# REGULATION 13 APPLICATION FOR MODIFICATION OF R13-1874E PLANT ID 039-00031 CHARLESTON FACILITY

Prepared for:

#### **Elementis Specialties, Inc.** 1003 MacCorkle Avenue, SW Charleston, West Virginia 25303

Prepared by:

## Potesta & Associates, Inc.

7012 MacCorkle Avenue, SE Charleston, West Virginia 25304 Phone: (304) 342-1400 Fax: (304) 343-9031 Email: potesta@potesta.com

Project No. 0101-12-0404-004

March 2017



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# **SECTION I**

# **GENERAL APPLICANT INFORMATION**

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION DIVISION OF AIR QUALITY 601 57 <sup>th</sup> Street, SE Charleston, WV 25304 (304) 926-0475 www.dep.wv.gov/dag PLEASE CHECK ALL THAT APPLY TO NSR (45CSR13) (IF KN CONSTRUCTION MODIFICATION RELOCATION CLASS I ADMINISTRATIVE UPDATE TEMPORARY CLASS II ADMINISTRATIVE UPDATE AFTER-THE-F	IOWN): PLEASE CHECK	APPLICATION FOR NSR PERMIT AND TITLE V PERMIT REVISION (OPTIONAL) PLEASE CHECK TYPE OF 45CSR30 (TITLE V) REVISION (IF AN ADMINISTRATIVE AMENDMENT IMINOR MODIFICATION SIGNIFICANT MODIFICATION IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS ATTACHMENT S TO THIS APPLICATION			
FOR TITLE V FACILITIES ONLY: Please refer to "Title V (Appendix A, "Title V Permit Revision Flowchart") and	Revision Guidance" in ord ability to operate with the	changes requested in this Permit Application.			
Sec	tion I. General				
<ol> <li>Name of applicant (as registered with the WV Secreta Elementis Specialties, Inc.</li> </ol>	2. Federal Employer ID No. <i>(FEIN):</i> 05-0495836				
3. Name of facility (if different from above):		4. The applicant is the:			
Charleston Facility					
5A. Applicant's mailing address: 1003 MacCorkle Avenue, SW Charleston, WV 25303	5A. Applicant's mailing address:5B. Facility's pres1003 MacCorkle Avenue, SW1003 MacCorkle				
<ul> <li>6. West Virginia Business Registration. Is the applicant a resident of the State of West Virginia? □ YES □ NO</li> <li>If YES, provide a copy of the Certificate of Incorporation/Organization/Limited Partnership (one page) including any name change amendments or other Business Registration Certificate as Attachment A.</li> <li>If NO, provide a copy of the Certificate of Authority/Authority of L.L.C./Registration (one page) including any name change amendments or other Business Certificate as Attachment A.</li> </ul>					
7. If applicant is a subsidiary corporation, please provide	the name of parent corpo	ooration: Elementis Global, LLC			
<ul> <li>8. Does the applicant own, lease, have an option to buy of the state of t</li></ul>	e.	ol of the <i>proposed site</i> ? ⊠ YES ☐ NO			
<ul> <li>9. Type of plant or facility (stationary source) to be constructed, modified, relocated, administratively updated or temporarily permitted (e.g., coal preparation plant, primary crusher, etc.): Modification to a rheological process to add the WWTP, update to throughput and hours of operation, update process/facility information, install Soda Ash system, and maintain dry blend Bentone<sup>™</sup> production.</li> <li>10. North American Industry Classification System (NAICS) code for the facility: 325188</li> </ul>					
11A. DAQ Plant ID No. (for existing facilities only): $0\ 3\ 9-0\ 0\ 0\ 3\ 1$	11B. List all current 45C associated with thi R13-1847E	CSR13 and 45CSR30 (Title V) permit numbers his process (for existing facilities only):			

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

12A.

c¦>	For Modifications, Administrative Updates or Temporary permits at an existing facility, please provide directions to the
	present location of the facility from the nearest state road;

For Construction or Relocation permits, please provide directions to the *proposed new site location* from the nearest state road. Include a MAP as Attachment B.

Plant entrance roadway intersects MacCorkle Avenue (State Route 61) at the C&O Railroad Bridge.

12.B. New site address (if applicable): NA	12C. Nearest city or town:	12D. County:
	Charleston	Kanawha
12.E. UTM Northing (KM): 4,245.970	12F. UTM Easting (KM): 442.201	12G. UTM Zone: 17
13. Briefly describe the proposed change(s) at the facilit Permitting WWTP unit at the facility, maintain the dry an increase in annual production, install Soda Ash syste	blend Bentone <sup>™</sup> process, increase the	hours of operation for the facility, ion.
<ul> <li>14A. Provide the date of anticipated installation or chan</li> <li>⇒ If this is an After-The-Fact permit application, provochange did happen: 04/01/2009 (WWTP) See Application</li> </ul>	14B. Date of anticipated Start-Up if a permit is granted: 5/01/2017	
14C. Provide a <b>Schedule</b> of the planned <b>Installation</b> of application as <b>Attachment C</b> (if more than one un	/ <b>Change</b> to and <b>Start-Up</b> of each of the it is involved).	units proposed in this permit
15. Provide maximum projected Operating Schedule of Hours Per Day 24Days Per Week 7	of activity/activities outlined in this applic Weeks Per Year 52	ation:
16. Is demolition or physical renovation at an existing fa	acility involved? XES DO	
17. Risk Management Plans. If this facility is subject to	o 112(r) of the 1990 CAAA, or will becom	ne subject due to proposed
changes (for applicability help see www.epa.gov/cep	po), submit your <b>Risk Management Pl</b> a	n (RMP) to U.S. EPA Region III.
18. Regulatory Discussion. List all Federal and State	air pollution control regulations that you	believe are applicable to the
proposed process (if known). A list of possible applic	able requirements is also included in At	tachment S of this application
(Title V Permit Revision Information). Discuss applica	ability and proposed demonstration(s) of	f compliance (if known). Provide this
information as Attachment D.		
Section II. Additional at	tachments and supporting o	locuments.
<ol> <li>Include a check payable to WVDEP – Division of Air 45CSR13).</li> </ol>		
20. Include a Table of Contents as the first page of yo		
21. Provide a <b>Plot Plan</b> , e.g. scaled map(s) and/or ske source(s) is or is to be located as <b>Attachment E</b> (F	Refer to <i>Plot Plan Guidance</i> ) .	
Indicate the location of the nearest occupied structure		
22. Provide a <b>Detailed Process Flow Diagram(s)</b> sho device as <b>Attachment F.</b>	wing each proposed or modified emission	ons unit, emission point and control
23. Provide a Process Description as Attachment G		
Also describe and quantify to the extent possible	e all changes made to the facility since t	he last permit review (If applicable).

All of the required forms and additional info	ormation can be found under the Pe	ermitting Section of DAQ's website, or requested by phone.				
24. Provide Material Safety Data Sheets (MSDS) for all materials processed, used or produced as Attachment H.						
➡ For chemical processes, provide a MS						
25. Fill out the Emission Units Table and						
26. Fill out the Emission Points Data Su	Immary Sheet (Table 1 and Tab	le 2) and provide it as Attachment J.				
27. Fill out the Fugitive Emissions Data	Summary Sheet and provide it	as Attachment K.				
28. Check all applicable Emissions Unit	Data Sheets listed below:					
Bulk Liquid Transfer Operations	Haul Road Emissions	Quarry				
⊠ Chemical Processes	Hot Mix Asphalt Plant	Solid Materials Sizing, Handling and Storage				
Concrete Batch Plant	Incinerator	Facilities				
Grey Iron and Steel Foundry	🛛 Indirect Heat Exchanger	⊠ Storage Tanks				
General Emission Unit, specify WWT	P, combustion devices					
Fill out and provide the Emissions Unit D	Data Sheet(s) as Attachment L.					
29. Check all applicable Air Pollution Co	ontrol Device Sheets listed belo	w:				
Absorption Systems	🛛 Baghouse	Flare				
Adsorption Systems	Condenser	Mechanical Collector				
⊠ Afterburner	Electrostatic Precipitat	tor Wet Collecting System				
Other Collectors, specify						
Fill out and provide the Air Pollution Cor	ntrol Device Sheet(s) as Attachi	ment M.				
30. Provide all <b>Supporting Emissions C</b> Items 28 through 31.	Calculations as Attachment N, o	or attach the calculations directly to the forms listed in				
31. <b>Monitoring, Recordkeeping, Reporting and Testing Plans.</b> Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as <b>Attachment O</b> .						
<ul> <li>Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.</li> </ul>						
32. Public Notice. At the time that the application is submitted, place a Class I Legal Advertisement in a newspaper of general						
		SR§13-8.3 through 45CSR§13-8.5 and <i>Example Legal</i>				
		on as Attachment P immediately upon receipt.				
33. Business Confidentiality Claims.	Does this application include cont	fidential information (per 45CSR31)?				
segment claimed confidential, includi Notice – Claims of Confidentiality'	ng the criteria under 45CSR§31- ' guidance found in the <b>General</b> i					
Se	ection III. Certification of	of Information				
34. Authority/Delegation of Authority. Check applicable Authority Form be	Only required when someone of elow:	ther than the responsible official signs the application.				
Authority of Corporation or Other Busi	ness Entity	Authority of Partnership				
Authority of Governmental Agency		Authority of Limited Partnership				
Submit completed and signed Authority	Form as Attachment R.					
		Permitting Section of DAQ's website, or requested by phone.				

35A. Certification of Information. To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

#### Certification of Truth, Accuracy, and Completeness

I, the undersigned Responsible Official / Authorized Representative, hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

#### **Compliance Certification**

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

	ATE: <u>3/8/2017</u> (Please use blue ink)	
35B. Printed name of signee: John Snodgrass		35C. Title: Plant Manager
35D. E-mail: John.Snodgrass@elementis.com	36E. Phone: (304) 342-8103	36F. FAX: (304) 342-7308
36A. Printed name of contact person (if differe	36B. Title: Manager, Process Engineering	
36C. E-mail: Paul.DiNicola@elementis- na.com36D. Phone: (304) 957-1500 Ext. 130515		36E. FAX: Use Email

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDE	D WITH THIS PERMIT APPLICATION:						
<ul> <li>Attachment A: Business Certificate</li> <li>Attachment B: Map(s)</li> <li>Attachment C: Installation and Start Up Schedule</li> <li>Attachment D: Regulatory Discussion</li> <li>Attachment E: Plot Plan</li> <li>Attachment F: Detailed Process Flow Diagram(s)</li> <li>Attachment G: Process Description</li> <li>Attachment H: Material Safety Data Sheets (MSDS)</li> <li>Attachment I: Emission Units Table</li> <li>Attachment J: Emission Points Data Summary Sheet</li> </ul>	<ul> <li>Attachment K: Fugitive Emissions Data Summary Sheet</li> <li>Attachment L: Emissions Unit Data Sheet(s)</li> <li>Attachment M: Air Pollution Control Device Sheet(s)</li> <li>Attachment N: Supporting Emissions Calculations</li> <li>Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans</li> <li>Attachment P: Public Notice</li> <li>Attachment Q: Business Confidential Claims</li> <li>Attachment R: Authority Forms</li> <li>Attachment S: Title V Permit Revision Information</li> <li>Application Fee</li> </ul>						
Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.							
FOR AGENCY USE ONLY - IF THIS IS A TITLE V SOURCE:							
Forward 1 copy of the application to the Title V Permitting	g Group and:						
For Title V Administrative Amendments:							
NSR permit writer should notify Title V permit writer of draft permit,							
For Title V Minor Modifications:							
	ication to EPA and affected states within 5 days of receipt,						
NSR permit writer should notify Title V permit writ							
For Title V Significant Modifications processed in parallel							
NSR permit writer should notify a Title V permit wi							
Public notice should reference both 45CSR13 and	Title V permits,						
EPA has 45 day review period of a draft permit.							
All of the required forms and additional information can be for	ound under the Permitting Section of DAQ's website, or requested by phone.						

# ATTACHMENT A

# **BUSINESS CERTIFICATE**

# WEST VIRGINIA STATE TAX DEPARTMENT BUSINESS REGISTRATION CERTIFICATE

ISSUED TO: ELEMENTIS SPECIALTIES, INC. 1003 MACCORKLE AVE SW CHARLESTON, WV 25303-1323

#### BUSINESS REGISTRATION ACCOUNT NUMBER:

1006-6971

This certificate is issued on: 02/1/2013

This certificate is issued by the West Virginia State Tax Commissioner in accordance with Chapter 11, Article 12, of the West Virginia Code

The person or organization identified on this certificate is registered to conduct business in the State of West Virginia at the location above.

This certificate is not transferrable and must be displayed at the location for which issued.

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

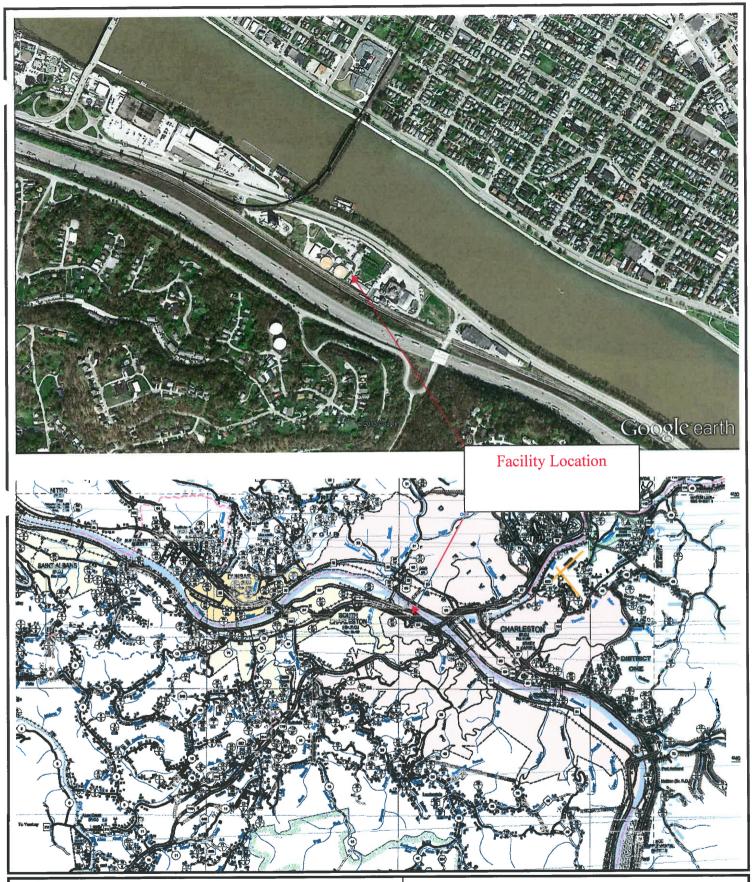
Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

atL006 v.4 L0909319040

# ATTACHMENT B

# **AREA MAP**





7012 MacCorkle Avenue, S.E Charleston, West Virginia 25304 Phone: (304) 342-1400 Fax: (304) 343-9031

**Elementis Specialties, Inc.** Charleston Facility Kanawha County, West Virginia

# ATTACHMENT C

# **INSTALLATION AND START UP SCHEDULE**

## ATTACHMENT C

## **INSTALLATION AND STARTUP SCHEDULE**

Elementis Specialties, Inc. installed the initial wastewater treatment system (sequencing batch reactors) in 2003. The wastewater treatment system was modified to the current configuration in April 2009. A Soda Ash System is proposed to be installed upon approval of the permit which is anticipated to be around April 15, 2017. The dry blend Bentone<sup>TM</sup> process was initially discontinued in July 2010. This revised application is returning the dry blend Bentone<sup>TM</sup> process back to production.

# ATTACHMENT D

# **REGULATORY DISCUSSION**

## ATTACHMENT D

## **REGULATORY DISCUSSION**

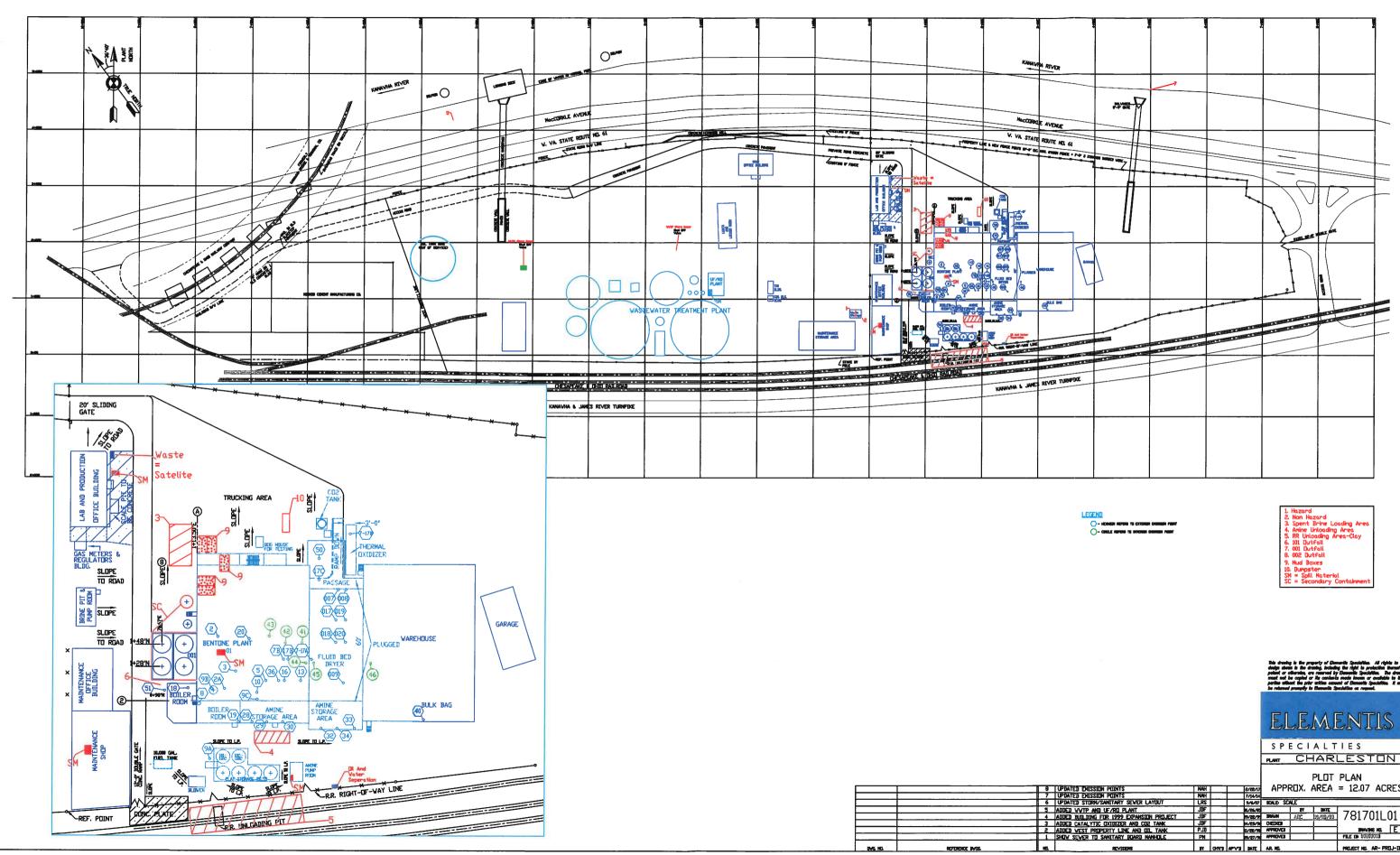
Elementis Specialties, Inc. (Elementis) is requesting that its existing R13-1847E permit be modified to include secondary emissions from the Wastewater Treatment Plant (WWTP) installed in 2003 and reconfigured in 2009, retain the dry blend Bentone<sup>™</sup> process, and addition of a Soda Ash System.

The following rules apply to this facility:

- 45CSR2 "To Prevent and Control Particulate Air Pollution for Combustion of Fuel in Indirect Heat Exchangers". The sources subject are Catalytic Oxidizer (7-17B), Flash Dryer (3), Kewanee Boiler (18), Gas Heater (19), West 1<sup>st</sup> Stage FBD (017), West 2<sup>nd</sup> Stage FBD (018), East 1<sup>st</sup> Stage FBD (019), and East 2<sup>nd</sup> Stage FBD (020).
- 2. 45CSR6 "To Prevent and Control Air Pollution for Combustion of Refuse". The Catalytic Oxidizer (7-17B) remains subject to 45CSR6.
- 3. 45CSR7 "To Prevent and Control Particulate Matter Air Pollution from Manufacturing Processes and Associated Operations". Particulate emitting process sources are subject to 45CSR7.
- 4. 45CSR10 "To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides" The sources subject are Catalytic Oxidizer (7-17B), Flash Dryer (3), Kewanee Boiler (18), Gas Heater (19), West 1<sup>st</sup> Stage FBD (017), West 2<sup>nd</sup> Stage FBD (018), East 1<sup>st</sup> Stage FBD (019), and East 2<sup>nd</sup> Stage FBD (020).
- 5. 45CSR13 "Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits, and Procedures for Evaluation". Regulation 13 Permit R13-1847E is proposed to be revised by this application.
- 6. 45CSR21 "To Prevent and Control Air Pollution from the Emissions of Volatile Organic Compounds". The before control maximum theoretical emissions from the facility are greater than 100 tons per year so the facility is subject to 45CSR21. The Catalytic Oxidizer (7-17B) was installed as Reasonably Available Control Measures (RACM) for the facility. Wastewater Treatment Facilities are specifically exempted from 45CSR21 requirements by 45CSR21-40.1.d.

# ATTACHMENT E

# PLOT PLAN



1. Hazard
2. Non Hazard
3. Spent Brine Loading Area
4. Anine Unloading Area
5. RR Unloading Area-Clay
6. 101 Dutfall
7. 001 Dutfall
8. 002 Dutfall
9. Hud Boxes
10. Dumpster
SM = Spill Material
SC = Secondary Containment

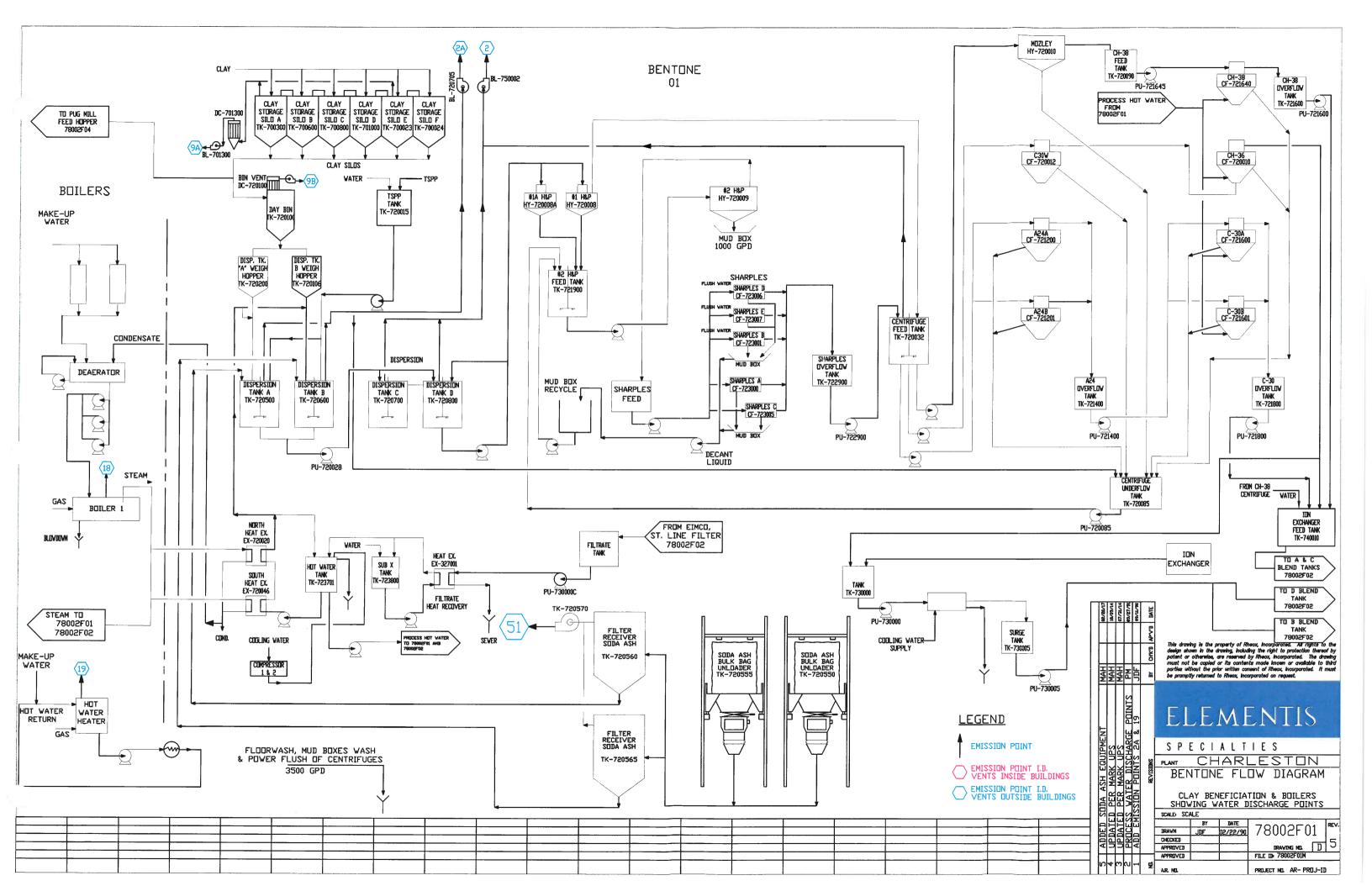
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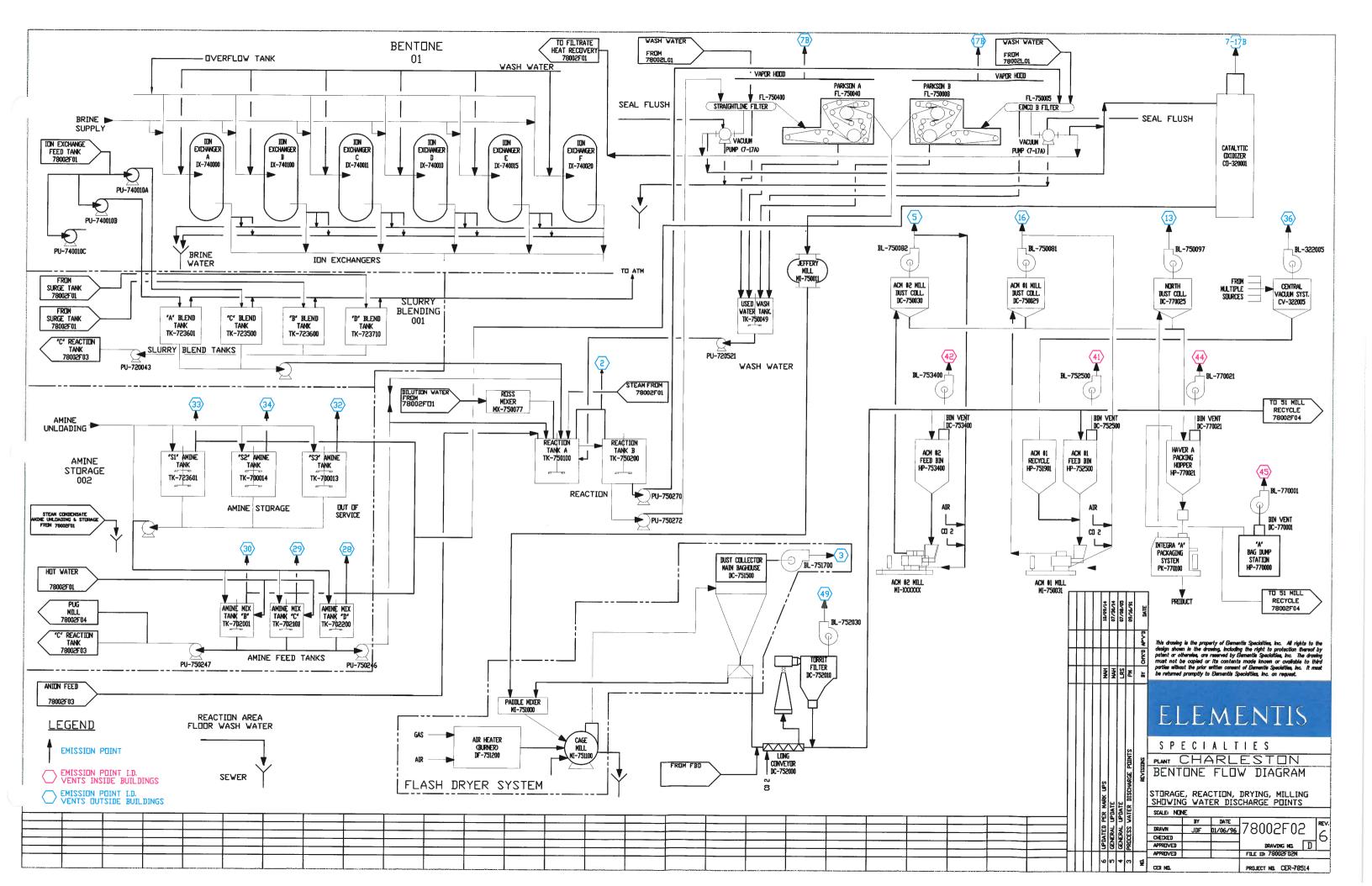
PLANT CHARLESTON

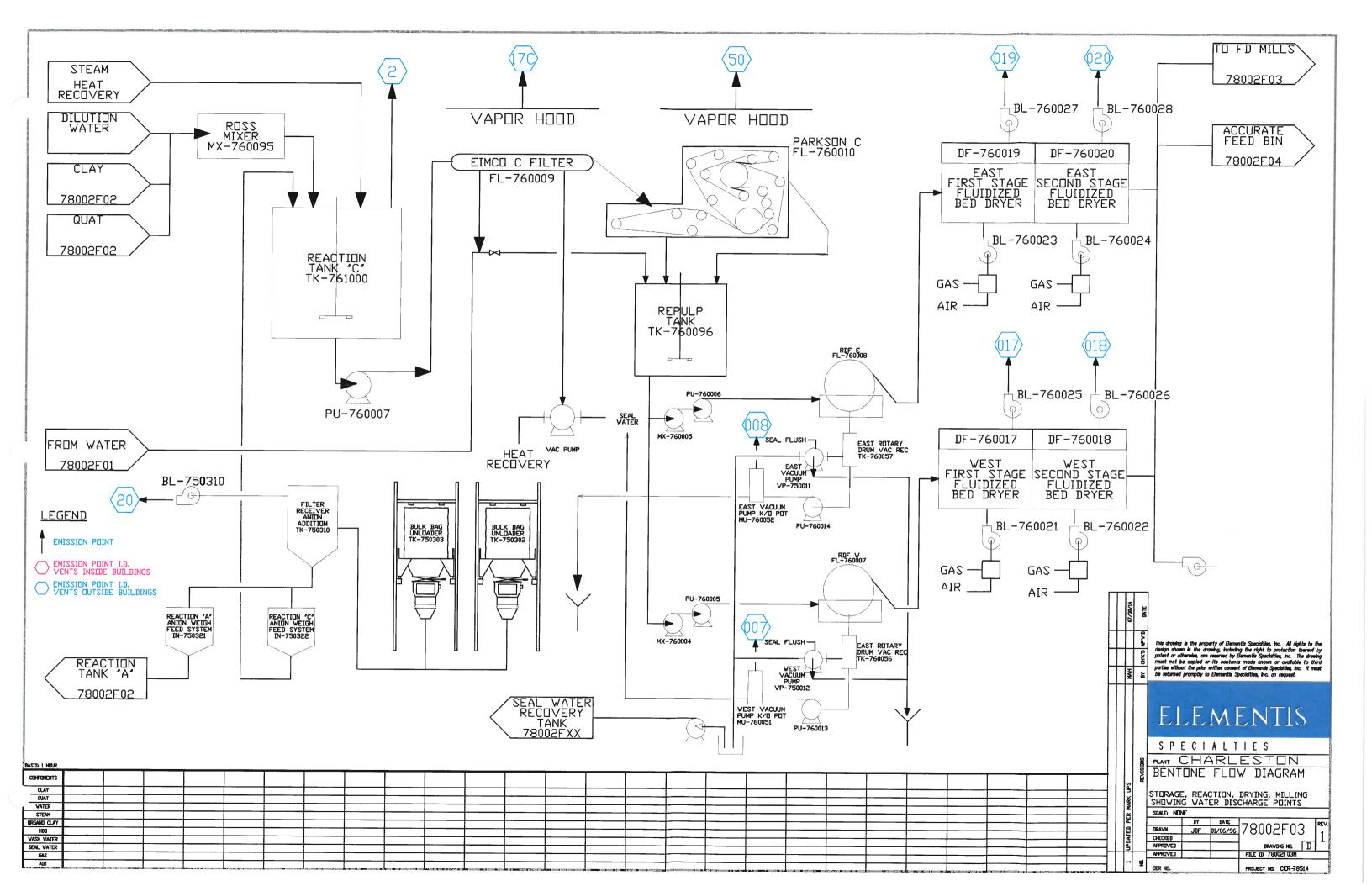
						PLOT	PLAN
UPDATED ENISSION POINTS	NAH		2/22/17	APPF	RDX.	AREA	= 12.07 ACRES
UPDATED ENISSION POINTS	NAH		7/14/14				
UPDATED STORM/SANITARY SEVER LAYOUT	LRS		3/6/07	SCALD SCA	N.E		
ADDED WYTP AND UF/RD PLANT	JOF		1/26/10		IV.	INTE	TOLTON ON NEV
ADDED DUILDING FOR 1999 EXPANSION PROJECT	JÜF		 1/22/7	BRANN	ABC	09/00/00	781701L01
ADDED CATALYTIC OXIDIZER AND CO2 TANK	JDF		4/23/3	CHECKED			
ADDED VEST PROPERTY LINE AND OIL TANK	PJD		1/32/14	APPROVED			BANVINE HG. E
SHOW SEWER TO SANITARY BOARD NANHOLE	PN		19/27/9	APPROVED		_	FILE ID: 00000000
REVISIONS	π	CHIKT	 MIE	AR NEL			PROJECT NOL AR- PROJ-10

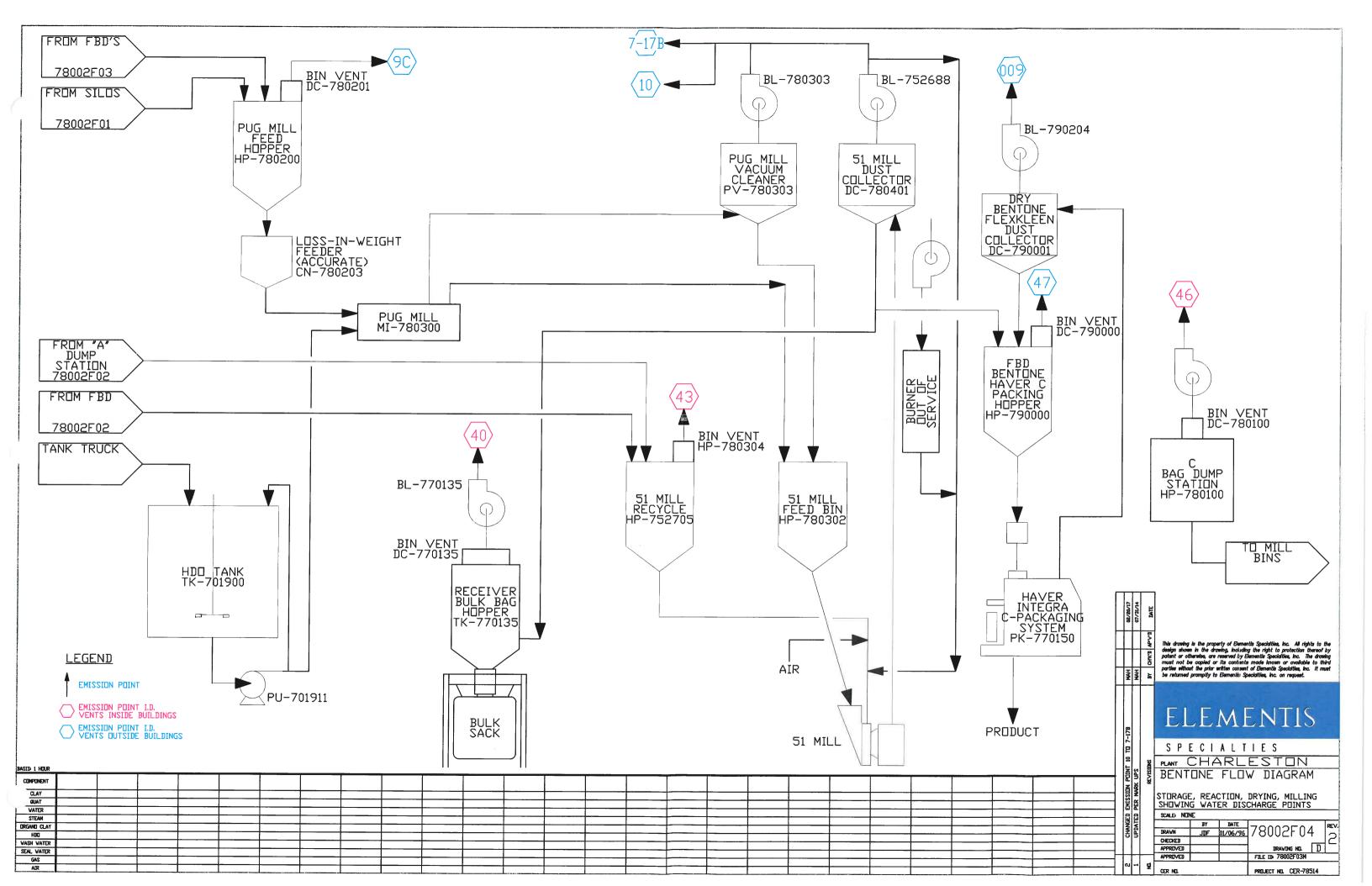
# ATTACHMENT F

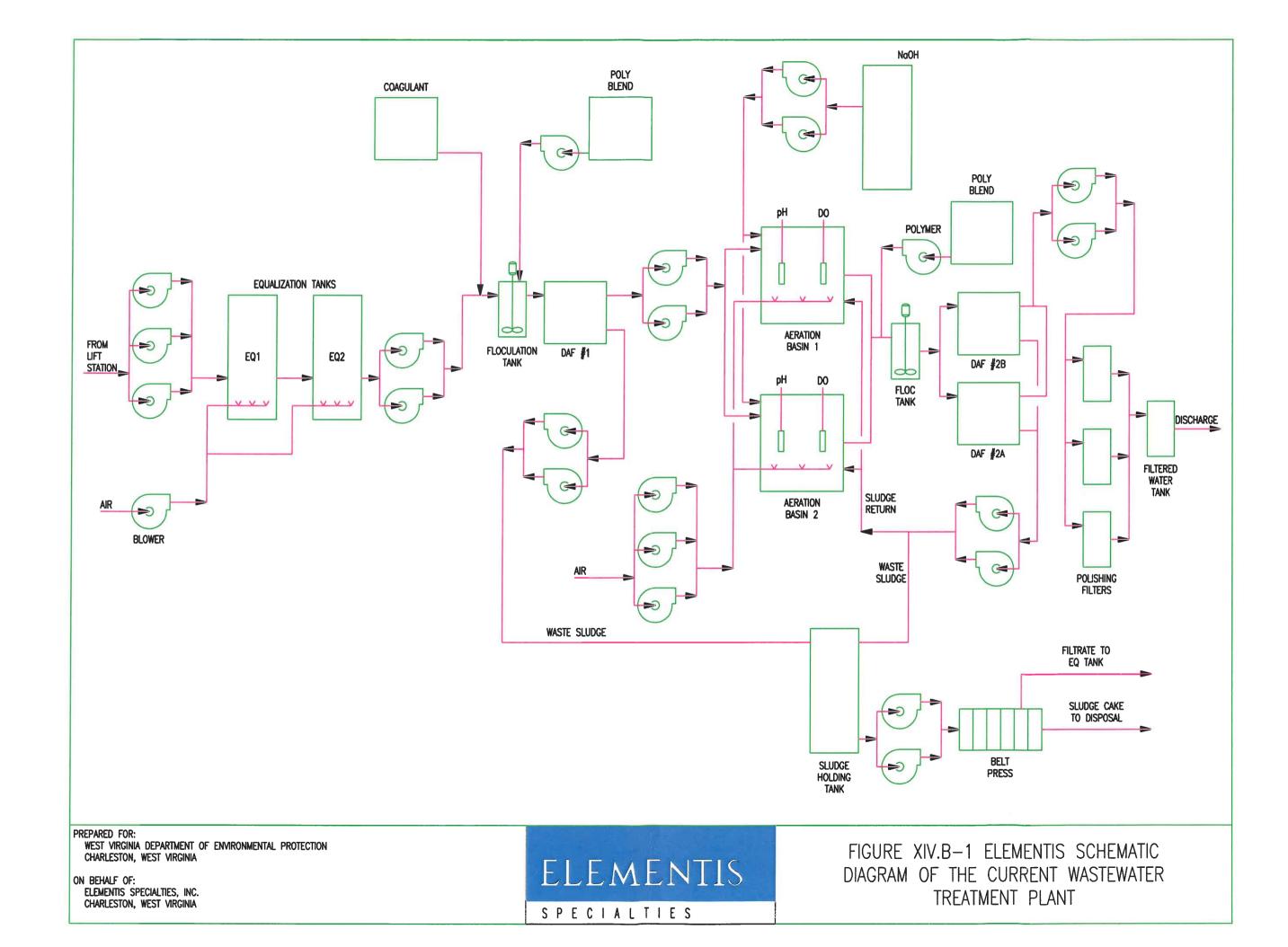
# DETAILED PROCESS FLOW DIAGRAM











# ATTACHMENT G

# **PROCESS DESCRIPTION**

## ATTACHMENT G PROCESS DESCRIPTION

Elementis Specialties, Inc. ("Elementis") operates wet and dry Bentone<sup>™</sup> processes under R13-1847E. In July 2010, the dry blend Bentone<sup>™</sup> process was discontinued and removed from service.

This requested modification updates process rates and equipment, adds a Soda Ash System, and includes emissions from the Wastewater Treatment Plant (WWTP). The facility manufactures rheological additives. The rheological additives consist of various dry powders, quaternary amines, and additives. The products are used in paints, coatings, printing inks, cosmetics, greases, drilling materials, etc. This requested update/modification would not change the products manufactured or the materials used in their manufacture. In addition, Elementis is requesting that the operating schedule be changed from 350 days a year to 365 days a year (8,760 hours per year).

The facility has three process lines called the A, C, and dry process (DP) sides of the plant. The A and C sides are wet production. In these processes, the bentonite clay is first placed in water to aid in removing the impurities from the bentonite clay and reaction with the quaternary amines and other additives. The material made in the wet process sides must be dried in either the Flash Dryer (A side) or the Fluid Bed Dryer (C side). The DP side is dry processing in which the bentonite clay is not dispensed with water. Materials made in the DP side are considered dry blend Bentone<sup>TM</sup> products. The plant can only operate two of these sides concurrently since they share process equipment.

Yearly production is limited to 9,000 tons of dried product for the A side, 6,000 tons of dry blend Bentone<sup>™</sup> from the DP side, and 9,000 tons of material from the C side. Total yearly production is limited to 18,000 tons of material from all three process lines.

## Production of Material (Wet Process) Bentone<sup>TM</sup> (A and C sides of plant)

The raw bentonite clay comes in powder form by rail car. It is then pneumatically conveyed to the silos (9A). The clay is pneumatically conveyed to the Day Bin (9B). It is then weighed and pneumatically conveyed to the dispersion tanks (2) where the clay is mixed with water to create a slurry mixture of 4.15% solids by an automatic batching system. The clay is then processed through the dispersion system which consists of an H&P Hydroclone (removal of heavier particles), centrifuges, ion exchanger (this step is used only if required by the raw material used and removes metallic ions and replaces them with sodium ions), and blending tanks. There are no VOCs introduced in the dispersion system.

A Kewanee boiler (18) is used to provide steam to the process. A smaller gas fired heater (19) is used to supply heat to the process building.

Two liquid streams, Quatenary Amine and clay slurry, are pumped from holding tanks to the Ross Mixers for reaction in either Reactor A or Reactor C tanks- a clay slurry from the blending

tanks and Quatenary Ammonium Chloride Salt (typically referred to as Quat or Quatenary Amine) stream from the Quat Tanks (28, 29, 30, 32, 33, or 34). The Quatenary Amine liquid stream contains ethanol as a solvent and is the sole source of VOCs in the process. Ethanol does not react in the system and is sent into either the wastewater system or to a catalytic oxidizer for destruction.

When Reactor A is fed, live steam is sparged into the reactor for temperature control. Reactor A overflows into Reactor B. Reactor B increases the retention time and is the feed tank for filtration.

When Reactor C is fed, live steam is sparged into Reactor C for temperature control. Reactor C feeds directly into filtration.

The reacted slurry is fed to Straight Line Filter (7B) or EMICO Filter (17B) for vacuum filtration. The dewatered cake is fed to the Parkson Belt Presses. A spray wash is used to clean the filter media. This wash water is sent to the Used Wash Water Tank. The Vacuum Pumps (7-17A) vent to the Catalytic Oxidizer (7-17B) for reduction of VOCs. Filtrate from the filters goes to the wastewater treatment system after passing through a heat exchanger to preheat city water entering the plant's hot water system for use in the process.

The Parkson Belt Presses dewater the product by pressing the cake from the belt vacuum filters. This is a continuous process. The filtrate is collected in the Used Wash Water Tank for further processing.

Material can be dried using the Flash Dryer (3) or Fluid Bed Dryer (FBD) (017, 018, 019, and 020). When using the Flash Dryer, the filter cake from the Parkson Belt Press is mechanically conveyed to the hammer mill, pug mill (9C) and cage mill. Heated air is introduced into the cage mill along with the product. The heated air and product is separated in a dust collector. Control of dryer moisture is through the dry divider which controls the amount of material recycled. The dry divider discharge conveyor has the availability to introduce CO2 to cool the product.

When using the FBDs, the Parkson cake is mechanically conveyed to the re-pulp tank. The cake is re-pulped using the water from the Used Wash Water Tank along with fresh water, if needed. This slurry is then fed to the Rotary Drum Filters (007 & 008) and then to the fluid bed dryers (West 1<sup>st</sup> Stage FBD – 017, West 2<sup>nd</sup> Stage FBD – 018, East 1<sup>st</sup> Stage FBD – 019, and East 2<sup>nd</sup> Stage FBD – 020). Heated air (natural gas) is introduced into the fluid beds along with the product. The dust collection is directly above the beds. The vibrating motion of the beds moves the product forward.

The product is normally milled after the drying process. The Flash Dryer is fed to the ACM #1 system [ACM Bin Vent #1 (41) and ACM #1 (16)], ACM#2 system [ACM Bin Vent #2 (42) and ACM #2 (5)] and 51 Mill (10). The fluid bed dryer is fed directly to the ACM #1, ACM #2 and to the pug mill feed bin (9C). The pug mill system feeds to the 51 Mill for grinding.

The pug mill blending system is used to blend dry powders with a liquid stream or another dry powder. The blending can be done with fluid bed dryer product or other dry products dumped and conveyed to the receiving hopper.

The product is packed into multi-wall bags on either the Haver A (13- packer 44S- hopper) or the Haver C Packer (009). The product from ACM#1 and #2 can be packed on the Haver A Packer. The product from the 51 Mill system can be packed on either the Haver A or the Haver C Packer.

#### Production of Material (Dry Process) Bentone<sup>TM</sup> (DP side of plant)

Bentonite clay and Quaternary Amine are fed directly to the Pug Mill Feed Hopper (9C) for mixing before transferring to the 51 Mill (10) for grinding. VOC emissions from this process come from the Pug Mill and 51 Mill grinding step and are sent to the Oxidizer (7-17B). This process does not send water to the wastewater treatment system since the bentonite clay is processed dry instead of being placed in a slurry with water.

#### Soda Ash System

The Soda Ash Delivery system will include 2 bulk bag unloading stations and a vacuum pneumatic transfer system with a single blower capable of delivering to one of two filter receivers at a time located in the wet area of the plant processing equipment.

The blower will be installed outside the building and is noted as emission point 51 on the process flow diagrams. The air transfer capacity is 262 cubic feet per minute and the material transfer rate is 50 pounds per minute. The transfer system will operate periodically for a few minutes to refill either of the receivers depending on plant production rates and delivery tank in service. The receivers hold a maximum of 400 pounds of soda ash. Maximum soda ash usage annually is estimated at 350 short tons.

The receiver's bag houses are equipped with pleated filter elements which remove 99.9% of material down to 2 micron from the air transfer system.

#### Wastewater Treatment

Wastewater from the wet bentone<sup>™</sup> process is treated in the on-site WWTP system under WV NPDES permit WV0051560. The system is an activated sludge system designed to biologically treat VOCs (primarily ethanol) and remove solids before discharge to the Kanawha River.

The WWTP system consists of two equalization tanks, two aeration basins, two diffused air floatation tanks, and sludge tank. Wastewater from the wet bentone<sup>TM</sup> process enters Equalization Tank 1 (EQ1). EQ1 is supplied with air (to prevent the solids from settling in the tank) and recycle from the sludge tank. The wastewater then transfers to Equalization Tank 2 (EQ2). EQ2 is supplied with air. The wastewater then flows to the Diffused Air Floatation Tank 1 (DAF1). From the DAF1, the wastewater then flows to Aeration Basin 1 (AB1) followed by Aeration Basin 2 (AB2). Air is diffused in each basin using the same blower systems as the equalization tanks. Wastewater from AB2 is transferred to the Diffused Air Floatation Tank 2

(DAF2). From the DAF2, wastewater is sent to polishing filters before final discharge to the Kanawha River. Sludge from DAF1 and DAF2 is collected in the sludge tank. A portion of this sludge is recycled to the aeration basins and the rest is processed through the belt press. The press solids are sent to the landfill and the drainage liquid is returned to the equalization tanks.

# ATTACHMENT H

# **MATERIAL SAFETY DATA SHEETS**

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

Approval Date: Supercedes:	April 16, 2008 February 20, 2002	
oupercedes.	1 CD1001 20, 2002	

#### 2. PRODUCT COMPOSITION

Product Classification: Rheological Additive		
HAZARDOUS SUBSTANCES	C.A.S. No.	Percent
Crystalline Silica - Quartz	14808-60-7	< 3.0%

#### 3. HAZARD IDENTIFICATION

<u>Warning:</u> May cause slight eye irritation. Long term overexposure to products containing Crystalline Silica may cause silicosis. IARC has classified Crystalline Silica as carcinogenic to humans.	Protective Measures: Avoid contact with the eyes. Use in well ventilated areas. Do not breathe dust.
--	---

#### 4. FIRST AID MEASURES

Eye Contact:	Rinse immediately with water for at least 15 minutes.
Skin Contact:	Wash with soap and water.
Ingestion:	Provide symptomatic treatment and seek medical attention.
Inhalation:	Remove person to fresh air. If breathing is difficult, provide oxygen and seek medical attention.
Other:	None known.

#### **5. FIRE FIGHTING MEASURES**

Flash Point: N.A.	Method: N.A.	<b>LEL:</b> 0.05 oz/ft <sup>3</sup>	UEL: N.A.
EXTINGUISHING MEDIA/FIRE FIGH	TING PROCEDURES		
Water fog, foam, dry chemical, or carb	on dioxide.		
UNUSUAL HAZARDS			
Precautions for flammable organic dus Assure all equipment is properly groun	•	•	

for potential energy release.

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

#### PRODUCT NAME: TRUVIS

Approval Date: April 16, 2008 Supercedes: February 20, 2002

#### 6. ACCIDENTAL RELEASE MEASURES

#### RELEASE RESPONSE

Minimize dusting. <u>Caution</u>: May cause a slippery condition when wet. Sweep/shovel up and transfer into a drum for re-use or disposal.

#### PERSONAL PROTECTIVE EQUIPMENT

Wear an air-purifying dust respirator and chemical resistant gloves. Wear eye protection to prevent dust from entering the eyes.

#### 7. HANDLING AND STORAGE

#### HANDLING

Avoid high dust concentrations while handling through the use of ventilation or other suitable controls. Precautions for flammable organic dusts should be provided. Assure all equipment is properly grounded to prevent static discharges, and vented to provide for potential energy release.

#### STORAGE

No special precautions required.

#### 8. EXPOSURE CONTROL INFORMATION

#### OCCUPATIONAL EXPOSURE LIMITS

Particulates not<br/>otherwiseACGIH - TLV<br/>8 hr. TWA - 10 mg/m³, total<br/>8 hr. TWA - 3 mg/m³, respirable

OSHA - PEL 8 hr. TWA - 10 mg/m<sup>3</sup>, total 8 hr. TWA - 5 mg/m<sup>3</sup>, respirable

Quartz: 0.1 mg/m<sup>3</sup>, respirable

0.1 mg/m<sup>3</sup>, respirable

#### ENGINEERING CONTROL MEASURES

Use local exhaust ventilation if airborne concentrations are above recommended exposure limits.

PERSONAL PROTECTION EQUIPMENT		
Respiratory:	Use an air-purifying dust respirator if airborne concentration levels are above exposure limits.	
Hand:	Use chemical resistant gloves.	
Eye:	Use safety glasses/goggles.	
Other:	None.	
OTHER CONTROL MEAS		
Use good hygiene practices	s. Wash hands and face before eating or drinking.	

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

PRODUCT NAME: TRUVIS	Approval Date:	April 16, 2008
	Supercedes:	February 20, 2002

#### 9. PROPERTIES

Appearance: Off White Powder	Odor: None	<b>pH:</b> N.A.
Boiling Range: N.A.	Melting Range: N.A.	Specific Gravity: Not measured.
Solubility: Insoluble.	Vapor Density: N.A.	Vapor Pressure: N.A.
% Volatile: N.A.	Freezing Point: N.A.	Density at 20° C: 1.6 g/cm <sup>3</sup>

#### **10. REACTIVITY INFORMATION**

Conditions to Avoid:	Temperatures > 130°C	
Materials to Avoid:	None known.	
Hazardous	Use of this product in applications at temperatures > 130°C	
Decomposition:	may release benzyl chloride.	
Stability:	Stable.	

#### 11. HEALTH/TOXICITY INFORMATION

#### HEALTH HAZARDS

Effects of Acute Exposure	
Inhalation: May cause slight irritat	
Skin Contact: Not expected to cause	e irritation.
Skin Absorption: Can not be absorbed t	through the skin.
Eye Contact: May produce slight (m	iechanical) irritation.
Ingestion: Not expected to produ	uce adverse effects.
Effects of Chronic Over Exposure Long term over exposure to products con Crystalline Silica as carcinogenic to huma Listed as a suspected carcinogen on:	ntaining Crystalline Silica may cause silicosis. IARC has classified ans. IARC: Yes NTP: Yes-Respirable. OSHA: No
	•
Medical Conditions Aggravated:	Respiratory disorders.

None determined.

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

Approval Date:	•
Supercedes:	February 20, 2002

#### ENVIRONMENTAL/DISPOSAL CONSIDERATIONS

# 12. ENVIRONMENTAL HAZARDS None known. 13. DISPOSAL CONSIDERATIONS Dispose of in a manner in accordance with local and federal regulations. Use a licensed waste handler.

#### **14. TRANSPORTATION**

Shipping Name: Not regulated.		Label: N.A.
Hazard Class: N.A.	Packing Group: N.A.	<b>UN#:</b> N.A.

#### **15. REGULATORY INFORMATION**

**CHEMICAL INVENTORIES** In compliance denotes that all components are on the inventory or exempt.

e Inventory			
INECS	Australian AICS	On AICS	
e ENCS	Philippines	On the Inventory	
e Inventory	China	On the Inventory	
	e ENCS	e ENCS Philippines	e ENCS Philippines On the Inventory

None known.

#### OTHER REGULATORY INFORMATION

WHMIS Controlled: Contains >0.1% Crystalline Silica. Class D2-A

#### **16. OTHER INFORMATION**

H.M.I.S. CODES

Health: 1\*

Flammability: 1

Reactivity: 0

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800

Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

#### PRODUCT NAME: DFE 430

Approval Date: April 16, 2008 Supercedes: July 23, 2002

#### 2. PRODUCT COMPOSITION

Product Classification: Rheological Additive		
HAZARDOUS SUBSTANCES	C.A.S. No.	Percent
Crystalline Silica - Quartz	14808-60-7	< 3.0%

#### **3. HAZARD IDENTIFICATION**

<u>Warning:</u> May cause slight eye irritation. Long term exposure to airborne concentrations above the recommended exposure	<u>Protective Measures:</u> Avoid contact with the eyes. Use in well ventilated areas.
guidelines may cause lung damage. May cause silicosis. Contains Crystalline Silica which is classified by IARC as carcinogenic to humans.	Do not breathe dust.

#### 4. FIRST AID MEASURES

Eye Contact:	Rinse immediately with water for at least 15 minutes.
Skin Contact:	Wash with soap and water.
Ingestion:	Provide symptomatic treatment and seek medical attention.
Inhalation:	Remove person to fresh air. If breathing is difficult, provide oxygen and seek medical attention.
Other:	None known.

#### **5. FIRE FIGHTING MEASURES**

Flash Point: N.A.	Method: N.A.	LEL: 0.07 oz/cu. ft.	UEL: N.A.
EXTINGUISHING MEDIA/FIRE FIGHTING PROCEDURES			
Water fog, foam, dry chemical, or carbon dioxide.			
UNUSUAL HAZARDS			
Normal precautions for organic dusts should be provided. Avoid high dust concentrations and ensure all equipment is properly grounded to prevent static discharges.			

#### 6. ACCIDENTAL RELEASE MEASURES

#### RELEASE RESPONSE

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

#### PRODUCT NAME: DFE 430

Approval Date: April 16, 2008 Supercedes: July 23, 2002

#### 6. ACCIDENTAL RELEASE MEASURES

Minimize dusting. <u>Caution</u>: May cause a slippery condition when wet. Sweep/shovel up and transfer into a drum for re-use or disposal.

#### PERSONAL PROTECTIVE EQUIPMENT

Wear an air-purifying dust respirator and chemical resistant gloves. Wear eye protection to prevent dust from entering the eyes.

#### 7. HANDLING AND STORAGE

#### HANDLING

Avoid high dust concentrations while handling through the use of ventilation or other suitable controls. Ensure all equipment is grounded to prevent static discharge.

#### STORAGE

None.

#### 8. EXPOSURE CONTROL INFORMATION

#### OCCUPATIONAL EXPOSURE LIMITS

Particulate not	ACGIH - TLV	OSHA - PEL	
otherwise	8 hr. TWA - 10 mg/m³, total	8 hr. TWA - 10 mg/m³, total	
classified:	8 hr. TWA - 3 mg/m³, respirable	8 hr. TWA - 5 mg/m³, respirable	
Quartz:	8 hr. TWA - 0.05 mg/m³, respirable	8 hr. TWA - 0.1 mg/m³, respirable	

#### ENGINEERING CONTROL MEASURES

Use local exhaust ventilation if airborne concentrations are above recommended exposure limits.

PERSONAL PROTECTION EQUIPMENT		
Respiratory:	Use an air-purifying dust respirator if airborne concentration levels are above exposure limits.	
Hand:	Use chemical resistant gloves.	
Eye:	Use safety glasses/goggles.	
Other:	None.	
OTHER CONTROL MEASURES		

# SAFETY DATA SHEET ELEMENTIS

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 **Emergency Telephone No.** CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

#### **PRODUCT NAME: DFE 430**

Approval Date: April 16, 2008 Supercedes: July 23, 2002

#### 8. EXPOSURE CONTROL INFORMATION

Use good hygiene practices. Wash hands and face before eating or drinking.

#### 9. PROPERTIES

Appearance: Off White Powder	Odor: None	<b>pH:</b> N.A.
Boiling Range: N.A.	Melting Range: Not determined.	Specific Gravity: 1.69 g/cm <sup>3</sup>
Solubility: Insoluble.	Vapor Density: Not determined.	Vapor Pressure: N.A.
% Volatile: N.A.	Freezing Point: N.A.	Density at 20° C: Not measured.

#### **10. REACTIVITY INFORMATION**

Conditions to Avoid:	None known.
Materials to Avoid:	None known.
Hazardous Decomposition:	Ammonia and Carbon Dioxide.
Stability:	Stable.

#### **11. HEALTH/TOXICITY INFORMATION**

#### **HEALTH HAZARDS**

#### Effects of Acute Exposure

Inhalation: May cause slight irritation. Skin Contact: Not expected to cause irritation. Skin Absorption: Can not be absorbed through the skin. Eye Contact: May produce slight (mechanical) irritation. Ingestion: Not expected to produce adverse effects.

#### Effects of Chronic Over Exposure

Long term exposure to dust concentrations above recommended exposure guidelines may overload the lung clearance mechanism and cause adverse lung effects and shortness of breath. Long term over exposure to products containing Crystalline Silica may cause silicosis. IARC has classified Crystalline Silica as carcinogenic to humans.

Listed as a suspected carcinogen on:

IARC: Yes NTP: Yes-Respirable. OSHA: No

Medical Conditions Aggravated:

Respiratory disorders.

#### TOXICITY INFORMATION

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

# PRODUCT NAME: DFE 430

Approval Date: April 16, 2008

Supercedes: July 23, 2002

# **11. HEALTH/TOXICITY INFORMATION**

None determined.

# ENVIRONMENTAL/DISPOSAL CONSIDERATIONS

#### **12. ENVIRONMENTAL HAZARDS**

None known.

#### 13. DISPOSAL CONSIDERATIONS

Dispose of in a manner in accordance with local and federal regulations. Use a licensed waste handler.

#### **14. TRANSPORTATION**

Shipping Name: Not regulated.		Label: N.A.
Hazard Class: N.A.	Packing Group: N.A.	<b>UN#:</b> N.A.

#### **15. REGULATORY INFORMATION**

CHEMICAL INVENTORI	ES In compliance denotes that	all components are	on the inventory or exempt.
U.S. TSCA Inventory: European Inventory:	On the Inventory On the EINECS	Canadian DSL:	On the DSL
SARA 313 Information			
None known.			
OTHER REGULATORY INFORMATION			

WHMIS CLASS: D2A Contains >0.1% Crystalline Silica. CA: Proposition 65 - Contains quartz (crystalline silica) a substance known to the State of California to cause cancer.

# **16. OTHER INFORMATION**

H.M.I.S. CODES

Health: 1\*

Flammability: 1

Reactivity: 0



# **MATERIAL SAFETY DATA SHEET**

Revision date: 04-Sep-2007

Supercedes: 19-Mar-2007

MSDS Number: 10826

# 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product name:	OILGEL® 3000	
Product Description:	Self activated grease additive	
Company/Undertaking Identification	Elementis Specialties, Inc. 329 Wyckoffs Mill Road Hightstown, NJ 08520 (609) 443-2000	Elementis Specialties, Inc. p/a Elementis Service Centre NV Pegasus Park De Kleetlaan 12A - P.O. Box 3 B-1831 Diegem, Belgium +32 (0)2 790 76 00
Emergency telephone number:	Emergency telephone number: CHEMTREC Emergency Response Number: 1-800-424-9300 (1	e Number: 1-800-424-9300 (1-703-527-3887)
	SGS Emergency Response Number: + 32 (0)3 575 55 55	
	Product Stewardship@elementis.c	com

# 2. HAZARDS IDENTIFICATION

#### **EMERGENCY OVERVIEW**

Appearance: Color: Odor: Powder Off-white Odorless

#### WARNING

May cause slight eye irritation. May cause irritation of respiratory tract. CONTAINS CRYSTALLINE SILICA (QUARTZ) WHICH MAY CAUSE CANCER. Repeated and/or prolonged exposures may cause lung damage (Silicosis). Risk of cancer depends on level and duration of exposure.

#### Potential health effects:

Eye contact:	May cause slight eye irritation. Signs and symptoms include burning, tearing, redness and swelling.
Skin contact:	Non-irritating to the skin.
Inhalation:	May cause irritation of respiratory tract. Long term exposure to airborne concentrations may cause lung damage.

Ingestion:	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Principle routes of exposure:	Inhalation, Skin, Ingestion
Target organ(s):	Lungs
See Sections 11 & 12 for additional toxicological and ecological information	

Environmental hazard: See Section 12, below

# **3. COMPOSITION/INFORMATION ON INGREDIENTS**

#### Hazardous Components

Components	CAS-No	Weight %
Crystalline silica (Quartz)	14808-60-7	< 3.0%

This product is considered hazardous as defined under OSHA's Hazard Communication Standard (29 CFR 1910.1200).

# 4. FIRST AID MEASURES

Inhalation:	Move to fresh air in case of accidental inhalation of dust or fumes from overheating or combustion. If breathing is difficult, give oxygen.
Skin contact:	Wash off immediately with soap and plenty of water. If a person feels unwell or symptoms of skin irritation appear, consult a physician.
Eye contact:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists, consult a specialist.
Ingestion:	If swallowed, seek medical advice immediately and show this container or label. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

Flash Point:	Not applicable
Autoignition temperature:	Not selfigniting
Unusual Fire and Explosion Hazards:	Emits toxic fumes under fire conditions
Reactivity Hazard:	None known
Suitable extinguishing media:	Water fog; foam; carbon dioxide; dry chemical
Hazardous combustion products	Combustion will produce carbon monoxide, carbon dioxide, and nitrogen oxides.
Special Fire Fighting Procedure:	Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing

# 6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Use personal protective equipment.
Environmental precautions:	Prevent further leakage or spillage if safe to do so. Do not flush into surface water or sanitary sewer system.
Clean-up Methods:	Sweep up and shovel into suitable containers for disposal. Clean spill area thoroughly. Local authorities should be advised if significant spillages cannot be contained.
7. HANDLING AND STORAGE	

# Handling:Remove all sources of ignition. Avoid contact with skin, eyes and clothing. Avoid<br/>breathing mists, dusts, or vapors. Wash hands thoroughly after handling.

Storage:	Keep containers tightly closed in a cool, well-ventilated place. Keep product and
-	empty container away from heat and sources of ignition.

# 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures:	Maintain adequate ventilation to keep hazardous ingredients below their PELs or
	TLVs. Use NIOSH/MSHA approved respirator whenever exposure limits exceeded.

#### Personal Protective Equipment

Eye protection:	Wear chemical goggles and/or full face shield as need.
Skin and body protection:	Wear protective clothing and impervious gloves (natural rubber, neoprene) to avoid skin contact.
Respiratory protection:	In the case of respirable dust and/or fumes, use self-contained breathing apparatus.
Hand protection:	Protective gloves

#### Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

#### Exposure controls

Components	OSHA STEL	OSHA PEL	OSHA TWA	ACGIH STEL	ACGIH TWA
Crystalline silica (Quartz)		0.1 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>		0.025 mg/m <sup>3</sup>
		(respirable fraction)	(respirable		(respirable
			fraction)		fraction)

TLV/PEL: OSHA TWA Nuisance Dust 15 mg/m<sup>3</sup> (total dust) 5 mg/m<sup>3</sup> (respirable fraction)

#### **ACGIH TWA**

10 mg/m<sup>3</sup> (total dust) 3 mg/m<sup>3</sup> (respirable fraction)

# 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Powder
Color:	Off-white
Odor:	Odorless
Physical state:	Solid
Solubility in Water:	Insoluble
Specific gravity:	1.7
Flash Point:	Not applicable

# **10. STABILITY AND REACTIVITY**

Stability:	Stable at normal conditions
Conditions to avoid:	Heat, flames and sparks
Materials to avoid:	Oxidizing agents
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide, Ammonia
Possibility of Hazardous Reactions:	Will not occur

# **11. TOXICOLOGICAL INFORMATION**

#### Acute toxicity

Components	LC50/Inhalation/4h/Rat	LD50/Dermal/Rat	LD50/Oral/Rat		
Crystalline silica (Quartz)	No data available	No data available	500 mg/kg		
Product Information:	The data listed, below, is	The data listed, below, is based on this or a similar product:			
LD50/Oral/Rat:	> 5000 mg/kg (rat)				
Local effects					
Skin irritation:	Non-irritating to the skin.				
Eye irritation:	Contact with eyes may ca	ause irritation.			
Inhalation:	May cause irritation of re	spiratory tract.			
Ingestion:	Ingestion may cause gas	trointestinal irritation, nausea,	vomiting and diarrhea.		
Chronic toxicity:	See table and/or data, be	elow			
Components	NTP	IARC	OSHA		

Components	NTP	IARC	OSHA
Crystalline silica (Quartz)	Group 2A	Group 1- Carcinogenic to	Present
		Humans	

#### **Specific effects**

Carcinogenic effects:	Crystalline silica has been reviewed by IARC. IARC working group found sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica in the form of quartz or cristobalite from occupational sources. There is sufficient evidence in experimental animals for the carcinogenicity of quartz and cristobalite. Therefore, IARC working group has classified Crystalline Silica as carcinogenic to humans (Group 1).

Target organ(s):

# **12. ECOLOGICAL INFORMATION**

# Aquatic toxicity:

Product Information:	No data available
Persistence and degradability:	No data available
Environmental Fate:	
Mobility (soil/air/water):	No data available
28-Day biodegradation:	No data available
Bioaccumulative potential:	No data available
Physical / Chemical:	No data available

Lungs

# **13. DISPOSAL CONSIDERATIONS**

Waste from residues / unused products:	Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of in accordance with Local and National regulations.
RCRA Hazardous Waste	
RCRA:	Not listed

# **14. TRANSPORT INFORMATION**

#### U.S. Department of Transportation Ground (49 CFR): Proper shipping name: Not regulated

#### International Air Transportation (ICAO/IATA):

Proper shipping name: Not regulated

#### International Maritime Organization (IMO/IMDG): Proper shipping name: Not regulated

Surface Shipments in Europe (ADR/RID):

Proper shipping name: Not regulated

# **15. REGULATORY INFORMATION**

#### Heavy metals:

Heavy metals content (ppm): Not applicable

#### International Inventories

TSCA/ (USA)	Listed	EINECS/ (EU)	Listed
DSL/	Listed	NDŚL/	Not applicable
(CANADA) ENCS/	Listed	(CANADA) IECSC/	Listed
(JAPAN) PICCS/	Listed	(CHINA) KECL	Listed
(PHILLIPINES)		(KOREA)	
AICS/ (AUSTRALIA)	Listed	HSNO/ New Zealand:	Listed

U.S. Regulations

#### TSCA Section 12(b) Export Notification

SARA Title III:

#### Section 302 EHS: None Section 311/312: Chronic Health Hazard Section 313: Not listed California Proposition 65: Components Carcinogen Reproductive No significant toxicity risk level This Product contains the following Chemical(s) known to Crystalline silica Listed the state of California to cause cancer and/or developmental (Quartz) effects. Canada WHMIS hazard class: D2A Possible, probable or known human carcinogen according to classifications by IARC or ACGIH. This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

# **16. OTHER INFORMATION**

HMIS:	
Health:	1 *
Flammability:	0
Reactivity:	0

#### Previous Revision Date:

#### Key/Legend:

N/A: Not applicable N/D: Not determined ppm: Parts per million X: Listed

#### Prepared by:

Product Stewardship

19-Mar-2007

The data set forth in these sheets are based on information provided by the suppliers of the raw materials and chemicals used in the manufacture of the aforementioned product. ELEMENTIS SPECIALTIES makes no warranty with respect to the accuracy of the information provided by their suppliers, and declaims all liability of reliance thereon. ELEMENTIS SPECIALTIES warrants only that its products conforms with their published specifications, and no other express warranty is made with regards thereof. We do not guarantee favorable results, and we assume no liability in connection with the use of the products. They are intended for use by persons having technical skill and knowledge, at their own discretion and risk.

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800

Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

# PRODUCT NAME: PSA-1

Approval Date: May 11, 2006 Previous date: September 20, 1996

# 2. PRODUCT COMPOSITION

Product Classification: Organophilic Clay		
HAZARDOUS SUBSTANCES	C.A.S. No.	Percent
Crystalline Silica		< 3.0%
Quartz	14808-60-7	

# 3. HAZARD IDENTIFICATION

#### Warning:

- May cause slight eye irritation.
- Long term exposure to airborne concentrations above
- the recommended exposure guidelines may cause lung damage.
- Contains Crystalline Silica which is classified by IARC
- as 2A-Probably carcinogenic to humans.

#### Protective Measures:

- Avoid contact with the eyes.
- Use in well ventilated areas.
- Do not breathe dust.

# 4. FIRST AID MEASURES

Eye Contact:	Rinse immediately with water for at least 15 minutes.
Skin Contact:	Wash with soap and water.
Ingestion:	Provide symptomatic treatment and seek medical attention.
Inhalation:	Remove person to fresh air. If breathing is difficult, provide oxygen and seek medical attention.
Other:	None known.

# 5. FIRE FIGHTING MEASURES

Flash Point : N.A.	Method: N.A.	<b>LEL:</b> 0.07 oz/cu. ft.; 73.6 g/m <sup>3</sup>	UEL: N.A.
EXTINGUISHING MEDIA/FIRE FIGHTING PROCEDURES			
Water fog, foam, dry chemical, or carbon dioxide.			
UNUSUAL HAZARDS			
Normal precautions for organic dusts should be provided. Avoid high dust concentrations and ensure all equipment is properly grounded to prevent static discharges.			

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

# PRODUCT NAME: PSA-1

Approval Date: May 11, 2006 Previous date: September 20, 1996

# 6. ACCIDENTAL RELEASE MEASURES

#### RELEASE RESPONSE

Minimize dusting. <u>Caution</u>: May cause a slippery condition when wet. Sweep/shovel up and transfer into a drum for re-use or disposal.

#### PERSONAL PROTECTIVE EQUIPMENT

Wear an air-purifying dust respirator and chemical resistant gloves. Wear eye protection to prevent dust from entering the eyes.

# 7. HANDLING AND STORAGE

#### HANDLING

Avoid high dust concentrations while handling through the use of ventilation or other suitable controls. Ensure all equipment is grounded to prevent static discharge.

#### STORAGE

None.

# 8. EXPOSURE CONTROL INFORMATION

#### OCCUPATIONAL EXPOSURE LIMITS

Quartz: Nuisance Dust: ACGIH - TLV 0.1 mg/m<sup>3</sup> 8 hr. TWA - 10 mg/m<sup>3</sup>, total OSHA - PEL 0.1 mg/m<sup>3</sup> 8 hr. TWA - 10 mg/m<sup>3</sup>, total 8 hr. TWA - 5 mg/m<sup>3</sup>, respirable

#### ENGINEERING CONTROL MEASURES

Use local exhaust ventilation if airborne concentrations are above recommended exposure limits.

#### PERSONAL PROTECTION EQUIPMENT

Respiratory:	Use an air-purifying dust respirator if airborne concentration levels are above exposure limits.	
Hand:	Use chemical resistant gloves.	
Eye:	Use safety glasses/goggles.	
Other:	None.	
OTHER CONTROL MEASURES		
Lies read by views practices. Which hands and fees before active and winking		

Use good hygiene practices. Wash hands and face before eating or drinking.

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

Previous date: September 20, 1996
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#### 9. PROPERTIES

Appearance: Light Cream Powder	Odor: None	pH: N.A.
Boiling Range: N.A.	Melting Range: N.A.	Specific Gravity: 1.7
Solubility: Insoluble in water.	Vapor Density: N.A.	Vapor Pressure: N.A.
% Volatile: N.A.	Freezing Point: N.A.	Density at 20° C: 1.7 g/cm <sup>3</sup>

# **10. REACTIVITY INFORMATION**

Conditions to Avoid:	None known.
Materials to Avoid:	None known.
Hazardous Decomposition:	Ammonia and Carbon Monoxide.
Stability:	Stable.

# **11. HEALTH/TOXICITY INFORMATION**

HEALTH HAZARDS		
Effects of Acute ExposureInhalation:May cause slight irritaSkin Contact:Not expected to causeSkin Absorption:Cannot be absorbed thEye Contact:May produce slight medIngestion:Not expected to produce	e irritation. hrough the skin. echanical irritation.	
Effects of Chronic Over Exposure As with any nuisance dust, long term exposure to concentrations above recommended exposure guidelines may overload the lung clearance mechanism and cause adverse lung effects and shortness of breath. Long term over exposure to products containing Crystalline Silica may cause silicosis. IARC has classified Crystalline Silica ] as 2A-Probably carcinogenic to humans.		
Listed as a suspected carcinogen on:	IARC: Yes NTP: Yes-Respirable. OSHA: No	
Medical Conditions Aggravated:	Respiratory disorders.	
TOXICITY INFORMATION		

SPECIALTIES

Elementis Specialties Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

PRODUCT NAME:	Approval Date: May 11, 2006 Previous date: September 20, 1996

# 11. HEALTH/TOXICITY INFORMATION

Based on this or similar product:

Oral LD<sub>50</sub> (Rat): > 8,000 mg/kg; Primary Skin Irritation (Rabbit): Non-Irritating; Primary Eye Irritation (Rabbit): Mild Mechanical Irritation; Allergenicity (Guinea Pig): Non-Allergenic; Acute Inhalation Toxicity: No Toxic Manifestations.

# ENVIRONMENTAL/DISPOSAL CONSIDERATIONS

#### 12. ENVIRONMENTAL HAZARDS

None.

#### **13. DISPOSAL CONSIDERATIONS**

Dispose of in accordance with local and federal regulations. Use a licensed waste handler.

#### **14. TRANSPORTATION**

Shipping Name: Not regulated.		Label: N.A.
Hazard Class: N.A.	Packing Group: N.A.	<b>UN#:</b> N.A.

# **15. REGULATORY INFORMATION**

J.S. TSCA Inventory:On the InventoryCanadian Inventory:On the DSLEuropean Inventory:On the EINECSAustralian Inventory:On the InventoryJapanese Inventory:On the MITIKoran Inventory:On the Inventory
Japanese Inventory: On the MITI Koran Inventory: On the Inventory
Japanese inventory. On the winn Koran inventory. Of the inventory

WHMIS: Contains >0.1% Crystalline Silica.

# **16. OTHER INFORMATION**

H.M.I.S. CODES

Health: 2\*

Flammability: 1

Reactivity: 0



# Revision date: 27-Aug-2007

Supercedes: New MSDS

MSDS Number: 12287

**MATERIAL SAFETY DATA SHEET** 

# 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product name:	Bentone® NP-10		
Product Description:	Rheological additive		
Company/Undertaking Identification	Elementis Specialties, Inc. 329 Wyckoffs Mill Road Hightstown, NJ 08520 (609) 443-2000	Elementis Specialties, Inc. p/a Elementis Service Centre NV Pegasus Park De Kleetlaan 12A - P.O. Box 3 B-1831 Diegem, Belgium +32 (0)2 790 76 00	
Emergency telephone number:	CHEMTREC Emergency Response Number: 1-800-424-9300 (1-703-527-3887)		
	SGS Emergency Response Numb	er: + 32 (0)3 575 55 55	
	Product Stewardship@elementis.com		

# 2. HAZARDS IDENTIFICATION

#### **EMERGENCY OVERVIEW**

Appearance: Color: Odor: Powder Off-white Odorless

#### WARNING

To our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

May cause slight eye irritation. May cause irritation of respiratory tract. Repeated and/or prolonged exposures may cause lung damage (Silicosis). Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. CONTAINS CRYSTALLINE SILICA (QUARTZ) WHICH MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

#### Potential health effects:

**Eye contact:** May cause slight eye irritation. Signs and symptoms include burning, tearing, redness and swelling.

Skin contact:	Non-irritating to the skin.
Inhalation:	May cause irritation of respiratory tract. Long term exposure to airborne concentrations may cause lung damage.
Ingestion:	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Principle routes of exposure:	Inhalation, Skin, Ingestion
Target organ(s):	Lungs
See Sections 11 & 12 for additional toxicological and ecological information	
Environmental hazard:	See Section 12, below

# **3. COMPOSITION/INFORMATION ON INGREDIENTS**

#### Hazardous Components

Components	CAS-No	Weight %
Crystalline silica (Quartz)	14808-60-7	< 3%

This product is considered hazardous as defined under OSHA's Hazard Communication Standard (29 CFR 1910.1200).

# 4. FIRST AID MEASURES

Inhalation:	Move to fresh air in case of accidental inhalation of dust or fumes from overheating or combustion. If breathing is difficult, give oxygen.
Skin contact:	Wash off immediately with soap and plenty of water. If a person feels unwell or symptoms of skin irritation appear, consult a physician.
Eye contact:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists, consult a specialist.
Ingestion:	If swallowed, seek medical advice immediately and show this container or label. Do not induce vomiting without medical advice. Do not give anything by mouth to an unconscious person.

# **5. FIRE-FIGHTING MEASURES**

Flash Point:	Not applicable
Autoignition temperature:	Not selfigniting
Explosive properties:	LEL: 0.07 oz/cu.ft.
Unusual Fire and Explosion Hazards:	Emits toxic fumes under fire conditions. Excess dust dispersed in air represents an explosion hazard in the presence of electrical sparks and static discharges .
Reactivity Hazard:	None known

Suitable extinguishing media: Water fog; foam; carbon dioxide; dry chemical

Hazardous combustion products: Combustion will produce carbon monoxide, carbon dioxide, and nitrogen oxides.

Special Fire Fighting Procedure: Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing

# 6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Use personal protective equipment.	
Environmental precautions:	Prevent further leakage or spillage if safe to do so. Do not flush into surface water or sanitary sewer system.	
Clean-up Methods:	Sweep up and shovel into suitable containers for disposal. Clean spill area thoroughly. Local authorities should be advised if significant spillages cannot be contained.	

#### 7. HANDLING AND STORAGE

Handling:	Remove all sources of ignition. Avoid contact with skin, eyes and clothing. Avoid breathing mists, dusts, or vapors. Wash hands thoroughly after handling.
Storage:	Keep containers tightly closed in a cool, well-ventilated place. Keep product and empty container away from heat and sources of ignition.

# 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures:	Maintain adequate ventilation to keep hazardous ingredients below their PELs or TLVs. Use NIOSH/MSHA approved respirator whenever exposure limits exceeded.

#### Personal Protective Equipment

Eye protection:	Wear chemical goggles and/or full face shield as need.
Skin and body protection:	Wear protective clothing and impervious gloves (natural rubber, neoprene) to avoid skin contact.
Respiratory protection:	If dust is released, use respirators tested and approved under appropriate goverment standards.
Hand protection:	Use chemical resistant gloves
Hygiene measures:	Handle in accordance with good industrial hygiene and safety practice.
Exposure controls	

Components	OSHA STEL	OSHA PEL	OSHA TWA	ACGIH STEL	ACGIH TWA
Crystalline silica (Quartz)		0.1 mg/m <sup>3</sup> (respirable fraction)	0.1 mg/m <sup>3</sup> (respirable fraction)		0.025 mg/m <sup>3</sup> (respirable fraction)

TLV/PEL: OSHA TWA	<b>Nuisance Dust</b> 15 mg/m³ (total dust) 5 mg/m³ (respirable fraction)
ACGIH TWA	10 mg/m³ (total dust) 3 mg/m³ (respirable fraction)

# 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Powder
Color:	Off-white
Odor:	Odorless
Physical state:	Solid
Solubility in Water:	Insoluble
Specific gravity:	1.7
Flash Point:	Not applicable

# **10. STABILITY AND REACTIVITY**

Stability:	Stable at normal conditions
Conditions to avoid:	Excessive heat, Open flame
Materials to avoid:	Oxidizing agents
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx)
Possibility of Hazardous Reactions:	Will not occur

# **11. TOXICOLOGICAL INFORMATION**

#### Acute toxicity

Components	LC50/Inhalation/4h/Rat	LD50/Dermal/Rat	LD50/Oral/Rat
Crystalline silica (Quartz)	No data available	No data available	500 mg/kg

#### Local effects

Skin irritation:	Non-irritating to the skin.
Eye irritation:	Contact with eyes may cause irritation.
Inhalation:	May cause irritation of respiratory tract.

#### Ingestion:

Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

**Chronic toxicity:** 

See table and/or data, below

Components	NTP	IARC	OSHA
Crystalline silica (Quartz)	Group 2A	Group 1- Carcinogenic to	Present
		Humans	

# Specific effects

Carcinogenic effects:	Crystalline silica has been reviewed by IARC. IARC working group found sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica in the form of quartz or cristobalite from occupational sources. There is sufficient evidence in experimental animals for the carcinogenicity of quartz and cristobalite. Therefore, IARC working group has classified Crystalline Silica as carcinogenic to humans (Group 1).

Target organ(s):

# **12. ECOLOGICAL INFORMATION**

#### Aquatic toxicity:

Product Information:	No data available
Persistence and degradability:	No data available
Environmental Fate:	
Mobility (soil/air/water):	No data available
28-Day biodegradation:	No data available
Bioaccumulative potential:	No data available
Physical / Chemical:	No data available

Lungs

# **13. DISPOSAL CONSIDERATIONS**

Waste from residues / unused products:	Do not contaminate ponds, waterways or ditches with chemical or used container. Observe all federal, state and local regulations when disposing of this material.
RCRA Hazardous Waste	
RCRA:	Not listed

# 12287

# **14. TRANSPORT INFORMATION**

U.S. Department of Transportation Ground (49 CFR): Proper shipping name: Not regulated

#### International Air Transportation (ICAO/IATA):

Proper shipping name: Not regulated

#### International Maritime Organization (IMO/IMDG): Proper shipping name: Not regulated

Surface Shipments in Europe (ADR/RID):

Proper shipping name: Not regulated

# **15. REGULATORY INFORMATION**

#### Heavy metals:

Heavy metals content (ppm): Not applicable

#### International Inventories

TSCA/ (USA)	Listed	EINECS/ (EU)	Listed
DSL/ (CANADA)	Listed	NDSL/ (CANADA)	Not applicable
ENCS/	Not Listed	ÌECSC/	Listed
(JAPAN) PICCS/	Listed	(CHINA) KECL	Listed
(PHILLIPINES)	Listed	(KOREA)	Listed
AICS/ (AUSTRALIA)	LISIEU	HSNO/ New Zealand:	LISIEU

U.S. Regulations

#### TSCA Section 12(b) Export Notification

SARA Title III:

#### Section 302 EHS: None Section 311/312: Chronic Health Hazard Section 313: Not listed California Proposition 65: Components Carcinogen Reproductive No significant toxicity risk level This Product contains the following Chemical(s) known to Crystalline silica Listed the state of California to cause cancer and/or developmental (Quartz) effects. Canada WHMIS hazard class: D2A Possible, probable or known human carcinogen according to classifications by IARC or ACGIH. This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

# **16. OTHER INFORMATION**

ŀ	ł	N	S	:

Health:	1 *
Flammability:	1
Reactivity:	0

#### Previous Revision Date:

Key/Legend:

N/A: Not applicable N/D: Not determined ppm: Parts per million X: Listed

#### Prepared by:

**Product Stewardship** 

Not applicable

The data set forth in these sheets are based on information provided by the suppliers of the raw materials and chemicals used in the manufacture of the aforementioned product. ELEMENTIS SPECIALTIES makes no warranty with respect to the accuracy of the information provided by their suppliers, and declaims all liability of reliance thereon. ELEMENTIS SPECIALTIES warrants only that its products conforms with their published specifications, and no other express warranty is made with regards thereof. We do not guarantee favorable results, and we assume no liability in connection with the use of the products. They are intended for use by persons having technical skill and knowledge, at their own discretion and risk.



# MATERIAL SAFETY DATA SHEET

Revision date: 25-Mar-2008

Supercedes: New MSDS

MSDS Number: 12296

# 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product name:	ECONO-ELB 1	
Product Use Description:	Rheological additive	
Company/Undertaking Identification	Elementis Specialties, Inc. 329 Wyckoffs Mill Road Hightstown, NJ 08520 (609) 443-2000	Elementis Specialties, Inc. p/a Elementis Service Centre NV Pegasus Park De Kleetlaan 12A - P.O. Box 3 B-1831 Diegem, Belgium +32 (0)2 790 76 00
Emergency telephone number:	CHEMTREC Emergency Response Number: 1-800-424-9300 (1-703-527-3887)	
	SGS Emergency Response Numb	er: + 32 (0)3 575 55 55
	Product Stewardship@elementis.com	

# 2. HAZARDS IDENTIFICATION

#### **EMERGENCY OVERVIEW**

Appearance: Color: Odor: Powder Off-white Odourless

#### WARNING

Harmful by inhalation May cause slight eye irritation May cause irritation of respiratory tract Repeated and/or prolonged exposures may cause lung damage (Silicosis) CONTAINS CRYSTALLINE SILICA (QUARTZ) WHICH MAY CAUSE CANCER Risk of cancer depends on level and duration of exposure

#### Potential health effects:

Eye contact:	May cause slight eye irritation. Signs and symptoms include burning, tearing, redness and swelling.
Skin contact:	Non-irritating to the skin.

Inhalation:	Harmful by inhalation. May cause irritation of respiratory tract. Long term exposure to airborne concentrations may cause lung damage.
Ingestion:	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Routes of exposure:	Inhalation, Skin, Ingestion
Target Organs:	Lungs
See Sections 11 & 12 for additional toxicological and ecological information	
Environmental hazard:	See Section 12, below

# **3. COMPOSITION/INFORMATION ON INGREDIENTS**

#### **Hazardous Components**

Components	CAS-No	Weight %
Crystalline silica (Quartz)	14808-60-7	< 3%

This product is considered hazardous as defined under OSHA's Hazard Communication Standard (29 CFR 1910.1200).

# 4. FIRST AID MEASURES

Inhalation:	Move to fresh air in case of accidental inhalation of dust or fumes from overheating or combustion. If breathing is difficult, give oxygen.
Skin contact:	Wash off immediately with soap and plenty of water. If a person feels unwell or symptoms of skin irritation appear, consult a physician.
Eye contact:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists, consult a specialist.
Ingestion:	If swallowed, seek medical advice immediately and show this container or label. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

# 5. FIRE-FIGHTING MEASURES

Not applicable
Not selfigniting
LEL: 0.07 oz/ft <sup>3</sup>
Excess dust dispersed in air represents an explosion hazard in the presence of electrical sparks and static discharges .
None known
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

Hazardous combustion products: Carbon monoxide, carbon dioxide (CO2), Nitrogen oxides (NOx).

Special Fire Fighting Procedure: Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing

# 6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Use personal protective equipment.
Environmental precautions:	Prevent further leakage or spillage if safe to do so. Do not flush into surface water or sanitary sewer system.
Clean-up methods:	Sweep up and shovel into suitable containers for disposal. Clean spill area thoroughly. Local authorities should be advised if significant spillages cannot be contained.

# 7. HANDLING AND STORAGE

Handling:	Remove all sources of ignition. Avoid contact with skin, eyes and clothing. Avoid breathing mists, dusts, or vapors. Wash hands thoroughly after handling.
Storage:	Keep containers tightly closed in a cool, well-ventilated place. Keep product and empty container away from heat and sources of ignition.

# 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures:	Maintain adequate ventilation to keep hazardous ingredients below their PELs or TLVs. Use NIOSH/MSHA approved respirator whenever exposure limits exceeded.
Personal Protective Equipment	
Eye protection:	Wear face protection
Skin and body protection:	Wear protective clothing and impervious gloves (natural rubber, neoprene) to avoid skin contact.
Respiratory protection:	In the case of respirable dust and/or fumes, use self-contained breathing apparatus.
Hand protection:	Protective gloves
Hygiene measures:	Handle in accordance with good industrial hygiene and safety practice.

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Ex	pos	ure	cont	rol	S

Components	OSHA STEL	OSHA PEL	OSHA TWA	ACGIH STEL	ACGIH TWA
Crystalline silica (Quartz)		0.1 mg/m <sup>3</sup> (respirable fraction)	0.1 mg/m <sup>3</sup> (respirable fraction)		0.025 mg/m <sup>3</sup> (respirable fraction)

TLV/PEL:	Particles (insoluble or poorly soluble) Not Otherwise Specified [PNOS]
OSHA TWA	10 mg/m <sup>3</sup> (inhalable particles) 5 mg/m <sup>3</sup> (respirable particles)
ACGIH TWA	10 mg/m <sup>3</sup> (inhalable particles) 3 mg/m <sup>3</sup> (respirable particles)

# 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Powder
Color:	Off-white
Odor:	Odourless
Physical state:	Solid
Solubility:	Water insoluble
Specific Gravity:	1.7
Flash Point:	Not applicable

# **10. STABILITY AND REACTIVITY**

Stability:	Stable at normal conditions
Conditions to avoid:	Heat, flames and sparks
Materials to avoid:	Oxidizing agents
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide (CO2), Nitrogen oxides (NOx)
Possibility of Hazardous Reactions:	Will not occur

# **11. TOXICOLOGICAL INFORMATION**

#### Acute toxicity

Components	LC50/inhalation/4h/Rat:	LD50/Dermal/Rat:	LD50/Oral/Rat:	
Crystalline silica (Quartz)	No data available	No data available	500 mg/kg	
Product Information:	The data listed, below, is based on this or a similar product:			
LD50/Oral/Rat:	> 8000 mg/kg (rat)			
Local effects				
Skin irritation:	Non-irritating to the skin.			
Eye irritation:	Contact with eyes may cause irritation.			
Inhalation:	May cause irritation of respiratory tract.			

Ingestion:	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Chronic toxicity:	Long-term chronic toxicity studies to evaluate the carcinogenic potential of this product have not been conducted; See table and/or data, below, of individual components.

Components	NTP	IARC	OSHA
Crystalline silica (Quartz)	Group A - Known to be human	Group 1- Carcinogenic to	Present
	carcinogens	Humans	

#### Specific effects

**Carcinogenic effects:** Crystalline silica has been reviewed by IARC. IARC working group found sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica in the form of quartz or cristobalite from occupational sources. There is sufficient evidence in experimental animals for the carcinogenicity of quartz and cristobalite. Therefore, IARC working group has classified Crystalline Silica as carcinogenic to humans (Group 1).

Target Organs: Lungs

# **12. ECOLOGICAL INFORMATION**

#### Aquatic toxicity:

-	-	
	Product Information:	The data listed, below, is based on this or a similar product:
	EC50/96hr/48hr/24hr	> 2000 mg/L (Marine invertebrate; 48 hrs) > 1000 mg/L (Marine alga; 48 hrs)
	Persistence and degradability:	No data available
	<u>ronmental Fate and</u> ways:	
	Mobility:	No data available
	Biodegradability:	No data available
	Bioaccumulative potential:	No data available
	Physical / Chemical:	No data available

# **13. DISPOSAL CONSIDERATIONS**

Waste from residues / unused	Do not contaminate ponds, waterways or ditches with chemical or used container.
products:	Dispose of in accordance with Local and National regulations.
RCRA Hazardous Waste:	

RCRA:

Not listed

# **14. TRANSPORT INFORMATION**

U.S. Department of Transportation Ground (49 CFR): Proper shipping name: Not regulated

International Air Transportation (ICAO/IATA): Proper shipping name: Not regulated

International Maritime Organization (IMO/IMDG): Proper shipping name: Not regulated

Surface Shipments in Europe (ADR/RID): Proper shipping name: Not regulated

# **15. REGULATORY INFORMATION**

Heavy metals:

Heavy metals content (ppm): Not applicable

#### **International Inventories**

TSCA/ (USA)	Listed	EINECS/ (EU)	Listed
DSL/ (CANADA)	Listed	NDSL/ (CANADA)	Not applicable
ENCS/ (JAPAN)	Listed	ÎECSC/ (CHINA)	Listed
PICCS/ (PHILLIPINES)	Listed	KECL (KOREA)	Listed
AICS/ (AUSTRALIA)	Listed	HSNO/ New Zealand:	Listed

**U.S. Regulations** 

TSCA Section 12(b) Export Notification

SARA Title III:

Section 302 EHS: None	e	Section 311/31	2:	Chronic Health	Hazard
Section 313: Not listed					
California Prop. 65: This Product contains the following	Substance (s) known to	Components	Carcinogen	Reproductive toxicity	No significant risk level
the state of California to cause cancer and/or developmental effects.		Crystalline silica (Quartz)	Listed		
<u>Canada</u> WHMIS hazard class:	D2A Possible, probable IARC or ACGIH.	or known huma	an carcinogen	according to cla	ssifications by

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

# **16. OTHER INFORMATION**

HMIS:	
Health:	1 *
Flammability:	0
Reactivity:	0
Previous Revision Date: Key/Legend:	Not applicable

N/A: Not applicable N/D: Not determined ppm: Parts per million X: Listed

#### Prepared by:

Product Stewardship

The data set forth in these sheets are based on information provided by the suppliers of the raw materials and chemicals used in the manufacture of the aforementioned product. ELEMENTIS SPECIALTIES makes no warranty with respect to the accuracy of the information provided by their suppliers, and declaims all liability of reliance thereon. ELEMENTIS SPECIALTIES warrants only that its products conforms with their published specifications, and no other express warranty is made with regards thereof. We do not guarantee favorable results, and we assume no liability in connection with the use of the products. They are intended for use by persons having technical skill and knowledge, at their own discretion and risk.

SPECIALTIES

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Elementis Specialities, Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800

Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

# 1. PRODUCT NAME: VG PLUS

Approval Date: December 13, 2001

# 2. PRODUCT COMPOSITION

Product Classification: Rheological Additive		
HAZARDOUS SUBSTANCES	C.A.S. No.	Percent
Crystalline Silica - Quartz	14808-60-7	<6.0

# **3. HAZARD IDENTIFICATION**

# Warning: Protective Measures: • Contains Crystalline Silica which is classified by IARC as carcinogenic to humans. • Do not breathe dust. • Long term exposure to airborne concentrations above the recommended exposure guidelines may cause lung damage including silicosis. • May cause slight eye irritation. • May cause slight eye irritation. • HIRST AID MEASURES

Eye Contact:	Rinse immediately with water for at least 15 minutes.
Skin Contact:	Wash with soap and water.
Ingestion:	Provide symptomatic treatment and seek medical attention.
Inhalation:	Remove person to fresh air. If breathing is difficult, provide oxygen and seek medical attention.
Other:	None known.

# **5. FIRE FIGHTING MEASURES**

Flash Point: N.A.	Method: N.A.	LEL: 0.05 oz/cu. ft.; 52.6 g/m <sup>3</sup>	UEL: N.A.	
EXTINGUISHING MEDIA/FIRE FIGHTING PROCEDURES				
Water fog, foam, dry che	emical, or carbon dioxide			
UNUSUAL HAZARDS				
Precautions for flammat equipment is properly gr	ele organic dusts should l ounded to prevent static	be provided. Avoid high dust concentration discharges, and vented to provide for po	ons. Assure all tential energy release.	

SPECIALTIES

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Elementis Specialities, Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

# 1. PRODUCT NAME: VG PLUS

Approval Date: December 13, 2001

# 6. ACCIDENTAL RELEASE MEASURES

#### **RELEASE RESPONSE**

Minimize dusting. <u>Caution</u>: May cause a slippery condition when wet. Sweep/shovel up and transfer into a drum for re-use or disposal.

#### PERSONAL PROTECTIVE EQUIPMENT

Wear an air-purifying dust respirator and chemical resistant gloves. Wear eye protection to prevent dust from entering the eyes.

# 7. HANDLING AND STORAGE

#### HANDLING

Precautions for flammable organic dusts should be provided. Avoid high dust concentrations. Assure all equipment is properly grounded to prevent static discharges, and vented to provide for potential energy.

#### STORAGE

None.

# 8. EXPOSURE CONTROL INFORMATION

#### **OCCUPATIONAL EXPOSURE LIMITS** Particulates not ACGIH - TLV **OSHA - PEL** 8 hr. TWA - 10 mg/m<sup>3</sup>, Inhalable 8 hr. TWA - 10 mg/m³, total otherwise 8 hr. TWA - 5 mg/m<sup>3</sup>, respirable classified: 8 hr. TWA - 3 mg/m<sup>3</sup>, respirable 8 hr. TWA - 0.1 mg/m³, respirable 8 hr. TWA - 0.1 mg/m<sup>3</sup>, respirable Quartz: **ENGINEERING CONTROL MEASURES** Use local exhaust ventilation if airborne concentrations are above recommended exposure limits. PERSONAL PROTECTION EQUIPMENT Use an air-purifying dust respirator if airborne concentration levels **Respiratory:** are above exposure limits. Hand: Use chemical resistant gloves. Use safety glasses/goggles. Eye: Other: None. **OTHER CONTROL MEASURES**

# SAFETY DATA SHEET elementis SPECIALTIES

Elementis Specialities, Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800

**Emergency Telephone No.** CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

# 1. PRODUCT NAME: VG PLUS

Approval Date: December 13, 2001

# 8. EXPOSURE CONTROL INFORMATION

Precautions for flammable organic dusts should be provided. Avoid high dust concentrations. Assure all equipment is properly grounded to prevent static discharges, and vented to provide for potential energy release. Use good industrial hygiene practices. Wash hands and face before eating or drinking.

# 9. PROPERTIES

Appearance: Light Cream Powder	Odor: None	pH: N.A.
Boiling Range: N.A.	Melting Range: N.A.	Specific Gravity: 1.7
Solubility: Insoluble in water.	Vapor Density: N.A.	Vapor Pressure: N.A.
% Volatile: N.A.	Freezing Point: N.A.	Density at 20° C: 1.7 g/cm <sup>3</sup>

# **10. REACTIVITY INFORMATION**

Conditions to Avoid:	None known.
Materials to Avoid:	None known.
Hazardous Decomposition: Processing this product in applications at temperatures > 130°C may release benzyl chlorides. In a fire - Oxides of carbon and nitro	
Stability:	Stable.

# **11. HEALTH/TOXICITY INFORMATION**

# **HEALTH HAZARDS**

Effects of Acute	<u>Exposure</u>					
Inhalation:	May cause slight resp	iratory irritation				
Skin Contact:	Not expected to cause	irritation.				
Skin Absorption:	Not be absorbed through	igh intact skin.			·	
Eye Contact:	May produce slight (m	echanical) irrita	ation.			
Ingestion:	Not expected to produ	ce adverse eff	ects.			
Effects of Chroni	<u>c Over Exposure</u>					
	Excessive exposure, o	over prolonaed	periods causes	s lung dam:	ana commonly called	
"silicosis". The In	ternational Agency for	Research on C	ancer has cond	cluded crys	talline silica	
inhaled in excess	sive amounts, in the for	m of quartz or (	cristobalite from	n occupatio	nal sources	
is carcinogenic to	humans.					
Listed as a suspe	ected carcinogen on:	IARC: Yes	NTP: Yes	OSHA: I	No	
Medical Condition	ns Aggravated:	Respiratory d	sorders.			
TOXICITY INFO	RMATION					

N.A.: Not Applicable

SPECIALTIES

Elementis Specialities, Inc. P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800

Emergency Telephone No. CHEMTREC: (800) 424-9300 ELEMENTIS: (609) 443-2000

1. PRODUCT NAME: VG PLUS

Approval Date: December 13, 2001

# 11. HEALTH/TOXICITY INFORMATION

None determined.

#### ENVIRONMENTAL/DISPOSAL CONSIDERATIONS

#### 12. ENVIRONMENTAL HAZARDS

None known.

#### **13. DISPOSAL CONSIDERATIONS**

Dispose of in accordance with local and federal regulations. Use a licensed waste handler.

# **14. TRANSPORTATION**

Shipping Name: Not regulated.		Label:	N.A.
Hazard Class: N.A.	Packing Group: N.A.	UN#:	N.A.

# **15. REGULATORY INFORMATION**

J.S. TSCA Inventory:	On the Inventory	Canadian DSL:	On the inventory
European Inventory:	On the EINECS	Australia AICS:	On the Inventory
Korean Inventory	On the Inventory	Philippine Inventory:	On the Inventory
New Zealand - Pending	Submitted for the Inventory	Chinese Inventory:	On the inventory
SARA 313 Information			
Not regulated under SARA	Section 313.		
OTHER REGULATORY IN			

# **16. OTHER INFORMATION**

H.M.I.S. CODES

Health: 2

Flammability: 1 Reac

Reactivity: 0

#### MATERIAL SAFETY DATA SHEET INDEX RAW MATERIALS - QUATS PLANT

2M2HT - E7030 B2MHT - E7032 MB2HT - E7044

> 5 can these in + label "HSDS: - Quats"

BZMHT

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Material Safety Data Sheet

MSDS# 15-04305

# Section 1. Chemical Product and Company Identification

Product name	ARQUAD® DMHTB-80 E		
Material Uses	: Surfactant.	In Case of Emergen	су
Supplier/ Manufacturer	AKZO NOBEL SURFACE CHEMISTRY LLC 525 West Van Buren Chicago, IL 60607-3823 www.surfactants.akzonobel.com	CHEMTREC: CANUTEC: Medical/Handling: Product/Technical:	800-424-9300 613-996-6666 914-693-6946 800-906-9977
	AKZO NOBEL CHEMICALS LTD. 1 City Centre Drive, Suite 318 Mississauga, Ontario L5B 1M2 Canada	į	÷

# Section 2. Hazards Identification

Physical State	Liquid.
Color	White.
Odor	Alcohol like.
ergency Overview	DANGER! CAUSES EYE BURNS. FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. CONTAINS ETHANOL-CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS: BLOOD, REPRODUCTIVE SYSTEM, LIVER, RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA. TOXIC TO AQUATIC ORGANISMS.
	CONTAINS MATERIAL WHICH MAY CAUSE DAMAGE TO THE FOLLOWING ORGANS: GASTROINTESTINAL TRACT. MAY BE HARMFUL TO ENVIRONMENT IF RELEASED IN LARGE AMOUNTS.
	Keep away from heat, sparks and flame. Do not get in eyes. Avoid breathing vapor or mist. Keep container closed. Use only with adequate ventilation. Avoid exposure during pregnancy. Wash thoroughly after handling. Avoid contact of spilled material and runoff with soil and surface waterways.
Possible Carcinogenic Effects	quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides: IARC, NTP, OSHA, ACGIH: Not listed. ethanol: ACGIH A4; IARC NTP OSHA Not listed. Isopropanol: IARC 3; ACGIH NTP OSHA Not listed. water: IARC, NTP, OSHA, ACGIH: Not listed. quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides: IARC, NTP,
	OSHA, ACGIH: Not listed. Amines, (hydrogenated tallow alkyl)dimethyl: IARC, NTP, OSHA, ACGIH: Not listed. benzyl chloride: IARC 2A, ACGIH A3; NTP OSHA Not listed. methyl chloride: ACGIH A4; IARC 3; NTP OSHA Not listed.
Routes of Entry	Absorbed through skin. Eye contact.
	See Toxicological Information (section 11)

Continued on Next Page

# Section 3. Composition/ Information on Ingredients

Name CA:	S #	% by Weight	
quatemary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides	61789-72-8	70-85	
ethanol	64-17-5	10-25	
Isopropanol	67-63-0	0-5	
water	7732-18-5	5-10	
quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides	61788-78-1	1-4	
Dimethyl (hydrogenated tallowalkyl) amine hydrochlorides	Not Assigned	0.001-2	
Amines, (hydrogenated tallow alkyl)dimethyl	61788-95-2	0.001-2	
benzyl chloride	100-44-7	<0.1	
methyl.chloride	74-87-3	< 0.03	

# Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 30 minutes. Cold water may be used. Get medical attention immediately.
Skin Contact	Wash with soap and water. Get medical attention if irritation develops. Cold water may be used.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Ingestion	Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.
Medical Conditions Aggravated by Overexposure	Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

#### Flammability of the Flammable. Product **Auto-ignition** The lowest known value is 398.85°C (749.9°F) (ethanol). Temperature **Flash Points** Closed cup: 37.8°C (100°F). (Pensky-Martens.) **Flammable Limits** The greatest known range is LOWER: 3.3% UPPER: 19% (ethanol) **Products of Combustion** These products are carbon oxides (CO, CO<sub>2</sub>), nitrogen oxides (NO, NO<sub>2...</sub>). **Fire Fighting Media** SMALL FIRE: Use DRY chemical powder. and Instructions LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Protective Clothing (Fire) Be sure to use an approved/certified respirator or equivalent. **Special Remarks on Fire** No sparking tools should be used. Take precautionary measures against static discharges. Hazards

# Section 5. Fire Fighting Measures

# Section 6. Accidental Release Measures

All Spill and LeakDilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste<br/>disposal container. If necessary: Use suitable protective equipment (Section 8).Large Spill and LeakKeep away from heat. Keep away from sources of ignition. Stop leak if without risk. If the product is in<br/>its solid form: Use a shovel to put the material into a convenient waste disposal container. If the product<br/>is in its liquid form: Absorb with DRY earth, sand or other non-combustible material. Do not get water<br/>inside container. Absorb with an inert material and put the spilled material in an appropriate waste<br/>disposal. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into<br/>sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Use suitable<br/>protective equipment (Section 8).

# Section 7. Handling and Storage

· · ·	
Handling	Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.
Storage	Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

# Section 8. Exposure Controls/ Personal Protection

vapors below the	t ventilation or other engineering controls to keep the airborne concentrations of eir respective occupational exposure limits. Ensure that eyewash stations and safety ximal to the work-station location.
Face shield.	
Full suit.	
	Be sure to use an approved/certified respirator or equivalent. Wear appropriate ventilation is inadequate.
Gloves.	
Boots.	
	Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus
	to avoid inhalation of the product. Suggested protective clothing might not be sufficient; list BEFORE handling this product.
	Exposure Limits United States
	Not available.
	ACGIH TLV (United States, 2006). Notes: 1996 Adoption Refers to Appendix A
	Carcinogens. TWA: 1880 mg/m <sup>3</sup> 8 hour(s).
	vapors below th showers are pro Face shield. Full suit. Vapor respirator respirator when Gloves. Boots. Boots. Splash goggles should be used

#### Continued on Next Page

Isopropanol

water

quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides Dimethyl (hydrogenated tallowalkyl) amine hydrochlorides Amines, (hydrogenated tallow alkyl)dimethyl benzyl chloride

methyl chloride

TWA: 1900 mg/m<sup>3</sup> 8 hour(s). TWA: 1000 ppm 8 hour(s). **OSHA PEL 1989 (United States, 1989).** TWA: 1900 mg/m<sup>3</sup> 8 hour(s). TWA: 1000 ppm 8 hour(s). **ACGIH TLV (United States, 2005). Notes: ACGIH 2003 Adoption Refers to Appendix A -- Carcinogens.** STEL: 400 ppm 15 minute(s). Form: All forms TWA: 200 ppm 8 hour(s). Form: All forms **NIOSH REL (United States, 2001).** STEL: 1225 mg/m<sup>3</sup> 15 minute(s). Form: All forms STEL: 500 ppm 15 minute(s). Form: All forms TWA: 980 mg/m<sup>3</sup> 10 hour(s). Form: All forms

TWA: 400 ppm 10 hour(s). Form: All forms OSHA PEL (United States, 1997).

OSHA PEL (United States, 1997).

TWA: 980 mg/m<sup>3</sup> 8 hour(s). Form: All forms TWA: 400 ppm 8 hour(s). Form: All forms

OSHA PEL 1989 (United States, 1989). STEL: 1225 mg/m<sup>3</sup> 15 minute(s). Form: All forms STEL: 500 ppm 15 minute(s). Form: All forms TWA: 980 mg/m<sup>3</sup> 8 hour(s). Form: All forms

TWA: 400 ppm 8 hour(s). Form: All forms

Not available.

Not available.

Not available.

Not available.

# ACGIH TLV (United States, 2005). Notes: Substance identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption Refers to Appendix A -- Carcinogens.

TWA: 5.2 mg/m<sup>3</sup> 8 hour(s). Form: All forms TWA: 1 ppm 8 hour(s). Form: All forms NIOSH REL (United States, 2001). CEIL: 5 mg/m<sup>3</sup> 15 minute(s). Form: All forms CEIL: 1 ppm 15 minute(s). Form: All forms OSHA PEL (United States, 1997). TWA: 5 mg/m<sup>3</sup> 8 hour(s). Form: All forms TWA: 1 ppm 8 hour(s). Form: All forms OSHA PEL 1989 (United States, 1989). TWA: 5 mg/m<sup>3</sup> 8 hour(s). Form: All forms TWA: 1 ppm 8 hour(s). Form: All forms ACGIH TLV (United States, 2005). Skin Notes: Substance Identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFR 58(124) :36338-33351, June 30, 1993, for revised OSHA PEL. Refers to Appendix A -- Carcinogens. STEL: 207 mg/m<sup>3</sup> 15 minute(s). Form: All forms STEL: 100 ppm 15 minute(s), Form: All forms

TWA: 103 mg/m<sup>3</sup> 8 hour(s). Form: All forms TWA: 50 ppm 8 hour(s). Form: All forms

OSHA PEL 1989 (United States, 1989). Notes: See Table Z-2. STEL: 210 mg/m<sup>3</sup> 15 minute(s). Form: All forms

STEL: 100 ppm 15 minute(s). Form: All forms TWA: 105 mg/m<sup>3</sup> 8 hour(s). Form: All forms

TWA: 50 ppm 8 hour(s). Form: All forms

OSHA PEL Z2 (United States, 1997).

AMP: 300 ppm 5 minute(s). Form: All forms

CEIL: 200 ppm Form: All forms

TWA: 100 ppm 8 hour(s). Form: All forms

**Continued on Next Page** 

# Section 9. Physical and Chemical Properties

n nysical State	Liquid.	
Color	White.	
Odor	Alcohol like.	
pН	Basic.	
Boiling/Condensation Point	80°C (176°F)	
Melting/Freezing Point	Not determined.	
Density	Not determined.	
Vapor Pressure	Not determined.	
Vapor Density	Not determined.	
Odor Threshold	The lowest known value is 180 ppm (ethanol) Weighted average: 197.31 ppm	
Evaporation Rate	The highest known value is 1.7 (ethanol) Weighted average: 1.52compared to Butyl acetate.	*
Solubility	Easily soluble in hot water, methanol, acetone. Soluble in cold water.	
<b>Dispersion Properties</b>	See solubility in water, methanol, acetone.	
Physical Chemical Comments	Freezing Point= 23 °C	

# Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Incompatibility with Various Substances	Reactive with OXIDIZING AGENTS. Slightly reactive to reactive with acids.
zardous Decomposition Products	These products are halogenated compounds, hydrogen chloride.
Hazardous Polymerization	Will not occur.

# Section 11. Toxicological Information

Toxicity to Animals Ingredient Name or Product name	Test	Result	Route	Species
quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides	LD50	>2000 mg/kg	Oral	Rat based on data for: (similar material)
ethanol	LD50	7060 mg/kg	Oral	Rat
	LD50	6300 mg/kg	Oral	Rabbit
	LD50	3450 mg/kg	Oral	Mouse
	LDLo	1400 mg/kg	Oral	human
	LDLo	5500 mg/kg	Oral	Dog
	LC50	20000 ppm (10 hour(s))	Inhalation	Rat
Isopropanoi	LD50	5045 mg/kg	Oral	Rat
	LD50	6410 mg/kg	Oral	Rabbit
	LD50	3600 mg/kg	Oral	Mouse
	LD50	12800 mg/kg	Dermal	Rabbit
	LDLo	1537 mg/kg	Oral	Dog
	LDLo	3570 mg/kg	Oral	human
	LDLo	5272 mg/kg	Oral	man
:	LC50	12000 ppm (8 hour(s))	Inhalation	Rat
	LC50	16970 ppm (4 hour(s))	Inhalation	Rat

ARQUAD® DMHTB-8	D E	· · · · · · · · · · · · · · · · · · ·		Page: 6/9
quatemary ammonium co (hydrogenated tallow alk chlorides		>5000 mg/kg	Oral	Rat based on data for: (similar material)
Amines, (hydrogenated t alkyl)dimethyl	allow LD50	>2000 mg/kg	Oral	Rat
benzyl chloride	LD50	1231 mg/kg	Oral	Rat
	LD50	1500 mg/kg	Orai	Mouse
	LD50	1500 mg/kg	Oral	Mammal
methyl chloride	LD50	1800 mg/kg	Oral	Rat
	DEVELOPMENTAL TO system/toxin/male [PRO Contains material which upper respiratory tract, s	VEN] [ethanol].	eproductive syst llowing organs: blo m (CNS), eye, len	tem/toxin/female, Reproductive bod, the reproductive system, liver, is or cornea.
Special Remarks on Chronic Effects on Humans	<b>quaternary ammonium</b> Teratogenic	i compounds, benzyl(hy	drogenated tallo	w alkyl)dimethyl, chiorides: Not
Acute Effects Skin	Practically non-toxic in c	ontact with skin.		
Acute Effects Eyes	Corrosive to the eyes.			
Special Remarks on Other Toxic Effects on Humans	and Eyes based on dat quaternary ammonium	a for: (similar material)	nated tailow alky	w alkyl)dimethyl, chlorides: Skin /l)trimethyl, chlorides: Skin and

ų ...

# Section 12. Ecological Information

Ecotoxicity	0	Destad	Desutt
Ingredient Name or Product name	Species	Period	Result
ethanol	Daphnia magna (EC50)	48 hour(s)	2 mg/l
	Daphnia magna (EC50)	48 hour(s)	9.3 mg/l
	Daphnia magna (EC50)	48 hour(s)	>100 mg/l
	Pimephales promelas (LC50)	96 hour(s)	>100 mg/l
	Daphnia magna (LC50)	96 hour(s)	>100 mg/l
	Oncorhynchus mykiss (LC50)	96 hour(s)	13000 mg/l
Isopropanol	Pimephales promelas (EC50)	48 hour(s)	10000 mg/l
	Lepomis macrochirus (LC50)	96 hour(s)	>1400 mg/l
	Pimephales promelas (LC50)	96 hour(s)	6550 mg/l
	Pimephales promelas (LC50)	96 hour(s)	9640 mg/l
	Pimephales promelas (LC50)	96 hour(s)	10400 mg/l
	Pimephales promelas (LC50)	96 hour(s)	11130 mg/l
quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides	Daphnia (EC50)	48 hour(s)	0.019 mg/l
benzyl chloride	Pimephales promelas (LC50)	96 hour(s)	5 mg/l
methyl chloride	Lepomis macrochirus (LC50)	96 hour(s)	550 mg/l

ARQUAD® DMHTB-80	E Page: 7/9
Biodegradability and Ecotoxicity Remarks	quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides: 679 @ day 84 CBT quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides: 48% @ 28 day(s) CBT based on data for: (similar material) Amines, (hydrogenated tallow alkyl)dimethyl: 58% @ 28 day(s) CBT 66% @ 42 day(s) CBT based on data for: (similar material)
Products of Degradation	These products are carbon oxides (CO, $CO_2$ ) and water, nitrogen oxides (NO, NO <sub>2</sub> ), .

# Section 13. Disposal Considerations

Waste Information	Waste must be disposed of in accordance with federal, state and local environmental control regulations.
RCRA Classification	D001 Ignitable Waste

### Consult your local or regional authorities.

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Section 14. Transport Information

Regulatory Information	UN number	Proper shipping name	Class	Packing Group	Label	Additional information
DOT Classification	UN1993	FLAMMABLE LIQUID, N.O.S. (ethanol, Isopropanol)	3	111		-
TDG ssification	UN1993	FLAMMABLE LIQUID, N.O.S. (ethanol, Isopropanol)	3	111	۲	-
IMDG Class	UN1993	FLAMMABLE LIQUID, N.O.S. (ethanol, Isopropanol)	3	111		-
IATA-DGR Class	UN1993	FLAMMABLE LIQUID, N.O.S. (ethanol, Isopropanol)	3	111		-

# Section 15. Regulatory Information

HCS Classification	Target organ effects Combustible liquid Corrosive Material
U.S. Federal Regulations	TSCA: All intentionally present components are listed on the TSCA inventory.
No. of	DSL: All intentionally present components are listed on the DSL.
No. 11	TSCA 5(a)2 final significant rules: No products were found.
	CERCLA: Hazardous substances.; benzyl chloride: 100 lbs. (45.36 kg); methyl chloride: 100 lbs. (45.36 kg);
Continued on Next Pa	ge

ARQUAD® DMHTB-80	i E			Page: 8/9
	SARA 302/304/311/312 extremely ha SARA 302/304 emergency planning a SARA 302/304/311/312 hazardous c SARA 302/304/311/312 hazardous c SARA 311/312 MSDS distribution - c E: Fire Hazard, Immediate (Acute) Ho SARA 313 Form R Reporting Require Isopropanol	and notification: No hemicals: ARQUAD hemical inventory - ealth Hazard, Delay	products were found. © DMHTB-80 E hazard identification:	ARQUAD® DMHTB-80
	SARA 313 Supplier Notification			
	Isopropanol			0-5
State Regulations	Pennsylvania RTK: ethanol: (generic generic environmental hazard); benz hazard); methyl chloride: (environme Massachusetts RTK: ethanol; Isoprop New Jersey: ethanol; Isopropanol; be	yl chloride: (environ ntal hazard, generic banol; benzyl chloric	mental hazard, gener c environmental hazar de; methyl chloride	ic environmental
• •	California prop. 65: This product cont has found to cause cancer, birth defe under the statute: benzyl chloride; me California prop. 65 (no significant risk California prop. 65: This product cont has found to cause birth defects whic California prop. 65: This product cont has found to cause cancer which wou	cts or other reprodu thyl chloride level): benzyl chlor ains the following ir h would require a w ains the following ir	uctive harm, which wo ride ngredients for which th varning under the state ngredients for which th	uld require a warning ne State of California ute: methyl chloride ne State of California
VHMIS (Canada)	Class B-3: Combustible liquid with a t Class D-2A: Material causing other to Class D-2B: Material causing other to	xic effects (VERY 1	TOXIC).	93.3°C (200°F).
	CEPA DSL: quaternary ammonium c	ompounds, benzyl(l	hydrogenated tallow a	lkyl)dimethyl, chlorides
	ethanol; Isopropanol; water; quaterna chlorides; Amines, (hydrogenated tall	ry ammonium com	pounds, (hydrogenate	d tallow alkyl)trimethyl
	chlorides; Amines, (hydrogenated tall	ry ammonium com	pounds, (hydrogenate	d tallow alkyl)trimethyl I chloride
uropean Union	chlorides; Amines, (hydrogenated tall Component quaternary ammonium compounds, benzyl(hydrogenated tallow	ory ammonium com low alkyl)dimethyl; t	pounds, (hydrogenate benzyl chloride; methy	d tallow alkyl)trimethyl
uropean Union	chlorides; Amines, (hydrogenated tall Component quaternary ammonium compounds,	ory ammonium com low alkyl)dimethyl; t EC Number	pounds, (hydrogenate benzyl chloride; methy EC Status Not available.	d tallow alkyl)trimethyl I chloride EC Annex Not available.
uropean Union	chlorides; Amines, (hydrogenated tall Component quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides ethanol	ory ammonium com low alky!)dimethyl; t <b>EC Number</b> 263-081-3 200-578-6	pounds, (hydrogenate benzyl chloride; methy EC Status	d tallow alkyl)trimethyl I chloride EC Annex Not available. 603-002-00-5
uropean Union	chlorides; Amines, (hydrogenated tall Component quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides	ary ammonium com low alkył)dimethyl; t EC Number 263-081-3	pounds, (hydrogenate benzyl chloride; methy EC Status Not available. Not available.	d tallow alkyl)trimethyl I chloride EC Annex Not available.
uropean Union	chlorides; Amines, (hydrogenated tall Component quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides ethanol isopropanol water quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl,	ary ammonium com low alky!)dimethyl; t EC Number 263-081-3 200-578-6 200-661-7	pounds, (hydrogenate benzyl chloride; methy EC Status Not available. Not available. Not available.	d tallow alkyl)trimethyl I chloride EC Annex Not available. 603-002-00-5 603-117-00-0
uropean Union	chlorides; Amines, (hydrogenated tall Component quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides ethanol isopropanol water quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides Dimethyl (hydrogenated tallowalkyl)	ary ammonium com low alky!)dimethyl; t EC Number 263-081-3 200-578-6 200-661-7 231-791-2	pounds, (hydrogenate benzyl chloride; methy EC Status Not available. Not available. Not available. Not available. Not available.	d tallow alkyl)trimethyl I chloride EC Annex Not available. 603-002-00-5 603-117-00-0 Not available.
uropean Union	chlorides; Amines, (hydrogenated tall <b>Component</b> quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides ethanol isopropanol water quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides Dimethyl (hydrogenated tallowalkyl) amine hydrochlorides Amines, (hydrogenated tallow	ary ammonium com low alkyl)dimethyl; t EC Number 263-081-3 200-578-6 200-661-7 231-791-2 263-005-9	pounds, (hydrogenate benzyl chloride; methy EC Status Not available. Not available. Not available. Not available. Not available. Not available.	d tallow alkyl)trimethyl I chloride EC Annex Not available. 603-002-00-5 603-117-00-0 Not available. Not available.
uropean Union	chlorides; Amines, (hydrogenated tall <b>Component</b> quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides ethanol isopropanol water quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides Dimethyl (hydrogenated tallowalkyl) amine hydrochlorides Amines, (hydrogenated tallow alkyl)dimethyl	EC Number 263-081-3 200-578-6 200-661-7 231-791-2 263-005-9 Not available. 263-022-1	pounds, (hydrogenate benzyl chloride; methy EC Status Not available. Not available. Not available. Not available. Not available. Not available.	d tallow alkyl)trimethy I chloride EC Annex Not available. 603-002-00-5 603-117-00-0 Not available. Not available. Not available. Not available.
uropean Union	chlorides; Amines, (hydrogenated tall <b>Component</b> quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides ethanol isopropanol water quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides Dimethyl (hydrogenated tallowalkyl) amine hydrochlorides Amines, (hydrogenated tallow	EC Number 263-081-3 200-578-6 200-661-7 231-791-2 263-005-9 Not available.	pounds, (hydrogenate benzyl chloride; methy EC Status Not available. Not available. Not available. Not available. Not available. Not available.	d tallow alkyl)trimethyl I chloride EC Annex Not available. 603-002-00-5 603-117-00-0 Not available. Not available. Not available.
	chlorides; Amines, (hydrogenated tall <b>Component</b> quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides ethanol isopropanol water quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides Dimethyl (hydrogenated tallowalkyl) amine hydrochlorides Amines, (hydrogenated tallow alkyl)dimethyl benzyl chloride	EC Number 263-081-3 200-578-6 200-661-7 231-791-2 263-005-9 Not available. 263-022-1 202-853-6 200-817-4 onium compounds, r; quaternary ammo	pounds, (hydrogenate benzyl chloride; methy EC Status Not available. Not available. Not available. Not available. Not available. Not available. Not available. Not available.	d tallow alkyl)trimethyl I chloride EC Annex Not available. 603-002-00-5 603-117-00-0 Not available. Not available. Not available. Not available. 602-037-00-3 602-001-00-7 tallow alkyl)dimethyl, drogenated tallow
	chlorides; Amines, (hydrogenated tall <b>Component</b> quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides ethanol Isopropanol water quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides Dimethyl (hydrogenated tallowalkyl) amine hydrochlorides Amines, (hydrogenated tallow alkyl)dimethyl benzyl chloride methyl chloride Australia (NICNAS): quaternary amm chlorides; ethanol; Isopropanol; water	EC Number 263-081-3 200-578-6 200-661-7 231-791-2 263-005-9 Not available. 263-022-1 202-853-6 200-817-4 onium compounds, r; quaternary ammo drogenated tallow a unds, benzyl(hydro ry ammonium comp	EC Status Not available. Not available. Senzyl(hydrogenated mium compounds, (hy alkyl)dimethyl; benzyl genated tallow alkyl)d	d tallow alkyl)trimethyl I chloride EC Annex Not available. 603-002-00-5 603-117-00-0 Not available. Not available. Not available. 602-037-00-3 602-001-00-7 tallow alkyl)dimethyl, drogenated tallow chloride; methyl chlorid imethyl, chlorides; d tallow alkyl)trimethyl
European Union Other International Lists	chlorides; Amines, (hydrogenated tall <b>Component</b> quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides ethanol Isopropanol water quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides Dimethyl (hydrogenated tallowalkyl) amine hydrochlorides Amines, (hydrogenated tallow alkyl)dimethyl benzyl chloride methyl chloride Australia (NICNAS): quaternary amm chlorides; ethanol; Isopropanol; water alkyl)trimethyl, chlorides; Amines, (hy	EC Number 263-081-3 200-578-6 200-661-7 231-791-2 263-005-9 Not available. 263-022-1 202-853-6 200-817-4 onium compounds, r; quatemary ammo drogenated tallow a unds, benzyl(hydro ry ammonium comp ow alkyl)dimethyl; b monium compound	EC Status Not available. Not available. Senzyl(hydrogenated pounds, (hydrogenated pounds, hydrogenated pounds, hydrogenat	d tallow alkyl)trimethyl I chloride EC Annex Not available. 603-002-00-5 603-117-00-0 Not available. Not available. Not available. 002-037-00-3 602-001-00-7 tallow alkyl)dimethyl, drogenated tallow chloride; methyl chlorid imethyl, chlorides; d tallow alkyl)trimethyl i chloride
	chlorides; Amines, (hydrogenated tall <b>Component</b> quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides ethanol Isopropanol water quaternary ammonium compounds, (hydrogenated tallow alkyl)trimethyl, chlorides Dimethyl (hydrogenated tallowalkyl) amine hydrochlorides Amines, (hydrogenated tallow alkyl)dimethyl benzyl chloride methyl chloride Australia (NICNAS): quaternary amm chlorides; ethanol; Isopropanol; water alkyl)trimethyl, chlorides; Amines, (hy China: quaternary ammonium compo ethanol; Isopropanol; water; quaternary am	ery ammonium com low alky!)dimethyl; t EC Number 263-081-3 200-578-6 200-661-7 231-791-2 263-005-9 Not available. 263-022-1 202-853-6 200-817-4 onium compounds, r; quaternary ammo drogenated tallow a unds, benzyl(hydro ry ammonium comp ow alkyl)dimethyl; t monium compound yl chloride; methyl c	EC Status Not available. Not available. Senzyl(hydrogenated pounds, (hydrogenated pounds, hydrogenated pounds, hydrogenated pou	d tallow alkyl)trimethyl chloride EC Annex Not available. 603-002-00-5 603-117-00-0 Not available. Not available. Not available. Not available. 602-037-00-3 602-001-00-7 tallow alkyl)dimethyl, drogenated tallow chloride; methyl chlorid imethyl, chlorides; d tallow alkyl)trimethyl chloride

### ARQUAD® DMHTB-80 E

Korea (TCCL): quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides; ethanol; Isopropanol; water; Amines, (hydrogenated tallow alkyl)dimethyl; benzyl chloride; methyl chloride

Philippines (RA6969): quaternary ammonium compounds, benzyl(hydrogenated tallow alkyl)dimethyl, chlorides; ethanol; isopropanol; water; benzyl chloride; methyl chloride

### Section 16. Other Information

Hazardous Material Information System (U.S.A.)



National Fire Protection Association (U.S.A.)



Other Information Arquad® is a registered trademark of Akzo Nobel or affiliated companies and is registered in one or more countries including the United States.

Validation Date Previous Validation Date **5/14/2007.** 10/26/2005.

Validated by Print Date Phone Number Product Safety Specialist 5/21/2007. 312-544-7038

### Notice to Reader

The information in the material safety data sheet should be provided to all who will use, handle, store, transport or otherwise be exposed to this product. All information concerning this product and/or suggestions for handling and use contained herein are offered in good faith and are believed to be reliable as of the date of publication. However, no warranty is made as to the accuracy of and/or sufficiency of such information and/or suggestions or as to the product's merchantability or fitness for any particular purpose, or that any suggested will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent.

yer must determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes, including mixing with other products. The information contained herein supersedes all previously issued bulletins on the subject matter covered. If the date on this document is more than three years old, call to make certain that this sheet is current.



Material Safety Data Sheet

Product name

MSDS# 15-04303

MB2HT

800-424-9300

613-996-6666

914-693-6946

800-906-9977

### Section 1. Chemical Product and Company Identification

**ARQUAD® M2HTB ES E** 

**Material Uses** : Surfactant. In Case of Emergency AKZO NOBEL SURFACE CHEMISTRY LLC Supplier/ CHEMTREC: Manufacturer 525 West Van Buren CANUTEC: Medical/Handling: Chicago, IL 60607-3823 www.surfactants.akzonobel.com Product/Technical: AKZO NOBEL CHEMICALS LTD. 1 City Centre Drive, Suite 318 Mississauga, Ontario L5B 1M2 Canada

# Section 2. Hazards Identification

Physical State	Liquid.
Color	White to yellowish.
Odor	Alcohol like.
ergency Overview	DANGER! CAUSES EYE BURNS. CONTAINS ETHANOL-CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS: BLOOD, REPRODUCTIVE SYSTEM, LIVER, RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA. FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. CONTAINS MATERIAL WHICH MAY CAUSE DAMAGE TO THE FOLLOWING ORGANS: GASTROINTESTINAL TRACT. CONTAINS BENZYL CHLORIDE-A SUSPECTED CANCER HAZARD. Risk of cancer depends on duration and level of exposure. Keep away from heat, sparks and flame. Do not get in eyes. Avoid breathing vapor or mist. Keep container closed. Use only with adequate ventilation. Avoid exposure during pregnancy. Wash thoroughly after handling.
Possible Carcinogenic Effects	quaternary ammonium compounds, benzylbis(hydrogenated tallow alkyl)methyl, chlorides: IARC, NTP, OSHA, ACGIH: Not listed. ethanol: ACGIH A4; IARC NTP OSHA Not listed. Isopropanol: IARC 3; ACGIH NTP OSHA Not listed. water: IARC, NTP, OSHA, ACGIH: Not listed. Amines, bis(hydrogenated tallow alkyl)methyl: IARC, NTP, OSHA, ACGIH: Not listed. Bis(hydrogenated tallowalkyl)methylamines hydrochloride: IARC, NTP, OSHA, ACGIH: Not listed. benzyl chloride: IARC 2A, ACGIH A3; NTP OSHA Not listed. methyl chloride: ACGIH A4; IARC 3; NTP OSHA Not listed.
Routes of Entry	Absorbed through skin. Eye contact.
	See Toxicological Information (section 11)

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# Section 3. Composition/ Information on Ingredients

Name	CAS #	% by Weight
quaternary ammonium compounds, benzylbis(hydrogenated tallow alkyl)methyl, chlorides	61789-73-9	75-85
ethanol	64-17-5	10-25
Isopropanol	67-63-0	0-5
water	7732-18-5	0-10
Amines, bis(hydrogenated tallow alkyl)methyl	61788-63-4	0.001-2
Bis(hydrogenated tallowalkyl)methylamines hydrochloride	Not Assigned	0.001-2
benzyl chloride	100-44-7	<0.2
methyl chloride	74-87-3	<0.03

# Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 30 minutes. Cold water may be used. Get medical attention immediately.
Skin Contact	Wash with soap and water. Get medical attention if irritation develops. Cold water may be used.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Ingestion	Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.
Medical Conditions Aggravated by verexposure	Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Flammability of the Product	Flammable.
Auto-ignition Temperature	The lowest known value is 398.85°C (749.9°F) (ethanol).
Flash Points	Closed cup: 21.1°C (70°F). (Pensky-Martens.)
Flammable Limits	The greatest known range is LOWER: 3.3% UPPER: 19% (ethanol)
Products of Combustion	These products are carbon oxides (CO, CO <sub>2</sub> ), nitrogen oxides (NO, NO <sub>2</sub> ), .
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks and static discharge, of heat.
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Protective Clothing (Fire)	Be sure to use an approved/certified respirator or equivalent.
Special Remarks on Fire Hazards	Take precautionary measures against static discharges. No sparking tools should be used.

# Section 5. Fire Fighting Measures

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# Section 6. Accidental Release Measures

Mail Spill and LeakDilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste<br/>disposal container. If necessary: Use suitable protective equipment (Section 8).Large Spill and LeakKeep away from heat. Keep away from sources of ignition. Stop leak if without risk. If the product is in<br/>its solid form: Use a shovel to put the material into a convenient waste disposal container. If the product<br/>is in its liquid form: Absorb with DRY earth, sand or other non-combustible material. Do not get water<br/>inside container. Absorb with an inert material and put the spilled material in an appropriate waste<br/>disposal. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into<br/>sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Use suitable<br/>protective equipment (Section 8).

# Section 7. Handling and Storage

Handling	Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.
Storage	Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

# Section 8. Exposure Controls/ Personal Protection

-	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	
Eyes	Face shield.
Body	Full suit.
	Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Hands	Gloves.
Feet	Boots.
Protective Clothing (Pictograms)	
Case of a Large Spill	Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Ingredient Name	Exposure Limits United States
quaternary ammonium com benzylbis(hydrogenated tall chlorides	
ethanol	ACGIH TLV (United States, 2006). Notes: 1996 Adoption Refers to Appendix A Carcinogens. TWA: 1880 mg/m <sup>3</sup> 8 hour(s).
	TWA: 1000 ppm 8 hour(s).
· ·	NIOSH REL (United States, 2001).
	TWA: 1900 mg/m <sup>3</sup> 10 hour(s). TWA: 1000 ppm 10 hour(s).

RQUAD® M2HTB ES E	Page: 4/9
······································	OSHA PEL (United States, 1997).
	TWA: 1900 mg/m <sup>3</sup> 8 hour(s).
	TWA: 1000 ppm 8 hour(s).
	OSHA PEL 1989 (United States, 1989).
	TWA: 1900 mg/m <sup>3</sup> 8 hour(s).
	TWA: 1000 ppm 8 hour(s).
Isopropanol	ACGIH TLV (United States, 2005). Notes: ACGIH 2003 Adoption Refers to
	Appendix A – Carcinogens.
	STEL: 400 ppm 15 minute(s). Form: All forms
	TWA: 200 ppm 8 hour(s). Form: All forms
	NIOSH REL (United States, 2001).
	STEL: 1225 mg/m <sup>3</sup> 15 minute(s). Form: All forms
	STEL: 500 ppm 15 minute(s). Form: All forms
	TWA: 980 mg/m³ 10 hour(s). Form: All forms TWA: 400 ppm 10 hour(s). Form: All forms
	OSHA PEL (United States, 1997).
2 · · ·	TWA: 980 mg/m <sup>3</sup> 8 hour(s). Form: All forms
	TWA: 400 ppm 8 hour(s). Form: All forms
	OSHA PEL 1989 (United States, 1989).
	STEL: 1225 mg/m <sup>3</sup> 15 minute(s). Form: All forms
	STEL: 500 ppm 15 minute(s). Form: All forms
	TWA: 980 mg/m <sup>3</sup> 8 hour(s). Form: All forms
	TWA: 400 ppm 8 hour(s). Form: All forms
water	Not available.
Amines, bis(hydrogenated tallow alkyl)methyl	Not available.
Bis(hydrogenated tallowalkyl)methylamines hydrochloride	
benzyl chloride	ACGIH TLV (United States, 2005). Notes: Substance identified by other source
	as a suspected or confirmed human carcinogen. 1996 Adoption Refers to
	Appendix A Carcinogens.
	TWA: 5.2 mg/m <sup>3</sup> 8 hour(s). Form: All forms
	TWA: 1 ppm 8 hour(s). Form: All forms
	NIOSH REL (United States, 2001). CEIL: 5 mg/m <sup>3</sup> 15 minute(s). Form: All forms
	CEIL: 1 ppm 15 minute(s). Form: All forms
	OSHA PEL (United States, 1997).
	TWA: 5 mg/m <sup>3</sup> 8 hour(s). Form: All forms
	TWA: 1 ppm 8 hour(s). Form: All forms
	OSHA PEL 1989 (United States, 1989).
	TWA: 5 mg/m <sup>3</sup> 8 hour(s). Form: All forms
	TWA: 1 ppm 8 hour(s). Form: All forms
methyl chloride	ACGIH TLV (United States, 2005). Skin Notes: Substance identified by other
•	sources as a suspected or confirmed human carcinogen. 1996 Adoption
	Substances for which the TLV is higher than the OSHA Permissible Exposure
	Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFF
	58(124) :36338-33351, June 30, 1993, for revised OSHA PEL. Refers to Appen
	A – Carcinogens.
	STEL: 207 mg/m <sup>3</sup> 15 minute(s). Form: All forms
	STEL: 100 ppm 15 minute(s). Form: All forms
	TWA: 103 mg/m <sup>3</sup> 8 hour(s). Form: All forms
	TWA: 50 ppm 8 hour(s). Form: All forms
	OSHA PEL 1989 (United States, 1989). Notes: See Table Z-2.
	STEL: 210 mg/m <sup>3</sup> 15 minute(s). Form: All forms
	STEL: 100 ppm 15 minute(s). Form: All forms
	TWA: 105 mg/m <sup>3</sup> 8 hour(s). Form: All forms
	TWA: 50 ppm 8 hour(s). Form: All forms
	OSHA PEL Z2 (United States, 1997).
	AMP: 300 ppm 5 minute(s). Form: All forms
	CEIL: 200 ppm Form: All forms

# Section 9. Physical and Chemical Properties

-nysical State	Liquid.
Color	White to yellowish.
Odor	Alcohol like.
pН	Basic.
Boiling/Condensation Point	80°C (176°F)
Melting/Freezing Point	27°C (80.6°F)
Density	Not determined.
Vapor Pressure	Not determined.
Vapor Density	Not determined.
Odor Threshold	The lowest known value is 180 ppm (ethanol) Weighted average: 197.31 ppm
Evaporation Rate	The highest known value is 1.7 (ethanol) Weighted average: 1.56compared to Butyl acetate.
Solubility	Easily soluble in hot water, methanol, acetone. Partially soluble in cold water.
<b>Dispersion Properties</b>	See solubility in water, methanol, acetone.
Physical Chemical Comments	Freezing point= 24°C

# Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Incompatibility with Various Substances	Reactive with OXIDIZING AGENTS. Slightly reactive to reactive with acids.
Jzardous Decomposition Products	These products are halogenated compounds, hydrogen chloride.
Hazardous Polymerization	Will not occur.

# Section 11. Toxicological Information

Toxicity to Animals				
Ingredient Name or Product name	Test	Result	Route	Species
quaternary ammonium compounds, benzylbis(hydrogenated tallow alkyl)methyl, chlorides	LD50	>2000 mg/kg	Oral	Rat
ethanol	LD50	7060 mg/kg	Oral	Rat
	LD50	6300 mg/kg	Oral	Rabbit
	LD50	3450 mg/kg	Oral	Mouse
	LDLo	1400 mg/kg	Oral	human
	LDLo	5500 mg/kg	Oral	Dog
	LC50	20000 ppm (10 hour(s))	Inhalation	Rat
Isopropanol	LD50	5045 mg/kg	Oral	Rat
	LD50	6410 mg/kg	Oral	Rabbit
	LD50	3600 mg/kg	Oral	Mouse
	LD50	12800 mg/kg	Dermal	Rabbit
	LDLo	1537 mg/kg	Oral	Dog
	LDLo	3570 mg/kg	Oral	human
	LDLo	5272 mg/kg	Oral	man
	LC50	12000 ppm (8 hour(s))	Inhalation	Rat
	LC50	16970 ppm (4 hour(s))	Inhalation	Rat

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Amines, bis(hydrogenate	d tallow LD50	>5000 mg/kg	Oral	Rat based on data for: (similar material)
alkyl)methyl	LD50	1231 mg/kg	Oral	Rat
	LD50	1500 mg/kg	Oral	Mouse
	LD50	1500 mg/kg	Oral	Mammal
methyl chloride	LD50	1800 mg/kg	Oral	Rat
	MUTAGENIC EFFECTS DEVELOPMENTAL TO system/toxin/male [PRO Contains material which upper respiratory tract, s	VEN] [ethanol]. causes damage to the fo	teria and/or yeast. eproductive sys llowing organs: bla	[Isopropanol]. tem/toxin/female, Reproductiv pod, the reproductive system, live
	Contains material which	skin, central nervous syste may cause damage to the		
Acute Effects Skin	Contains material which Practically non-toxic in c	may cause damage to the		
Acute Effects Skin Acute Effects Eyes		may cause damage to the		

# Section 12. Ecological Information

	cotoxicity					
	Ingredient Name or Produ	uct name	Species	Period	Result	
	ethanol		Daphnia magna (EC50)	48 hour(s)	2 mg/l	
			Daphnia magna (EC50)	48 hour(s)	9.3 mg/l	
			Daphnia magna (EC50)	48 hour(s)	>100 mg/l	
			Pimephales promelas (LC50)	96 hour(s)	>100 mg/l	
			Daphnia magna (LC50)	96 hour(s)	>100 mg/l	
			Oncorhynchus mykiss (LC50)	96 hour(s)	13000 mg/l	
	Isopropanol		Pimephales promelas (EC50)	48 hour(s)	10000 mg/l	
			Lepomis macrochirus (LC50)	96 hour(s)	>1400 mg/l	
			Pimephales promelas (LC50)	96 hour(s)	6550 mg/l	
			Pimephales promelas (LC50)	96 hour(s)	9640 mg/l	
			Pimephales promelas (LC50)	96 hour(s)	10400 mg/l	
			Pimephales promelas (LC50)	96 hour(s)	11130 mg/l	
	Amines, bis(hydrogenated ta	allow	Aigae. based on data for:	72 hour(s)	0.12 mg/l	
	alkyl)methyl		(similar material) (EC50)			
			Algae, based on data for:	72 hour(s)	0.05 mg/l	
			(similar material) (EC50)			
	benzyl chloride		Pimephales promelas (LC50)	96 hour(s)	5 mg/l	
	methyl chloride		Lepomis macrochirus (LC50)	96 hour(s)	550 mg/l	
	Biodegradability and Ecotoxicity Remarks	quaternary ammonium compounds, benzylbis(hydrogenated tallow alkyl)methyl, chlorides: 3% @ 28 day(s) CBT Amines, bis(hydrogenated tallow alkyl)methyl: 86% @ 14 day(s) CBT				
_	Products of Degradation	These prod	iucts are carbon oxides (CO, CO <sub>2</sub> )	and water, nitrogen	oxides (NO, NO₂).	

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# Section 13. Disposal Considerations

. aste InformationWaste must be disposed of in accordance with federal, state and local environmental control<br/>regulations.RCRA ClassificationD001 Ignitable Waste

### Consult your local or regional authorities.

# Section 14. Transport Information

Regulatory Information	UN number	Proper shipping name	Class	Packing Group	Label	Additional information
DOT Classification	UN1993	Flammable liquids, n.o.s. (ethanol, Isopropanol)	3	11		-
TDG Classification	UN1993	FLAMMABLE LIQUID, N.O.S. (ethanol, Isopropanol)	3	11		
IMDG Class	UN1993	FLAMMABLE LIQUID, N.O.S. (ethanol, Isopropanol)	3	II		-
A-DGR Class	UN1993	Flammable liquid, n.o.s. (ethanol, Isopropanol)	3	11		-

# Section 15. Regulatory Information

**Continued on Next Page** 

HCS Classification	Flammable liquid Target organ effects Corrosive Material				
U.S. Federal Regulations	TSCA: All intentionally present components are listed on the TSCA inventory.				
	DSL: All intentionally present components are listed on the DSL.				
	TSCA 5(a)2 final significant rules: No products were found.				
	CERCLA: Hazardous substances.: benzyl chloride: 100 lbs. (45.36 kg); methyl chloride: 100 lbs. (45.36 kg);				
	SARA 302/304/311/312 extremely hazardous substances: No products were found. SARA 302/304 emergency planning and notification: No products were found. SARA 302/304/311/312 hazardous chemicals: ARQUAD® M2HTB ES E SARA 311/312 MSDS distribution - chemical inventory - hazard identification: ARQU E: Fire Hazard, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard				
	SARA 313 Form R Reporting Requirements				
	Isopropanol	0-5			
	benzyl chloride	<0.2			

ARQUAD® M2HTB ES	E			Page: 8/9	
	SARA 313 Supplier Notification				
	Isopropanol			0-5	
	benzyl chloride			<0.2	
ate Regulations	Pennsylvania RTK: ethanol: (generic generic environmental hazard); benzy hazard); methyl chloride: (environmer Massachusetts RTK: ethanol; lsoprop New Jersey: ethanol; lsopropanol; be	/l chloride: (environ Ital hazard, generic Janol; benzyl chloric	mental hazard, generi environmental hazard le; methyl chloride	c environmental	
<b>_</b>	California prop. 65: This product conta has found to cause cancer, birth defe- under the statute: benzyl chloride; me California prop. 65 (no significant risk California prop. 65: This product conta has found to cause birth defects whic California prop. 65: This product conta has found to cause cancer which wou	cts or other reprodu athyl chloride level): benzyl chlor ains the following in h would require a w ains the following in	ictive harm, which wo ide gredients for which th varning under the statu gredients for which th	uld require a warning e State of California ute: methyl chloride e State of California	
WH <b>M</b> IS (Canada)	Class B-2: Flammable liquid with a fla Class D-2A: Material causing other to Class D-2B: Material causing other to	xic effects (VERY 1	FOXIC).		
	CEPA DSL: quaternary ammonium compounds, benzylbis(hydrogenated tallow alkyl)methyl, ethanol; Isopropanol; water; Amines, bis(hydrogenated tallow alkyl)methyl; benzyl chloride; m chloride				
	Component	EC Number	EC Status	EC Annex	
European Union	quaternary ammonium compounds, benzylbis(hydrogenated tallow alkyl)methyl, chlorides	263-082-9	Not available.	Not available.	
	ethanol	200-578-6	Not available.	603-002-00-5	
	Isopropanol	200-661-7	Not available.	603-117-00-0	
	water	231-791-2	Not available.	Not available.	
	Amines, bis(hydrogenated tallow alkyl)methyl	262-991-8	Not available.	Not available.	
	Bis(hydrogenated	Not available.	Not available.	Not available.	
	tallowalkyi)methylamines		Hot available.		
	hydrochloride				
	benzyl chloride	202-853-6		602-037-00-3	
	methyl chloride	200-817-4	Not available.	602-001-00-7	
Other International Lists	Australia (NICNAS): quaternary ammonium compounds, benzylbis(hydrogenated tallow alkyl)methyl, chlorides; ethanol; isopropanol; water; Amines, bis(hydrogenated tallow alkyl)methyl; benzyl chloride; methyl chloride				
	China: quaternary ammonium compounds, benzylbis(hydrogenated tallow alkyl)methyl, chlorides; ethanol; Isopropanol; water; Amines, bis(hydrogenated tallow alkyl)methyl; benzyl chloride; methyl chloride				
	Germany water class: ethanol; Isopropanol; Amines, bis(hydrogenated tallow alkyl)methyl; benzyl chloride; methyl chloride				
	Japan (MITI): ethanol; Isopropanol; water; Amines, bis(hydrogenated tallow alkyl)methyl; benzyl chloride; methyl chloride				
	Japan (MOL): Isopropanol				
· .	Korea (TCCL): quaternary ammoniur chlorides; ethanol; Isopropanol; wate methyl chloride				
Sec. 2	Philippines (RA6969): quaternary am chlorides; ethanol; Isopropanol; wate methyl chloride				

### ARQUAD® M2HTB ES E

# Section 16. Other Information

Hazardous Material Information System (U.S.A.)	Health Fire Hazard Reconstruction	3 3 0	National Fire Protection Association (U.S.A.)	Health 3 Fire Hazard Specific Hazard
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Other Information Arquad® is a registered trademark of Akzo Nobel or affiliated companies and is registered in one or more countries including the United States.

Validation Date	5/14/2007.	Validated by	Product Safety Specialist
Previous Validation Date	10/26/2005.	Print Date	5/21/2007.
		Phone Number	312-544-7038

### Notice to Reader

The information in the material safety data sheet should be provided to all who will use, handle, store, transport or otherwise be exposed to this product. All information concerning this product and/or suggestions for handling and use contained herein are offered in good faith and are believed to be reliable as of the date of publication. However, no warranty is made as to the accuracy of and/or sufficiency of such information and/or suggestions or as to the product's merchantability or fitness for any particular purpose, or that any suggested use will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. Buyer must determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes, including mixing with other products. The information contained herein supersedes all previously issued bulletins on the subject matter covered. If the date on this document is more than three years old, call to make certain that this sheet is current.

-2M2HT



Material Safety Data Sheet

MSDS# 15-31740

Page: 1/8

### Section 1. Chemical Product and Company Identification

**ARQUAD® 2HT-83E ES Product name Material Uses** : Surfactant. In Case of Emergency Supplier/ AKZO NOBEL SURFACE CHEMISTRY LLC CHEMTREC: 800-424-9300 Manufacturer 525 West Van Buren CANUTEC: 613-996-6666 Medical/Handling: Chicago, IL 60607-3823 914-693-6946 www.surfactants.akzonobel.com Product/Technical: 800-906-9977 AKZO NOBEL CHEMICALS LTD. 1 City Centre Drive, Suite 318 Mississauga, Ontario L5B 1M2 Canada

# Section 2. Hazards Identification

Physical State Color Odor	Liquid. White. Alcohol like.
ergency Overview	WARNING! FLAMMABLE LIQUID AND VAPOR VAPOR MAY CAUSE FLASH FIRE. MAY CAUSE EYE IRRITATION. CONTAINS ETHANOL-CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS: BLOOD, REPRODUCTIVE SYSTEM, LIVER, RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA TOXIC TO AQUATIC ORGANISMS. MAY BE HARMFUL TO ENVIRONMENT IF RELEASED IN LARGE AMOUNTS. Keep away from heat, sparks and flame. Avoid contact with eyes. Keep container closed. Use only with adequate ventilation. Avoid exposure during pregnancy. Wash thoroughly after handling. Avoid contact of spilled material and runoff with soil and surface waterways.
Possible Carcinogenic Effects	quaternary ammonium compounds, bis(hydrogenated tallow alkyl)dimethyl, chlorides: ACGIH IARC Not listed. NTP = No Evidence. OSHA = None. ethanol: ACGIH A4; IARC NTP OSHA Not listed. water: IARC, NTP, OSHA, ACGIH: Not listed. Bis(hydrogenated tallowalkyl)methylamines hydrochloride: IARC, NTP, OSHA, ACGIH: Not listed. Amines, bis(hydrogenated tallow alkyl)methyl: IARC, NTP, OSHA, ACGIH: Not listed. methyl chloride: ACGIH A4; IARC 3; NTP OSHA Not listed.
Routes of Entry	Absorbed through skin. Eye contact.
	See Toxicological Information (section 11)

### Section 3. Composition/Information on Ingredients

Name

CAS#

% by Weight

ARQUAD® 2HT-83E ES		Page: 2/8
quaternary ammonium compounds, bis(hydrogenated tallow alkyl)dimethyl, chlorides	61789-80-8	81-85
nol	64-17-5	14
ər	7732-18-5	1-5
Bis(hydrogenated tallowalkyl)methylamines hydrochloride	Not Assigned	0.001-5
Amines, bis(hydrogenated tallow alkyl)methyl	61788-63-4	0.001-5
methyl chloride	74-87-3	<0.03

# Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 30 minutes. Cold water may be used. Get medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Ingestion	Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.
Medical Conditions Aggravated by Overexposure	Repeated or prolonged exposure is not known to aggravate medical condition.

# Section 5. Fire Fighting Measures

mmability of the	Flammable.
Auto-ignition Temperature	The lowest known value is 398.85°C (749.9°F) (ethanol).
Flash Points	Closed cup: 37.8°C (100°F). (Pensky-Martens.)
Flammable Limits	The greatest known range is LOWER: 3.3% UPPER: 19% (ethanol)
Products of Combustion	These products are carbon oxides (CO, CO <sub>2</sub> ), nitrogen oxides (NO, NO <sub>2</sub> ).
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Protective Clothing (Fire)	Be sure to use an approved/certified respirator or equivalent.
Special Remarks on Fire Hazards	No sparking tools should be used. Take precautionary measures against static discharges.

# Section 6. Accidental Release Measures

Small Spill and LeakDilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste<br/>disposal container.Large Spill and LeakKeep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY<br/>earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers,<br/>basements or confined areas; dike if needed.

# Section 7. Handling and Storage

andling	Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.
Storage	Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

# Section 8. Exposure Controls/ Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	
Eyes	Splash goggles.
Body	Lab coat.
Respiratory	Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate

Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Gloves.

Hands

Feet

Protective Clothing

Not applicable.



Personal Protection in<br/>Case of a Large SpillSplash goggles. Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus<br/>should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient;<br/>consult a specialist BEFORE handling this product.

# Ingredient Name Expo quaternary ammonium compounds, Not a bis(hydrogenated tallow alkyl)dimethyl, Chlorides ethanol ACGI Carci Carci

**Exposure Limits United States** 

Not available.

ACGIH TLV (United States, 2006). Notes: 1996 Adoption Refers to Appendix A --Carcinogens. TWA: 1880 mg/m<sup>3</sup> 8 hour(s). TWA: 1000 ppm 8 hour(s). NIOSH REL (United States, 2001). TWA: 1900 mg/m<sup>3</sup> 10 hour(s). TWA: 1000 ppm 10 hour(s). OSHA PEL (United States, 1997). TWA: 1900 mg/m<sup>3</sup> 8 hour(s). TWA: 1000 ppm 8 hour(s). OSHA PEL 1989 (United States, 1989). TWA: 1900 mg/m<sup>3</sup> 8 hour(s). TWA: 1000 ppm 8 hour(s). Not available. water Bis(hydrogenated tallowalkyl)methylamines Not available. hydrochloride mines, bis(hydrogenated tallow Not available. alkyl)methyl methyl chloride ACGIH TLV (United States, 2005). Skin Notes: Substance identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption

### Continued on Next Page

ARQUAD® 2HT-83E ES	Page: 4/8
	Substances for which the TLV is higher than the OSHA Permissible Exposure
	Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFR
	58(124) :36338-33351, June 30, 1993, for revised OSHA PEL. Refers to Appendix
	A Carcinogens.
	STEL: 207 mg/m <sup>3</sup> 15 minute(s). Form: All forms
	STEL: 100 ppm 15 minute(s). Form: All forms
	TWA: 103 mg/m <sup>3</sup> 8 hour(s). Form: All forms
	TWA: 50 ppm 8 hour(s). Form: All forms
	OSHA PEL 1989 (United States, 1989). Notes: See Table Z-2.
	STEL: 210 mg/m <sup>3</sup> 15 minute(s). Form: All forms
	STEL: 100 ppm 15 minute(s). Form: All forms
	TWA: 105 mg/m <sup>3</sup> 8 hour(s). Form: All forms
	TWA: 50 ppm 8 hour(s). Form: All forms
	OSHA PEL Z2 (United States, 1997).
	AMP: 300 ppm 5 minute(s). Form: All forms
	CEIL: 200 ppm Form: All forms
- ·	TWA: 100 ppm 8 hour(s). Form: All forms

# Section 9. Physical and Chemical Properties

Dhumiest State	Liquid
Physical State	Liquid.
Color	White.
Odor	Alcohol like.
рН	Not determined.
Boiling/Condensation Point	78.27°C (172.9°F)
Melting/Freezing Point	68°C (154.4°F)
Density	0.851 g/cm <sup>3</sup> (25°C / 77°F)
por Pressure	4.7 kPa (35 mmHg) (at 20°C)
apor Density	1.6 (Air = 1)
Odor Threshold	Not determined.
Evaporation Rate	1.7 compared to Butyl acetate.
Solubility	Easily soluble in cold water, hot water. Soluble in methanol, acetone.
<b>Dispersion Properties</b>	See solubility in water, methanol, acetone.
Physical Chemical Comments	Freezing point = 37°C

# Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Incompatibility with Various Substances	Reactive with OXIDIZING AGENTS. Slightly reactive to reactive with acids.
Hazardous Polymerization	Will not occur.
	2 7 8 2 P 47

# Section 11. Toxicological Information

Toxicity to Animals				
Ingredient Name or Product	Test	Result	Route	Species
name				

**Continued on Next Page** 

RQUAD® 2HT-83E ES				Page: 5/8
quaternary ammonium compound	ds, LD50	>9850 mg/kg	Oral	Rat
bis(hydrogenated tallow alkyt)dimethyl, chlorides	LC50	>180 mg/l (1 hour(s))	Inhalation	Rat
thanol	LD50	7060 mg/kg	Oral	Rat
	LD50	6300 mg/kg	Oral	Rabbit
	LD50	3450 mg/kg	Oral	Mouse
	LDLo	1400 mg/kg	Oral	human
	LDLo	5500 mg/kg	Oral	Dog
	LC50	20000 ppm (10 hour(s))	Inhalation	Rat
Amines, bis(hydrogenated tallow alkyl)methyl	LD50	>5000 mg/kg	Oral	Rat based on data for (similar material)
methyl chloride	LD50	1800 mg/kg	Oral	Rat
Chronic Effects on Humans CARCINOGENIC EFFECTS: Classified None. by OSHA, None. by NIOSH [quaternary amm compounds, bis(hydrogenated tallow alkyl)dimethyl, chlorides]. Classified None. by NIOSH [et Classified A4 (Not classifiable for human or animal.) by ACGIH [ethanol]. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reprod system/toxin/male [PROVEN] [ethanol]. Contains material which causes damage to the following organs: blood, the reproductive system upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.			ified None. by NIOSH [ethand ol]. n/toxin/female, Reproduction d, the reproductive system, live	

# Section 12. Ecological Information

Ingredient Name or Product name	Species	Period	Result
quaternary ammonium compounds,	Fish (LC50)	96 hour(s)	1.33 mg/l
is(hydrogenated tallow alkyl)dimethyl,	Trout (LC50)	96 hour(s)	4.22 mg/l
hlorides	Algae. (EC50)	96 hour(s)	0.21 mg/l
ethanol	Daphnia magna (EC50)	48 hour(s)	2 mg/l
	Daphnia magna (EC50)	48 hour(s)	9.3 mg/l
	Daphnia magna (EC50)	48 hour(s)	>100 mg/l
	Pimephales promelas (LC50)	96 hour(s)	>100 mg/l
	Daphnia magna (LC50)	96 hour(s)	>100 mg/l
	Oncorhynchus mykiss (LC50)	96 hour(s)	13000 mg/l
Amines, bis(hydrogenated tallow alkyl)methyl	Algae. based on data for: (similar material) (EC50)	72 hour(s)	0.12 mg/l
	Algae. based on data for: (similar material) (EC50)	72 hour(s)	0.05 mg/i
methyl chloride	Lepomis macrochirus (LC50)	96 hour(s)	550 mg/l
Ecotoxicity Remarks 287 day(s)		-	alkyl)dimethyl, chlorides: 68% @ (s) CBT

Products of Degradation These products are carbon oxides (CO, CO<sub>2</sub>) and water, nitrogen oxides (NO, NO<sub>2</sub>...).

### Section 13. Disposal Considerations

Waste Information

**Continued on Next Page** 

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Consult your local or regional authorities.

# Section 14. Transport Information

gulatory Information	UN number	Proper shipping name	Class	Packing Group	Label	Additional information
DOT Classification	UN1993	Flammable liquids, n.o.s. (ethanol)	3	L H		-
TDG Classification	UN1993	FLAMMABLE LIQUID, N.O.S. (ethanol)	3	111	٩	-
IMDG Class	UN1993	FLAMMABLE LIQUID, N.O.S. (ethanol)	3			-
IATA-DGR Class	UN1993	Flammable liquid, n.o.s. (ethanol)	3			

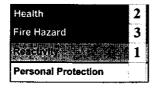
# Section 15. Regulatory Information

HCS Classification	Target organ effects Reproductive toxin Combustible liquid
U.S. Federal Regulations	TSCA: All intentionally present components are listed on the TSCA inventory.
	DSL: All intentionally present components are listed on the DSL.
	TSCA 5(a)2 final significant rules: No products were found.
	CERCLA: Hazardous substances.: methyl chloride: 100 lbs. (45.36 kg);
	SARA 302/304/311/312 extremely hazardous substances: No products were found. SARA 302/304 emergency planning and notification: No products were found. SARA 302/304/311/312 hazardous chemicals: ARQUAD® 2HT-83E ES SARA 311/312 MSDS distribution - chemical inventory - hazard identification: ARQUAD® 2HT-83E ES: Fire Hazard, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard SARA 313 Form R Reporting Requirements No products were found.
	SARA 313 Supplier Notification No products were found.
State Regulations	Pennsylvania RTK: ethanol: (generic environmental hazard); methyl chloride: (environmental hazard, generic environmental hazard) Massachusetts RTK: ethanol; methyl chloride
n An Anna Anna Anna Anna Anna Anna Anna	New Jersey: ethanol; methyl chloride

ARQUAD® 2HT-83E E	'S			Page: 7/8
	California prop. 65: This product cont has found to cause cancer, birth defe under the statute: methyl chloride California prop. 65: This product cont has found to cause birth defects whic	ects or other reprodu	uctive harm, which wo	uld require a warning ne State of California
WHMIS (Canada)	Class B-3: Combustible liquid with a f Class D-2A: Material causing other to Class D-2B: Material causing other to	xic effects (VERY 1	TOXIC).	93.3°C (200°F).
	CEPA DSL: quaternary ammonium c ethanol; water; Amines, bis(hydroger	ompounds, bis(hyd nated tallow alkyl)m	rogenated tallow alkyl ethyl; methyl chloride	)dimethył, chlorides;
European Union	Component quaternary ammonium compounds, bis(hydrogenated tallow alkyl)dimethyl, chlorides	EC Number 263-090-2	<b>EC Status</b> Not available.	EC Annex Not available.
	ethanol water Bis(hydrogenated tallowalkyl)methylamines hydrochloride	200-578-6 231-791-2 Not available.	Not available. Not available. Not available.	603-002-00-5 Not available. Not available.
	Amines, bis(hydrogenated tallow alkyl)methyl methyl chloride	262-991-8 200-817-4	Not available. Not available.	Not available. 602-001-00-7
Other International Lists	Australia (NICNAS): quaternary amm chlorides; ethanol; water; Amines, bis China: quaternary ammonium compo water; Amines, bis(hydrogenated talk	onium compounds, s(hydrogenated tallo unds, bis(hydrogen	bis(hydrogenated tall w alkyl)methyl; methy ated tallow alkyl)dime	ow alkyl)dimethyl, /l chloride
	Germany water class: quaternary am chlorides; ethanol; Amines, bis(hydro	monium compound genated tallow alky	s, bis(hydrogenated ta I)methyl; methyl chlori	allow alkyl)dimethyl, ide
	Japan (MITI): quaternary ammonium ethanol; water; Amines, bis(hydrogen	compounds, bis(hy ated tallow alkyl)me	drogenated tailow alk; ethyl; methyl chloride	yl)dimethyl, chlorides;
	Korea (TCCL): quaternary ammoniun ethanol; water; Amines, bis(hydrogen	n compounds, bis(h ated tallow alkyl)me	ydrogenated tallow all ethyl; methyl chloride	kyl)dimethyl, chloride:
	Philippines (RA6969): quatemary am chlorides; ethanol; water; Amines, bis	monium compound	s, bis(hydrogenated ta w alkyl)methyl: methy	allow alkyl)dimethyl, d chloride

### Section 16. Other Information

Hazardous Material Information System (U.S.A.)



National Fire Protection Association (U.S.A.)



Other Information Arquad® is a registered trademark of Akzo Nobel or affiliated companies and is registered in one or more countries including the United States.

Validation Date5/14/2007.Previous Validation Date7/25/2006.

Validated by Print Date Phone <del>N</del>umber Product Safety Specialist 5/21/2007. 312-544-7038

Notice to Reader

### ARQUAD® 2HT-83E ES

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### MATERIAL SAFETY DATA SHEET INDEX RAW MATERIALS PLANT

Additives

Sodium Chloride Salt Sodium Stearate HDO ® 1,6 Hexanediol E3008 Sodium Nitrate SLS (Sodium Lauryl Sulfate Sodium Benzoate E3009 Tetrasodium Pyrophosphate Tetrasodium Pyrophosphate Anhydrous Tetrasodium Pyrophosphate (FMC) Tetrasodium Pyrophosphate (Olin) Econ-Abrator © Catalyst

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# MATERIAL SAFETY DATA SHEET

Product Name	)	Sodium Chloride, Salt		
CAS #		7647-14-5		
Product use		De-icer. General industrial and water softening/conditioning purposes.		
Manufacturer		North American Salt Company 9900 West 109th SL, Suite 600 Overland Park, KS 66210 US Phone: 913-344-9200		
Supplier		Compess Minerals International 9900 West 109th Street, Suite 600 Overland Park, KS 66210 US Phone: 913-344-9200 Website: www.compessminerals.com		
LEGENI HMIS/NFI	-			
Severe	4			
Serious	3			
Moderate	2	Physical Hazard 0		
60_L.	1	Personal Protection		
Slight				

### 1. Product and Company Identification

2. Hazards Identification

Emergency overview	CAUTION EYE AND SKIN IRRITANT.
Potential short term health offe	
Routes of exposure	Eye, Skin contact, Inhalation, Ingestion.
Eyes	May cause initiation,
<b>Skin</b>	May cause initiation.
Inhalation	Dusts of this product may cause irritation of the nose, throat, and respiratory tract.
Ingestion	May cause stomech distress, nauses or vomiting.
Target organs	Eyes, Skin, Respiratory system.
Chronic effects	Prolonged or repeated exposure can cause drying, defatting and dormatitis.
Signe and symptoms	Symptoms may include redness, edems, drying, defaiting and cracking of the skin. Symptoms of overexposure may be headache, dizziness, tiredness, hauses and vomiting.

# 3. Composition / Information on Ingredients

ingradient(s)	CAS #	Barnand	
Sodium chloride	7647-14-5	Fercent 60 - 100	
	4. First Aid Measures		
First aid procedures			
Eye contact	Flush with cool water. Remove contact lenses, if applicable, and continue flu Obtain medical attention if initiation persists.	shing,	
Sidn contact	Brush away excess of dry meterial. Flush with water. Obtain medical attention if irritation persists.		
Inhalation	If symptoms develop move victim to fresh air. If symptoms persist, obtain medical attention.		
Ingestion	Do not induce vomiting. Rinse mouth with water, then drink one or two glasses of water. Obtain medical attention. Never give anything by mouth if victim is unconscious, or is convulsing.		
Notes to physician	Symptoms may be delayed.		
General advice	None Available.		
	5. Fire Fighting Measures		
Flammable properties	Not fammable by WHMIS/OSHA oriteria. May be combustible at high temper	etures.	

#12463

Extinguishing media			
Suitable extinguishing modia	Treat for surrounding material.		
Unsuitable attinguishing media	Not available		
Protection of firefighters			
Specific hazards arising from the chemical	Not available		
Protective equipment for firefighters	Firefighters should wear full protective clothing including self contained breathing apparetus.		
	6. Accidental Release Measures		
Personal precautions	Before attempting clean up, refer to hazard data given above. Use broom or dry vacuum to collect material for proper disposal without raising dust. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.		
Nethods for containment	None necessary.		
Methods for cleaning up	Before attempting clean up, refer to hazard data given above. Use broom or dry vacuum to collect material for proper disposal without raising dust. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.		

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# 7. Handling and Storage

Handling	Avoid breathing dusts from this material.
Storage	Keep out of reach of children. Keep containers tightly closed in a cool, well-ventilated
•	place.

# 8. Exposure Controls / Personal Protection

Exposure ilmits Ingredient(s)	Exposure Limits
Sodium chloride	ACGH-TLV
Sodialu caronois	Not established
	OSHA-PEL
	Not established
Engineering controls	TWA PEL: No specific limits have been established for sodium chloride (a soluble substance). As a guideline, OSHA (United States) has established the following limits which are generally recognized for inert or nuisence dust. Particulates Not Otherwise Regulated (PNOR): 5mg/cu.m. Respirable Dust 8-Hour TWA PEL, 15mg/cu.m. Total Dust 6-Hour TWA PEL.
	TWA TLV: No specific limits have been established for sodium chloride (a soluble substance). As a guideline, ACGIH (United States) has established the following limits which are generally recognized for inert or nulsance dust. Particulates (insolubles) Not Otherwise Classified (PNOC): 10mg/cu.m. Inhelable Particulate 8-Hours TWA TLV, 3mg/cu.m. Respirable Particulate TWA TLV.
	Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommanded exposure limits. If user operations generate dust, fumes, or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal protective equipment	
Eye / face protection	Safety glosses.
Hand protection	Rubber gloves. Confirm with a reputable supplier first.
Skin and body protection	As required by employer code.
Respiratory protection	Where exposure guidaline levels may be exceeded, use an approved NIOSH respirator or NIOSH-approved filtering facepiece.
General hygiene considerations	Handle in accordance with good industrial hygione and safety practice. When using do not eat or drink. Wash hands before breaks and immediately after handling the product.
9	. Physical & Chemical Properties

	and the second secon	the second s		
Appearance	Crystalline.			
Color	White			
Form	Crystals			
Odor	Odoriess.			
#12463		Page 2 of 5	latue data	08-Sep-2005

Odor threshold	Not available
Physical state	Solid
pH	6 - 8 (Neutral)
Meiting point	800.9 °C (1473.8 °F)
Freezing point	Notevellebie
Bolling point	1413 °C (2575.4 °F)
Flash point	Not available
Evaporation rate	Not available
Flammability limits in air, lower, % by volume	Not applicable
Flammability limits in air, upper, % by volume	Not applicable
Vapor pressure	0.1 kPa (1 mmHg) @ 855*C
Vapor density	Not applicable
Specific gravity	2.17 (H2O = 1)
Relative density	2.17 g/cm3
Octanol/water coefficient	Not available
Solubility (H2O)	36g/100g H2O @ 20°C
Auto-ignition temperature	Not available
Viscosity	Not applicable
Percent volatile	0 % ww
Nolecular weight	58.4400 g/mole
Molecular formula	NaCl

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# 10. Chemical Stability & Reactivity Information

Chemical stability	Stable under recommended storage conditions.
Conditions to avoid	Do not mix with incompatible materials.
Incompatible materials	Reactive with oxidizing egents, acids, lithium, bromine effluoride
Hazardous decomposition products	May include and are not limited to: Chlorine. sodium oxides
	Hazardous polymerization does not occur.

# 11. Toxicological Information

Component analysis - LCSO	
Ingradient(s)	LC50
Sodium chloride	> 21000 mg/m3 rat
Component analysis - Oral LD50	
Ingradient(s)	LDSQ
Sodium chloride	3000 mg/kg nat
Effects of acute exposure	
Eye	May cause initation.
Şkin	May cause initation.
Inhalation	Dusts of this product may cause imitation of the nose, throat, and respiratory tract.
Ingestion	May cause stomach distress, nauses or vomiting.
5ensitization	Not classified or listed by IARC, NTP, OSHA and ACGIH.
Chronic effects	Not classified or listed by IARC, NTP, OSHA and ACGH.
Carcinogenicity	Not classified or listed by IARC, NTP, OSHA and ACGIH.
Nutagenicity	Not classified or listed by JARC, NTP, OSHA and ACGIH.
Reproductive effects	Not classified or listed by IARC, NTP, OSHA and ACGIH.
Teratogenicity	Not classified or listed by IARC, NTP, OSHA and ACGIH.

# 12. Ecological Information

Ecotoxicity	Maybe harmful to freshwater aquatic species and to plants that are not saline tolerant.
Environmental effects	Not available
Aquatic toxicity	Not available
Persistence / degradability	Not available
Bioaccumulation / accumulation	Not evellable
#12463	Page 3 of 5 litera data

 Partition coefficient
 Not available

 Mobility in environmental media
 Not available

 Chemical fate information
 Not available

### **13. Disposal Considerations**

Weste codes Disposal instructions	Not available Waste must be disposed of in accordance with federal, state/provincial and local environmental control regulations.
Wasts from residues / unused products	Not evaluable
Contaminated peckaging	Not available

### 14. Transport Information

Department of Transportation (DOT)

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Not regulated as dangerous goods.

### Transportation of Dangerous Goods (TDG)

Not regulated as dangerous goods.

### 15. Regulatory Information

Canadian federal regulations	This product has been classified in accordance with the I Products Regulations and the MSDS contains all the info Controlled Products Regulations.	
US Federal regulations	This product is not known to be a "Hezardous Chemical" Communication Standard, 29 CFR 1910.1200, All components are on the U.S. EPA TSCA Inventory Lis	-
	CERCLA/SARA Hazardous Substances - Not applicable.	
Occupational Safety and Health Adm	inistration (OBHA)	
29 CFR 1910.1200 hazardous chemical	No	•
CERCLA (Superfund) reportable que None	ntity -	
Superfund Amendments and Results	prization Act of 1996 (SARA)	
Hazard categories	Immodiate Hazard - No Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hezard - No	
Section 302 extremely hazardous substance	No	
Section 311 hazerdous chemical	No	
Clean Air Act (CAA)	Not available	
Clean Water Act (CWA)	Not available	
Safe Drinking Water Act (SDWA)	Not available	
Drug Enforcement Agency (DEA)	Not evallable	
Food and Drug Administration (FDA)	Not available	
WHMIS status	Not Controlled	
State regulations	This product does not contain a chemical known to the State of California to cause canoer, birth defects or other reproductive herm.	
Inventory name		
Country(s) or region	Inventory name	On Inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) inventory	Yeş

A "Yea" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

Disclaimer

haus date Effective date Expiry date Prepared by

### **16. Other Information**

Information contained herein was obtained from sources considered technically accurate and reliable. While every effort has been made to ansure full disclosure of product hazards, in some cases data is not available and is so stated. Since conditions of actual product use are beyond control of the supplier, it is assumed that users of this material have been fully trained according to the negulitements of all applicable legislation and regulatory instruments. No warranty, expressed or implied, is made and supplier will not be liable for any losses, injuries or consequential damages which may result from the use of or reliance on any information contained in this document.

09-Sep-2005 01-Sep-2005

01-Sep-2008

Dell Tech Laboratories Ltd. (519) 858-5021

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# **RTD \* HALLSTAR Material Safety Data Sheet**

0283

# Product: OP-100 TG HM Sodium Stearate

Revision Date: 11/27/01

### Section 1. **Chemical Product and Company Identification**

MANUFACTURER / SUPPLIER:

**RTD HALLSTAR** 1500 Rt. 517 Suite 305 Hackettstown, NJ 07840

Information Telephone: 908-852-6128 24-Hour Emergency Telephone (Chemtrec): 800-424-9300

PRODUCT NAME:	
CHEMICAL FAMILY:	
FORMULA:	
CAS NUMBER:	

OP - 100 TG HM Sodium Stearate Soap Mixture Mixture

### Section 2. **Composition / Information on Ingredients**

MATERIAL	
Sodium Stearate	CAS NUMBER AMOUNT
	68309-30-8

All ingredients are considered non-hazardous by OSHA and various environmental laws.

#### Section 3. **Hazards** Identification

### POTENTIAL HEALTH EFFECTS:

INHALATION Dust may cause intitation EYE: May cause irritation. SKIN: Prolonged contact may cause irritation INGESTION: None determined

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Irritation

#### Section 4. First Aid Measures

### INHALATION:

Remove to fresh air

EYE CONTACT:

Promptly flush with water, holding the cyclids apart for 15 minutes. Seek medical attention. SKIN CONTACT:

Wash contaminated skin with mild soap and water.

INGESTION:

Treat as a soap ingestion. Get medical attention.

NOTES TO PHYSICIAN (INCLUDING ANTIDOTES):

Treat symptomatically.

#### Section 5. **Fire Fighting Measures**

### FLASH POINT (METHOD USED):

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# **RTD \* HALLSTAR** Material Safety Data Sheet

### Product: OP-100 TG HM Sodium Stearate

Revision Date: 11/27/01

177 C/350 F. COC

FLAMMABLE LIMITS IN AIR (% BY VOLUME)

LEL: N/A

UEL: N/A

EXTINGUISHING MEDIA: Co2, Fourn, or Dry Chemical

### SPECIAL FIRE FIGHTING PROCEDURES:

Do not use water! Compound is very slowly soluble in cold water and will float on water. Propelled media may also cause clouds of dust. Self-contained breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Dust explosion possible

### Section 6. Accidental Release Measures

### STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED:

Sweep up and put into container for disposal. Avoid dusting

### Section 7. Handling and Storage

### HANDLING:

In accordance with good industrial practice, handle with care and avoid unnecessary personal contact Avoid contact with eyes. Provide dust mask if conditions warrant.

### STORAGE:

2

Indoors. Keep dry

### Section 8. Exposure Controls / Personal Protection

ENGINEERING CONTROLS: VENTILATION: Dust collection at source may be required PERSONAL PROTECTIVE EOUIPMENT: EYE PROTECTION: Safety Glasses with side shields SKIN PROTECTION: Gloves for prolonged contact. RESPIRATORY PROTECTION: Dust Mask / NIOSH Approval respirator OTHER PROTECTIVE EQUIPMENT: Long Sleeves PERMISSIBLE EXPOSURE LIMITS: None determined

### Section 9. Physical and Chemical Properties

pH	NA
VAPOR DENSITY (AIR=1):	NA
SOLUBILITY (in water)	Complete

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# **RTD \* HALLSTAR Material Safety Data Sheet**

### Product: OP-100 TG HM Sodium Stearate

Revision Date: 11/27/01

SPECIFIC GRAVITY VAPOR PRESSURE (25 C) BOILING POINT APPEARANCE % VOLATILE **EVAPORATION RATE** REACTIVITY IN WATER

1.02 NA NA fine white powder, fatty odor NA NA NA

#### Section 10. Stability and Reactivity

STABILITY: Stable CONDITIONS TO AVOID: Dusting HAZARDOUS POLYMERIZATION: Will not occur. INCOMPATIBILITY (MATERIALS TO AVOID); Strong oxidizing agents, flame, spark, ect. Under dust conditions. HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide, Carbon Monoxide

#### Section 11. **Toxicological Information**

None available

#### IS CHEMICAL LISTED AS A CARCINOGEN OR POTENITAL CARCINOGEN? **IARC** NTP <u>OSHA</u> No No No

#### Section 12. **Ecological Information**

NO DATA

#### Section 13. **Disposal Considerations**

### WASTE DISPOSAL METHOD:

Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. Incineration or landfill in accordance with all federal, state and local regulations.

#### Section 14. **Transport Information**

U.S. DOT SHIPPING NAME:	Not Regulated
U.S. DOT HAZARD CLASS:	Not Regulated

#### Section 15. **Regulatory Information**

Ingredients contained in this product are in compliance with TSCA. Ingredients regulated by SARA III: NONE

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# RTD \* HALLSTAR Material Safety Data Sheet

### Product: OP-100 TG HM Sodium Stearate

Revision Date: 11/27/01

### Section 16. Other Information

The information contained herein are based upon data believed to be correct. However no guarantee or warranty of any kind either expressed or implied is made with respect to the information contained herein. We assume no responsibility for any loss, damage, or expense, direct or indirect, arising out of its use.

Prepared By:

Ted Fickert



The Chemical Company

# Safety data sheet

# HDO<sup>® 1,6-Hexanediol molten</sup>

Revision date : 2005/03/16 Version: 2.0

Page: 1/7 (30036625/MDS\_GEN\_US/EN)

### 1. Substance/preparation and company identification

<u>Company</u> **BASF Corporation** 100 Campus Drive Florham Park, NJ 07932 24 Hour Emergency Response Information CHEMTREC: (800) 424-9300 BASF HOTLINE: (800) 832-HELP

Molecular formula: Chemical family: Synonyms:

C(6)H(14)O(2) diols 1,6 Hexanediol

### 2. Composition/information on ingredients

CAS Number 629-11-8

Content (W/W) > 96.0 %

Chemical name hexane-1,6-diol

### 3. Hazard identification

### Emergency overview

CAUTION: MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION. INGESTION MAY CAUSE GASTRIC DISTURBANCES. Use with local exhaust ventilation. Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator. Wear NIOSH-certified chemical goggles. Wear protective clothing. Wear a NIOSH-certified (or equivalent) particulate respirator. Eye wash fountains and safety showers must be easily accessible.

### Potential health effects

### Primary routes of exposure

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

### Acute toxicity:

Information on: Hexanediol (1,6-)

1,6-hexanediol has been known to cause disequilibrium, atonia, and anorexia in experimental animals given high acute gavage doses. Repeated gavage doses in experimental animals has been known to produce liver effects.



# Safety data sheet HDO<sup>®</sup> 1,6-Hexanediol molten

Revision date : 2005/03/16 Version: 2.0

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### 4. First-aid measures

#### General advice:

Remove contaminated clothing.

#### If inhaled:

Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary. If breathing difficulties develop, aid in breathing and seek immediate medical attention.

If on skin:

Wash affected areas thoroughly with soap and water. If irritation develops, seek medical attention.

#### If in eyes:

In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. If irritation develops, seek medical attention.

### If swallowed:

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Rinse mouth thoroughly with water, seek medical attention. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions.

### 5. Fire-fighting measures

Flash point:
Autoignition:
Lower explosion limit:
Upper explosion limit:

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approx. 147 °C 320 °C 6.6 %(V) 16.0 %(V) (DIN 51758) (DIN 51794)

### Suitable extinguishing media:

water, dry extinguishing media, alcohol-resistant foam, carbon dioxide

-

#### Protective equipment for fire-fighting:

Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

### Further information:

Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems.

If exposed to fire, keep containers cool by spraying with water. Contain contaminated water/firefighting water.

NFPA Hazard codes: Health: 2 Fire: 1

Reactivity: 0 Special:

### 6. Accidental release measures

### **Personal precautions:**

Handle in accordance with good industrial hygiene and safety practice.



# Safety data sheet HDO<sup>®</sup> 1,6-Hexanediol molten

Revision date : 2005/03/16

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Page: 3/7 (30036625/MDS\_GEN\_US/EN)

Wear appropriate respiratory protection. Use personal protective clothing. Ensure adequate ventilation.

### Environmental precautions:

This product is not regulated by RCRA. This product is not regulated by CERCLA ('Superfund').

### Cleanup:

Spills should be contained and placed in suitable containers for disposal.

### 7. Handling and storage

### Handling

General advice: Avoid contact with skin and eyes. Ensure adequate ventilation.

### Protection against fire and explosion:

Prevent electrostatic charge - sources of ignition should be kept well clear - fire extinguishers should be kept handy. Avoid whirling up the material/product because of the danger of dust explosion.

### Storage

General advice: Keep container dry.

### 8. Exposure controls and personal protection

### Personal protective equipment

### **Respiratory protection:**

Wear a NIOSH-certified (or equivalent) particulate respirator. Do not exceed the maximum use concentration for the respirator facepiece/cartridge combination.

### Hand protection:

Chemical resistant protective gloves, nitrile rubber (Buna N), chloroprene rubber (Neoprene), polyvinyl alcohol, Manufacturer's directions for use should be observed because of great diversity of types.

### Eye protection:

Tightly fitting safety goggles (chemical goggles).

### General safety and hygiene measures:

Eye wash fountains and safety showers must be easily accessible. Wear protective clothing as necessary to minimize contact.

### 9. Physical and chemical properties

Form: Odour: Colour:

Molten mass or solid odourless colourless



# Safety data sheet HDO<sup>®</sup> 1,6-Hexanediol molten

Revision date : 2005/03/16 Version: 2.0		Page: 4/7 (30036625/MDS_GEN_US/EN)
pH value: Melting point:	5.7 40 - 42 °C	( 500 g∕l, 20 °C)
Boiling point: Vapour pressure: Bulk density: Partitioning coefficient n-	253 - 260 °C < 0.01 mbar 530 kg/m3 0.00	( 20 °C)
octanol/water (log Pow): Miscibility with water: Solubility in other solvents:	> 700 g/kg	miscible in all proportions Ethanol (approx. 25 °C)

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### 10. Stability and reactivity

### Minimum ignition energy:

> 0.65 - < 1.3 J, approx. 1 bar, approx. 20 °C (VDI 2263, sheet 1, 2.5)

### Substances to avoid: acids, acid chlorides, isocyanates

Hazardous reactions: No hazardous reactions if stored and handled as prescribed/indicated.

### Corrosion to metals:

No corrosive effect on metal.

### **11. Toxicological information**

### Acute toxicity

Oral:

LD50/rat: 3,000 mg/kg

### Inhalation:

Inhalation-risk test (IRT): No mortality within 7 hours as shown in animal studies. The inhalation of a highly saturated vapor-air mixture represents no acute hazard.

### Dermal:

LD50/rabbit: > 2,500 mg/kg

Skin irritation: rabbit: non-irritant (BASF-Test)

Eye irritation : rabbit: non-irritant (BASF-Test)

### Sensitization:

Guinea pig maximization test/: Skin sensitizing effects were not observed in animal studies.



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# Safety data sheet HDO<sup>®</sup> 1,6-Hexanediol molten

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**Chronic toxicity** 

Other information:

No experimental evidence available for genotoxicity in vitro (Ames test negative).

### 12. Ecological information

### Environmental fate and transport

### **Biodegradation:**

Test method: Method of analysis: Degree of elimination: Test method: Method of analysis: Degree of elimination: Evaluation: DIN 38409 Part 51 BOD of COD > 60 % OECD 301 A (new version) DOC reduction > 90 % Easily eliminated from water. Readily biodegradable.

Chemical oxygen demand (COD): 2,190 mg/g

Biochemical oxygen demand (BOD): Incubation period 5 d: 1,320 mg/g

Adsorbable organically-bound halogen (AOX):

This product contains no organically-bound halogen. Acute and prolonged toxicity to fish: golden orfe/LC50 (96 h): > 460 - < 1,000 mg/l

Acute toxicity to aquatic invertebrates: Daphnia magna/EC50 (48 h): > 500 mg/

Toxicity to aquatic plants: green algae/EC50 (72 h): 2,200 mg/l

### 13. Disposal considerations

### Waste disposal of substance:

Incinerate in a licensed facility. Do not discharge substance/product into sewer system.

### Container disposal:

Dispose of in a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers.



Safety data sheet HDO<sup>®</sup> 1,6-Hexanediol molten

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#### 14. Transport information

**Reference Bill of Lading** 

Land transport USDOT

Not dangerous goods

Sea transport IMDG

Not dangerous goods

Air transport IATA/IMO

Not dangerous goods

#### 15. Regulatory information

**Federal Regulations** 

Registration status: TSCA, US

released / listed

OSHA hazard category: Acute target organ effects reported

SARA hazard categories (EPCRA 311/312): Acute

#### 16. Other information

HMIS III rating Health: 2 Flammability: 1 Physical hazard: 0

HMIS uses a numbering scale ranging from 0 to 4 to indicate the degree of hazard. A value of zero means that the substance possesses essentially no hazard; a rating of four indicates high hazard.

Local contact information PROD\_STEW\_CA\_CP\_CZ@BASF.COM



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## Safety data sheet HDO<sup>®</sup> 1,6-Hexanediol molten

Revision date : 2005/03/16 Version: 2.0

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## **Sodium Nitrite**

## 1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Sodium Nitrite

**OTHER/GENERIC NAMES:** Nitrous Acid, Sodium Salt

Sodium Nitrite (various grades)

PRODUCT USE: Food preservative, dye manufacturing, corrosion inhibition

MANUFACTURER: General Chemical Corporation 90 East Halsey Road Parsippany, NJ 07054

FOR MORE INFORMATION CALL: 973-515-1840 (Monday-Friday, 9:00am-4:30pm)

IN CASE OF EMERGENCY CALL: 800-631-8050 or (24 Hours/Day, 7 Days/Week)

973-515-0900 (Outside of USA)

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

#### INGREDIENT NAME

Sodium nitrite

**CAS NUMBER** 7632-00-0

WEIGHT % >95

Trace impurities and additional material names not listed above may appear in Section 15 of this MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

**OSHA Hazard Communication Standard:** 

This product is considered hazardous under the OSHA Hazard Communication Standard.

## 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: White to slightly yellow crystalline solid. Toxic if swallowed or dust is inhaled. Oxidizer: May ignite organic materials and react with other materials. Can decompose if mixed with acids or exposed to fire conditions, releasing toxic nitrogen oxides.

#### POTENTIAL HEALTH HAZARDS

SKIN: Prolonged contact with dust may cause irritation.

EYES: May cause temporary irritation.

INHALATION: Dust may irritate nose and throat. Dusts are soluble and inhalation may result in toxic effects similar to ingestion.



## MATERIAL SAFETY DATA SHEET Sodium Nitrite

May irritate mouth, esophagus and stomach. Although small quantities are used in food INGESTION: preparation, swallowing moderate amounts of sodium nitrite can result in serious toxic effects including death. Effects include nausea, weakness, cyanosis (blue skin), collapse and coma, possibly leading to death. Sodium nitrite interferes with the blood's ability to transport oxygen.

DELAYED EFFECTS: Sodium nitrite has no known delayed effects. (If sodium nitrite is used with amines found in certain cutting fluids, potentially carcinogenic nitrosamine compounds may be formed.)

Ingredients found on one of the three OSHA designated carcinogen lists are listed below.

#### INGREDIENT NAME

**NTP STATUS** 

**OSHA LIST** IARC STATUS

No ingredients listed in this section.

## 4. FIRST AID MEASURES

- SKIN: Wash with plenty of soap and water to remove all product residues. Remove contaminated clothing and wash before reuse.
- EYES: Immediately flush with running water continuing for 15 minutes. If irritation persists, consult a physician.
- Remove to fresh air. If breathing has stopped, give artificial respiration, preferably mouth to INHALATION: mouth. If breathing is difficult, oxygen should be administered, provided a qualified operator is present. Get immediate medical assistance for any symptom.
- If conscious, give victim 2 to 4 glasses of water and induce vomiting by touching finger to back of **INGESTION:** throat. Continue until vomited fluid is clear. Get immediate medical assistance.

Sodium nitrite forms methemoglobin in the blood stream. Treat accordingly. ADVICE TO PHYSICIAN:

## FIRE FIGHTING MEASURES

#### FLAMMABLE PROPERTIES

FLASH POINT: FLASH POINT METHOD: AUTOIGNITION TEMPERATURE: UPPER FLAME LIMIT (volume % in air): LOWER FLAME LIMIT (volume % in air): FLAME PROPAGATION RATE (solids): OSHA FLAMMABILITY CLASS:

Not flammable Not applicable Not applicable Not applicable Not applicable Not applicable Not applicable

## **EXTINGUISHING MEDIA:**

Use flooding amounts of water or other agents. DO NOT use dry chemicals containing ammonium phosphate.

## UNUSUAL FIRE AND EXPLOSION HAZARDS:

Material does not burn but is an oxidizing agent and will support combustion of other materials. Product decomposes above 608°F releasing toxic nitrogen oxides.

MSDS Number: GC-3061 Current Issue Date: May, 1999

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## MATERIAL SAFETY DATA SHEET

## Sodium Nitrite

## SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

Wear self-contained breathing apparatus.

## 6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (See section 8 for recommended personal protective equipment.) Sweep or shovel spilled material into containers. Close container and label them. Do not allow product or residues to enter waterways and/or any source of drinking water.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

#### 7. HANDLING AND STORAGE

NORMAL HANDLING: (See section 8 for recommended personal protective equipment.)

Avoid contact with skin and eyes. Do not breathe product dusts. Avoid contact with combustible materials and acids.

#### STORAGE RECOMMENDATIONS:

Store in a cool, dry place. Keep container closed. Do not store on wooden floors. Isolate from combustible materials.

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### **ENGINEERING CONTROLS:**

Use local exhaust ventilation in any areas where product dusts may be generated. (Note incompatibilities in section 10.)

#### PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:	Use impervious gloves (e.g. rubber) for routine handling. Wear long sleeved shirt and pants. Impervious work aprons may be required for transfer of material from packages to process equipment.
EYE PROTECTION:	Wear safety goggles in any area where dusty conditions may occur.
RESPIRATORY PROTECTION:	Not required for properly ventilated areas.
ADDITIONAL RECOMMENDATIONS:	Provide eyewash and washing facilities.

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## MATERIAL SAFETY DATA SHEET

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Sodium Nitrite

#### **EXPOSURE GUIDELINES**

INGREDIENT NAME No ingredients listed in this section.	ACGIH TLV	OSHA PEL	OTHER LIMIT
<ul> <li><sup>1</sup> = Limit established by General Chemi</li> <li><sup>2</sup> = Workplace Environmental Exposure</li> <li><sup>3</sup> = Biological Exposure Index (ACGIH).</li> </ul>	Level (AIHA).		
OTHER EXPOSURE LIMITS FOR POT None.	ENTIAL DECOMPOSITION	PRODUCTS:	
9. PHYSICAL AND CHEMICAL PR	ROPERTIES		
APPEARANCE:	White to slightly yellow	crystals	
PHYSICAL STATE:	Solid		
MOLECULAR WEIGHT:	69.0		
CHEMICAL FORMULA:	NaNO <sub>2</sub>		
ODOR:	None		
SPECIFIC GRAVITY (water = 1.0):	2.17		
SOLUBILITY IN WATER (weight %):	46% at 68°F		
pH:	Approximately 9 (for aq	ueous solution)	
BOILING POINT:	Decomposes above 60	8°F	
MELTING POINT:	520°F		
VAPOR PRESSURE:	Not applicable		
VAPOR DENSITY (air = 1.0):	Not applicable		-liashio
EVAPORATION RATE:	Not applicable CC	MPARED TO: Not ap	picaule

FLASH POINT: (Flash point method and additional flammability data are found in Section 5.)

## **10.STABILITY AND REACTIVITY**

## NORMALLY STABLE? (CONDITIONS TO AVOID):

Normally stable.

% VOLATILES:

#### INCOMPATIBILITIES:

Hazardous reactions can occur with acids, ammonium compounds, reducing agents (particularly cyanides, thiocyanates and thiosulfates). May ignite organic compounds and other combustible materials.

Not applicable

Not flammable

## HAZARDOUS DECOMPOSITION PRODUCTS:

Oxides of nitrogen (toxic and irritating).

#### HAZARDOUS POLYMERIZATION:

Will not occur.

MSDS Number: GC-3061 Current Issue Date: May, 1999



## MATERIAL SAFETY DATA SHEET

**Sodium Nitrite** 

#### **11. TOXICOLOGICAL INFORMATION**

#### **IMMEDIATE (ACUTE) EFFECTS:**

LD<sub>50</sub> (oral, rat) 180 mg/kg LD<sub>50</sub> (oral, rabbit) 186 mg/kg Eye irritation, rabbit, 500 mg/24 hr; mild

#### DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:

Multiple reproductive tests indicate that sodium nitrite is not teratogenic. Fetal toxicity has been demonstrated in pregnant animals fed toxic doses of sodium nitrite. This is due to the formation of methemoglobin.

#### OTHER DATA:

None

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## **12. ECOLOGICAL INFORMATION**

17.1 ppm/24hr./minnow/no effect/fresh water.

7.5 ppm/48 hr./mosquito fish/TLm/fresh water.

#### 13. DISPOSAL CONSIDERATIONS

#### RCRA

is the unused product a RCRA hazardous waste if discarded? Yes

If yes, the RCRA ID number is: D001 (ignitable)

#### **OTHER DISPOSAL CONSIDERATIONS:**

See below.

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

#### **14. TRANSPORT INFORMATION**

US DOT HAZARD CLASS:	5.1 Oxidizer (6.1 Toxic subsidiary risk)
US DOT ID NUMBER:	UN1500
PROPER SHIPPING NAME:	Sodium nitrite

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

MSDS Number: GC-3061 Current Issue Date: May, 1999



## MATERIAL SAFETY DATA SHEET

Sodium Nitrite

## **15. REGULATORY INFORMATION**

#### TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: Listed on TSCA Inventory of Chemical Substances

Requires export notification (Section 12b) Subject to SNUR if used in metalworking OTHER TSCA ISSUES: fluids (40CFR721.4740).

#### SARA TITLE INCERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

INGREDIENT NAME	SARA/CERCLA RQ (Ib)	SARA EHS TPQ (Ib)
Sodium nitrite	, 100	none

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Immediate

#### SARA 313 TOXIC CHEMICALS:

The following ingredients are SARA 313 "Toxic Chemicals" and may be subject to annual reporting requirments. CAS numbers and weight percents are found in Section 2.

COMMENT

COMMENT

none

WEIGHT %

INGREDIENT NAME Sodium nitrite

#### STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

#### INGREDIENT NAME

No ingredients listed in this section.

## ADDITIONAL REGULATORY INFORMATION:

None

WHMIS CLASSIFICATION (CANADA):

C. D1B, D2B

FOREIGN CHEMICAL CONTROL INVENTORY STATUS:

Listed on Canadian DSL and EU's EINECS (EINECS #: 231-555-9)

#### **16. OTHER INFORMATION**

CURRENT ISSUE DATE: June, 1999

MSDS Number: GC-3061 Current Issue Date: May, 1999 Page 6 of 7



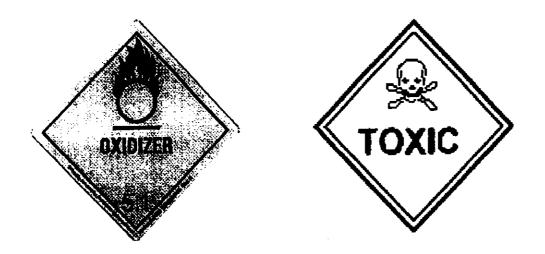
## MATERIAL SAFETY DATA SHEET Sodium Nitrite

PREVIOUS ISSUE DATE: January, 1997

## CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:

- 1. Adoption of 16 section ANSI format.
- 2. Modifications & clarifications made to health hazards, first aid, fire fighting instructions, personal protective equipment, and DOT shipping information.

OTHER INFORMATION: None



Storage Statement: Storage Temperature: This product may be stored under all ambient temperatures up to 170° F

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## MATERIAL SAFETY DATA SHEET

PRODUCT NAME:	ACMEPON SODIUM LAURYL SULFATE NEEDLES 799
** * *********	CHEMICAL PRODUCT AND DISTRIBUTOR IDENTIFICATION
TRADE NAME:	ACMEPON SODIUM LAURYL SULFATE NEEDLES 799
DATE:	September 26, 2002
DISTRIBUTOR: ADDRESS:	ACME-HARDESTY COMPANY 1787 Sentry Parkway West Suite 18-460 Blue Bell, PA 19422
TELEPHONE:	(800) 223 - 7054
FAX:	(215) 591 - 3620
	COMPOSITION / INFORMATION ON INGREDIENTS
INFORMATION ON E	IAZARDOUS INGREDIENTS:
CHEMICAL NAME:	Sodium Lanyi Sulfate
% COMPOUND;	min 90%
EINECS #;	273-257-1
CAS#:	68955-19-1
EC #:	Not available
SYMBOL:	Not available
	HAZARDOUS INGREDIENTS/IDENTITY INFORMATION
ENVIRONMENTAL H	AZARDS: None
HUMAN HEALTH HA	ZARDS; None
	FIRST AID MEASURES
EFFECT AND SYMPT	OMS:
Ingestion:	Harmful if ingested, Causes irritation.
Inhalation:	Irritation and coughing.
Skin Contact:	May cause irritation.
Eye Contact:	Irritating.
IRST AID MEASURE	S:
Ingestion:	Induce vomiting and seek medical attention.
Inhalation:	Remove to fresh air.
Skin Contact:	Flush with water for at least 15 minutes.
Eye Contact:	Flush with water for at least 15 minutes.

1787 Sentry Parkway West - Suite 18-460 - Blue Bell, PA - 19422 - www.acme-herdesty.com Toll-Free; 800/222-7084 - Phone: 215/591-3810 - Env 315/501-3820

#### MATERIAL SAFETY DATA SHEET **ACMEPON SODIUM LAURYL SULFATE NEEDLES 799** September 26, 2002 Page 2 of 4

#### FIRE FIGHTING MEASURES EXTINGUISHING MEDIA: Use extinguishing media suitable for fire. Suitable: Not applicable Not Suitable: Wear protective equipment and self contained breathing apparatus. Special Fire Fighting Procedures: Unusual Fire/Explosion Hazards: Not applicable **Protection Of Pirefighters:** Standard. Hazardous Thermal Decomposition Products: Sulphur Dioxide, carbos monoride, carbos dioxide ACCIDENTAL RELEASE MEASURES PERSONAL PRECAUTIONS: Avoid contact with skin. ENVIRONMENTAL PRECAUTIONS: Not applicable METHOD OF CLEANING UP: Fluck spill with water. HANDLING AND STORAGE HANDLING: Nome. STORAGE: General storage. HMHDPE woven begs / paper bags or fiber drums. Keep container tightly SUITABLE PACKING MATERIALS: closed. NOT SUITABLE PACKING MATERIALS; Not applicable EXPOSURE CONTROLS/PERSONAL PROTECTION TLV/STEL (USA) MAK (GERMANY) **RESPIRATORY SYSTEM PROTECTION:** None required when adequate ventilation available. If airborne concentration is high, use a mesk or respirator. SKIN AND BODY PROTECTION: Uniform and apron HAND PROTECTION: Rubber gioves EYE PROTECTION: Safety goggies STABILITY AND REACTIVITY CONDITIONS TO AVOID: Heat, flame and other sources of ignition.

Do not subject to soldie pH / moisture strong acids and oxidizing agents. MATERIALS TO AVOID: HAZARDOUS DECOMP PROD: Do not subject to acidic pH / moisture strong acids and oxidizing agents. • • •

#### MATERIAL SAFETY DATA SHEET ACMEPON SODIUM LAURYL SULFATE NEEDLES 799 September 26, 2002 Page 3 of 4

#### PHYSICAL AND CHEMICAL PROPERTIES PHYSICAL STATE: Needles COLOR: White to Pale Yellow ODOR: Characteristic BOILING POINT: Not applicable MELTING POINT: Not applicable pH: 7.5 - 10.5 SOLUBILITY WATER: Soluble SOLUBILITY OIL & SOLVENTS: Not applicable VAPOR DENSITY (air-1); Not applicable FLASH POINT: Not applicable AUTOIGNITION TEMP: Not applicable LEL: Not applicable Not applicable UEL: TOXICOLOGICAL INFORMATION ACUTE TOXICITY: Oral (LD50) (Rat): 1288 mg / Kg (Walker) Dermal (LD50) Rabbit); Not available Inhalation (LC50); Not available Skin Initation: Severe Irritation Eye Initation: Severe Irritation Sensitization: Not sensitizing Chronic Toxicity: None identified Caroinogenicity: No ECOLOGICAL INFORMATION Comment: Not applicable Ecotoxicity: Not applicable DISPOSAL CONSIDERATIONS

Methods Of Disposal:

sel: In accordance with local, federal, and state environmental regulations.

#### MATERIAL SAFETY DATA SHEET ACMEPON SODIUM LAURYL SULFATE NEEDLES 799 September 26, 2002 Page 4 of 4

#### TRANSPORT INFORMATION UN NUMBER: Not applicable LANDROAD / RAILWAY: ADR / RID CLASS: Chemicals N. O. S. (non regulated) Chemicals N. O. S. (non regulated) ADR / RID ITEM #: INLAND WATERWAYS: ADNR CLASS: Chemicals N. O. S. (non regulated) SEA: IMDG CLASS: Chemicais N. O. S. (non regulated) IMDG PAGE #: Chemicals N. O. S. (non regalated) AIR: IATA-DGR CLASS: Chemicals N. O. S. (non regulated) NATIONAL TRANSPORT REGULATIONS: **REGULATORY INFORMATION EC-REGULATIONS:** Not available Not available

EC - REGULATIONS EC CLASSIFICATION: LABEL NAME; HAZARD SYMBOLS: RISK PHRASES: SAFETY PHRASES;

Not available Sodium Lauryl Sulfate Not applicable Not applicable Not applicable .

# Material Safety Data Sheet

Not controlled under DSCL (Europe) Section ... Complete Static ( and Sectors of American Product Name/ CAS# Probenz SG FCC Grade 532-32-1 Trade Name Supplier Velsicol Chemical Limited EINECS# 208-534-8 Viewpoint **Basing View** Basingstoke Hampshire RG 21 4 RG England Tel: (0) 1256 799766 Fax: (0) 1256 799767 Synonym Sodium Benzoic Acid; Benzoic Acid, sodium salt; Antimol Chemical Name Sodium Benzoate In Case of In the continental U.S.A. call **Chemical Family** Alkaline metal salt. (Salt.) Emergency CHEMTREC 800-424-9300 (24 hours) Outside the continental U.S.A. call CHEMTREC 703-527-3887 (24 hours) Chemical Formula C6H5C00Na Material Uses Consumer products: Food preservative. Manufacturer Velsicol Eesti AS Antioxidant in food. Uus Tehase 8, p/k 8 30328 KOHTLA-JARVE 1 **ESTONIA** Phone: (37-233) 75120 Fax: (37-233) 73714

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	Santon La composition	anoženskom na sraškom		
	Name	CAS#	% by Weight	Exposure Limits
	1) Sodium benzoate	532-32-1	99-100	Not available
ĺ	2) Water (Impurity)	7732-18-5	0-0.99	Not available

Potential Acute Health Effects	Inhalation and skin contact are expected to be the primary routes of occupational exposure to Sodium Benzoate. Although ingestion (swallowing) of sodium benzoate may be harmful to laboratory animals, it is not harmful to humans in small amounts when mixed with food. Ingestion of large amounts may cause stomach pain, nausea and vorniting. Skin irritation may occur based on human exposure.
Potential Chronic Health	There is no known effect from chronic exposure to this product. Repeated or prolonged
Effects	exposure is not known to aggravate medical condition.

Sections	First Ald Monsures
Eye Contact	Flush with plenty of water. Seek medical attention if irritation persists.
Skin Contact	Flush the area with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Get medical attention if irritation develops and persists. Thoroughly clean shoes before reuse.
Inhalation	As a precaution, move individual to fresh air as soon as possible.
Ingestion	If swallowed, induce vomiting as directed by medical personnel. Get medical attention. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

Section 2 Figures	Xpission Date
Flammability of the Product	Combustible.
Auto-Ignition Temperature	800°C (1472°F)
Flash Points	Not available.
Flammable Limits	Not available.
Products of Combustion	Not available.

[Probenz SG FCC Grade (Europe)]

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Fire and Explosion Hazards	Very slightly to slightly flammable in presence of open flames, sparks and heat. Not considered to present risks of explosion under normal handling and use.
Fire Fighting Media	SMALL FIRE: Use DRY chemicals, CO2, water spray or foam.
and Instructions	LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet.
	Firefighters and others who may be exposed to products of combustion should wear full firefighting turn out gear and self-contained breathing apparatus. Firefighting equipment should be thoroughly decontaminated after use.

SSON	L Accelerator Release Measures
Small Spill	Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.
Large Spill	Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

in accordance with good industrial hygiene and safety practices. These practices include g unnecessary exposure and removal of material from eyes, skin and clothing.
g unnecessary exposure and removal of material from eyes, skin and cloring.
and use away from heat, sparks, open flame, or any other ignition source. Ground all metal ters during storage. Limit indoor storage to areas equipped with appropriate automatic sprinkler is.
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	number Controle/Personal Protection
Engineering Controls	Investigate engineering techniques to reduce exposures. Provide ventilation if necessary to minimize exposure. If practical use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.
Personal Protection	Safety glasses. Gloves. Dust respirator.
Personal Protection in Case of a Large Spill	Safety glasses. Dust respirator. Gloves. Boots. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	None established.

		<u></u>	
Physical State & Appearance	Solid. (Crystals/granules.)	Odor	Odoriess
Molecular Weight	144.11	Taste	Sweetish, astringent.
pH (1% soln/water)	8	Color	White.
Boiling Point	Not available.		
Melting Point	300°C (572°F)		······································
Critical Temperature	Not available		
Specific Gravity	1.44		
Vapor Pressure	0 mm of Hg (@ 20°C). Does not for	m vapor.	
Vapor Density	Not available.		
Volatility	Not available.		
Odor Threshold	Not available.		
Evaporation Rate	Not available.		
Viscosily	Not available.		
Log Octanol/Water	Not available.		
Partitition Coeff.			
Ionicity (In Water)	Not available.		
Dispersion Properties	See solubility in water, methanol.		
Solubility	Easily soluble in cold water, hot wat	er. Partially sol	uble in methanol.

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	No additional remark.
Incompatibility with Various Substances	Highly reactive with oxidizing agents. Hygroscopic (absorbs moisture from the air). Incompatible with acids and ferric salts.
Corrosivity	Not considered to be corrosive for metals and glass according to our database.
Hazardous Polymerization	Not available.
Hazardous Decomposition Products	Not available.

/Probenz SG FCC Grade (Europe)]

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|---------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Routes of Entry     | Ingestion. Skin contact. Inhalation.                                                                                            |
| Toxicity to Animals | Acute oral toxicity (LD50):                                                                                                     |
|                     | 4010 mg/kg (Rat), Slightly Toxic                                                                                                |
|                     | 1600 mg/kg (Mouse), Slightly Toxic                                                                                              |
|                     | 2000 mg/kg (Rabbit), Slightly Toxic                                                                                             |
|                     |                                                                                                                                 |
|                     | 2000 mg/kg (Dog), Slightly Toxic                                                                                                |
|                     | Studies in laboratory animals indicate that high (> 27 gm/kg) repeated oral doses of sodiu                                      |
|                     | benzoate cause liver, kidney, blood and central nervous system effects as well as effect                                        |
|                     | on the offspring of these animals. These effects on the embryo and fetus may be a res                                           |
|                     | of maternal toxicity. No adverse effects on implantation, maternal or fetal survival                                            |
|                     | abnormalities in the soft or skeletal tissue were reported in mice (up to 175 mg/kg), rats (                                    |
|                     | to 175 mg/kg) hamsters (up to 300 mg/kg), or rabbits (up to 250 mg/kg) given sodiu<br>benzoate orally during fetal development. |
|                     | Human oral In a double-blind oral challenge, none of 81 subjects reacted adversely to                                           |
|                     | or 100 mg of sodium benzoate. In a number of other studies, the ingestion of sodiu                                              |
|                     | benzoate, typically at doses of 50-500 mg, has been associated with bouts of asthma                                             |
|                     | decreases in lung function in 15 of a total of 157 asthmatics. Gastric pain and appetite lo                                     |
|                     | have been reported in some subjects ingesting 12 g of sodium benzoate/day for 5 days.                                           |
|                     | Rat - Repeated administration of sodium benzoate at dietary levels of 3% or more h                                              |
|                     | produced decreases in the growth rates, damage to the spleen and lymph nodes, liver, as                                         |
|                     | kidneys and gastro-intestinal tract as well as effects to the Central Nervous System 1                                          |
|                     | effects to the mothers or on the growth and development of the offspring were seen who                                          |
|                     | groups of ten rats were fed diets containing up to 1% sodium benzoate during pregnand                                           |
|                     | and lactation, and the diets fed to the offspring after weaning. Sodium benzoate did n                                          |
|                     | damage the bone marrow chromosomes of rats.                                                                                     |
|                     | Mouse - Survival was unaffected by the inclusion of 2% sodium benzoate in the drinkin                                           |
|                     | water of groups of 50 male and 50 female mice for life. Gross examination of "all organ                                         |
|                     | and microscopic examination of the major organs and of any grossly abnormal organ                                               |
|                     | revealed no evidence of carcinogenicity in a group of 50 male and 50 female mice give                                           |
|                     | 2% of sodium benzoate in their drinking water for life.                                                                         |
|                     | Sodium Benzoate caused chromosome damage in rat and hamster cells, both with an                                                 |
|                     | without an added liver metabolic activation fraction. Sodium benzoate has consistent                                            |
|                     | failed to demonstrate mutagenic activity in Ames assays both with and without added liv                                         |
| <u> </u>            | metabolic activation fractions.                                                                                                 |
|                     | prcal information                                                                                                               |
| cotoxicology        | Medaka, Oryzias latipes, were given up to 80,000 ppm in their diet. 13/50 fish died after                                       |
|                     | 24 weeks. Bile duct proliferation in the liver was observed at 80,000 ppm. No evidence                                          |
|                     | carcinogenicity was reported.                                                                                                   |
|                     | The 96-hour LC50 values for seven aquatic species (minnow, snait, flatworm, segmente                                            |
|                     | worm, sideswimmer, water flea and pillbug) were greater than 100 mg of sodium benzoate                                          |
| hemical Fate        | The product itself and its products of degradation are not toxic.                                                               |
| Service and MA SS   | Star Considerations                                                                                                             |
| aste Disposal       | Recycle to process if possible. Consult was beet                                                                                |
|                     | Recycle to process, if possible. Consult your local or regional authorities for dispose<br>options.                             |
|                     |                                                                                                                                 |
| DR Classification   | sport information                                                                                                               |
| DR Classification   | Not controlled under ADR (Europe)                                                                                               |
|                     | ICOA/IATA (Air): Not regulated.                                                                                                 |
| or Transport        | IMO/IMDG (Sea): Not regulated.                                                                                                  |
|                     | TDG (Canada): Not regulated.                                                                                                    |
|                     | DOT (U.S.A.): Not regulated.                                                                                                    |
|                     |                                                                                                                                 |
|                     | CUSTOMS CLASSIFICATION                                                                                                          |

[Probenz SG FCC Grade (Europe)]

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| er Regulations | EUROPEAN REGULATIONS                                                                                                                                                                                                                                   |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -              | EINECS: This product in on the European Inventory of Existing Commercial Chemical<br>Substances (EINECS): ID number 208-534-8                                                                                                                          |
|                | EU: Council Directive No. 95/2/EC on Food Additives other than colors and sweetners:<br>Listed as E No. E211 in Annex III (conditionally permitted preservatives and antioxidants<br>Part A)                                                           |
|                | OECD: This substance is on the Organization for Economic Cooperation and<br>Development (OECD) Working List (Sublist) of High Production Volume Chemicals.                                                                                             |
|                | Germany: Ordinance on Classification of Water-Endangering Substances. This substance has been assigned WGK Class: 1 (Slightly water endangering): WGK Identification Number: None; Assigned by Verband Chemischer Industry (VCI).                      |
|                | Switzerland: Federal Health Agency, Giftiste 1 (Stoffe), Ausgabe 1995 [Toxics list 1 (1995)]. Toxicity Category: 4; Identification Number: G-2572.                                                                                                     |
|                | NORTH AMERICAN REGULATIONS                                                                                                                                                                                                                             |
|                | United States: TSCA (Toxic Substance Control Act): This product is listed on the TSCA<br>Inventory; [CASRN 532-32-1].                                                                                                                                  |
|                | United States: OSHA Hazard Communication Standard (29 CFR 1910.1200)<br>classification: This product is not regulated as a hazardous substance.                                                                                                        |
|                | United States: Food and Drug Administration (FDA) Approvals: 21 CFR 184.1733 (Direc<br>Food Substances Generalty Recognized As Safe) Maximum Use level 0.1%.<br>21 CFR 582.3733 (General Purpose Food Additives) Maximum Use level 0.1% Animal<br>food |
|                | United States: Flavor and Extract Manufactures' Association (FEMA) Generally<br>Recognized As Safe (GRAS) listing. FEMA number 3025.21                                                                                                                 |
|                | Canada: This product is on the Canadian Environmental Protection Act (CEPA) Domesti<br>Substances List (DSL); [CASRN 532.32.1].                                                                                                                        |
|                | Canada: WHMIS classification; Not listed or regulated as a hazardous substance.                                                                                                                                                                        |
|                | PACIFIC RIM REGULATIONS                                                                                                                                                                                                                                |
|                | Australia: This substance is on the Australian Inventory of Chemical Substances (AICS):<br>[CASRN 532.32.1].                                                                                                                                           |
|                | China: This substance is on the DRAFT Chinese Inventory of Chemical Substances.<br>ID#: 1                                                                                                                                                              |
|                | Japan: This substance is on the MITI/MHW Chemical Substance Control Law inventory<br>of Existing and New Chemical Substances (ENCS); ENCS # (3)-1272, ENCS # (3)-1293                                                                                  |
|                | Japan: This substance is not known to be on the MOL Industrial Safety and Health Law (ISHL) List of Existing Chemical Substances.                                                                                                                      |
|                | Philippines: This substance is on the DRAFT Philippines Inventory of Chemicals and<br>Chemical Substances (PICCS). CASRN: 532.32.1                                                                                                                     |
|                | South Korea: This substance is on the Korean Existing Chemicals List (ECL); ID Numb 3-1076.                                                                                                                                                            |

[Prohenz SG FCC Grade (Europe)]

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| References          | REGISTRY Database Chomic                                                                                                                                                                                                                       | Abatrat Carries 12/01/05                                                     |  |  |  |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--|--|--|
| 1010100000          | -REGISTRY Database, Chemical Abstract Service, 12/01/95                                                                                                                                                                                        |                                                                              |  |  |  |
|                     | -CHEMLIST Database, Chemical Abstract Service, 12/01/95<br>-MEDITEXT Medical Management Database, Micromedex Inc., Col.27, 7/31/96                                                                                                             |                                                                              |  |  |  |
|                     | Paginter of Tavia Effects of Ch.                                                                                                                                                                                                               | ani Database, Micromedex Inc., Col.27, 7/31/96                               |  |  |  |
|                     | Hereday Di Toxic Enects of Che                                                                                                                                                                                                                 | mical Substances (RTECS), 7/31/96                                            |  |  |  |
|                     | -nazaroous Substance Data Ba                                                                                                                                                                                                                   | nk (HSDB), National Library of Medicine, #0696, 07/31/96                     |  |  |  |
|                     | -REPROTEXT Database, Micro                                                                                                                                                                                                                     | mrdex Inc., 07/31/96                                                         |  |  |  |
|                     | -LOLI Database, Chem Advisor                                                                                                                                                                                                                   | Via Micromedex Inc., 07/02/96                                                |  |  |  |
|                     | -ICRMS European Database, A                                                                                                                                                                                                                    | riel Research Corporation, 07/02/96                                          |  |  |  |
|                     | -ICRMS inventories Database, /                                                                                                                                                                                                                 | Ariel Research Corporation, 07/02/96                                         |  |  |  |
|                     | -ICKMS North American Databa                                                                                                                                                                                                                   | se, Ariel Research Corporation, 07/02/96                                     |  |  |  |
|                     | -Unpublished analytical study, V                                                                                                                                                                                                               | elsicol Chemical Corporation, 02/07/96                                       |  |  |  |
|                     | -Japan J. Exp. Med. Vol. 85,5 F                                                                                                                                                                                                                | . 243-253, 1982.                                                             |  |  |  |
|                     | -rood and Urug Research Lab                                                                                                                                                                                                                    | . Inc. Teratologic Evaluation of FDA 71-37 (Sodium Benzoate)                 |  |  |  |
|                     | (NTIS) PB-221-777.                                                                                                                                                                                                                             |                                                                              |  |  |  |
| <b>D</b>            | November 1972.                                                                                                                                                                                                                                 |                                                                              |  |  |  |
| Revisions           | NEW                                                                                                                                                                                                                                            |                                                                              |  |  |  |
| Information Contact | For MSDS or Regulatory                                                                                                                                                                                                                         | Supercedes Date NEW                                                          |  |  |  |
|                     | information, contact:<br>Environmental, Health and Safety                                                                                                                                                                                      |                                                                              |  |  |  |
|                     | Department                                                                                                                                                                                                                                     |                                                                              |  |  |  |
|                     | Velsicol Chemical Corporation,                                                                                                                                                                                                                 |                                                                              |  |  |  |
|                     | Rosemont, IL, U.S.A.                                                                                                                                                                                                                           |                                                                              |  |  |  |
|                     | Phone: 847-635-3450                                                                                                                                                                                                                            |                                                                              |  |  |  |
|                     | Fax: 847-298-9015                                                                                                                                                                                                                              |                                                                              |  |  |  |
|                     | For Technical or Product Support                                                                                                                                                                                                               |                                                                              |  |  |  |
|                     | Information, contact:                                                                                                                                                                                                                          |                                                                              |  |  |  |
|                     | Velsicol Chemical Limited,                                                                                                                                                                                                                     |                                                                              |  |  |  |
|                     | Viewpoint, Basing View,                                                                                                                                                                                                                        |                                                                              |  |  |  |
|                     | Basingstoke,                                                                                                                                                                                                                                   |                                                                              |  |  |  |
|                     | Hampshire RG 21 4 RG,                                                                                                                                                                                                                          |                                                                              |  |  |  |
|                     | ENGLAND<br>Phone: (0) 1256 799766                                                                                                                                                                                                              |                                                                              |  |  |  |
|                     | Fax: (0) 1256 799767                                                                                                                                                                                                                           |                                                                              |  |  |  |
| Prepared By & Date  | Emily Clark on 10/1/03                                                                                                                                                                                                                         |                                                                              |  |  |  |
| Notice to Render    | To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier                                                                                                                          |                                                                              |  |  |  |
|                     | nor any of its subsidiaries assumes a                                                                                                                                                                                                          | ny liability what aeven is accurate. However, neurer the above named supplie |  |  |  |
|                     | oor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information<br>contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials |                                                                              |  |  |  |
|                     | may present unknown hazards and should be used with caution. Although certain hazards are described herein, we                                                                                                                                 |                                                                              |  |  |  |
|                     | cannot guarantee that these are the only                                                                                                                                                                                                       | hazards that exist.                                                          |  |  |  |

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Page: 1 Revision Date: 03/26/2007 Print Date: 8/29/2007 MSDS Number: R0001151 Version: 1.

# TETRASOD PYROPHOS TECH GR 56301

# 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Ashland P.O. Box 2219 Columbus, OH 43216 Regulatory Information Number Telephone Emergency telephone number 1-800-325-3751 614-790-3333 1-800-ASHLAND (1-800-274-5263)

Product name Product code Product Use Description TETRASOD PYROPHOS TECH GR 56301 No data

### 2. HAZARDS IDENTIFICATION

#### **Emergency Overview**

Appearance: solid, white

Moderate skin irritant, Moderate eye irritant.

#### **Potential Health Effects**

#### **Routes of Exposure**

Inhalation, Skin absorption, Skin contact, Eye Contact, Ingestion

#### Eye Contact

Can cause eye irritation. Symptoms include stinging, tearing, redness, and swelling of eyes.

#### **Skin Contact**

May cause mild skin irritation. Symptoms may include redness and burning of skin. Passage of this material into the body through the skin is possible, but it is unlikely that this would result in harmful effects during safe handling and use.

#### Ingestion

Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful.

#### Inhalation

This material is a dust or may produce dust. Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large



Page: 2 Revision Date: 03/26/2007 Print Date: 8/29/2007 MSDS Number: R0001151 Version: 1.

# TETRASOD PYROPHOS TECH GR 56301

amounts may be harmful. Symptoms are not expected at air concentrations below the recommended exposure limits, if applicable (see Section 8.).

## **Aggravated Medical Condition**

Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material:, lung (for example, asthma-like conditions), kidney

#### Symptoms

Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include:, stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways)

#### **Target Organs**

Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals:, kidney damage

#### Carcinogenicity

There is no information available. The chance of this material causing cancer is unknown. This material is not listed as a carcinogen by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or the Occupational Safety and Health Administration (OSHA).

#### **Reproductive Hazard**

Based on the available information, risk to the fetus from maternal exposure to this material cannot be assessed.

#### **Other Information**

No data

## **3. COMPOSITION/INFORMATION ON INGREDIENTS**

| Components                | CAS-No.   | Concentration |
|---------------------------|-----------|---------------|
| TETRASODIUM PYROPHOSPHATE | 7722-88-5 | <=100%        |

#### 4. FIRST AID MEASURES

Eyes

If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.



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TETRASOD PYROPHOS TECH GR 56301

#### Skin

Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

#### Ingestion

Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

#### Inhalation

If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.

#### Notes to Physician

**Hazards:** Excessive levels of phosphorus can cause low blood calcium, with tetany and convulsions.

Treatment: No information available.

#### **5. FIRE-FIGHTING MEASURES**

#### **Suitable Extinguishing Media**

Water mist, carbon dioxide (CO2), dry chemical

#### **Hazardous Combustion Products**

May form:, phosphorous oxides, sodium oxide

#### **Precautions for Fire-Fighting**

No special fire hazards are known to be associated with this product. Wear full firefighting turn-out gear (full Bunker gear), and respiratory protection (SCBA).

## 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions No data

Environmental Precautions No data

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# TETRASOD PYROPHOS TECH GR 56301

## Methods for Cleaning Up

Shovel material into containers. Thoroughly sweep area of spill to clean up any residual material. Sweep up material for disposal or recovery.

## 7. HANDLING AND STORAGE

#### Handling

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.

#### Storage

No data

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

#### **Exposure Guidelines**

#### **General Advice**

These recommendations provide general guidance for handling this product. Personal protective equipment should be selected for individual applications and should consider factors which affect exposure potential, such as handling practices, chemical concentrations and ventilation. It is ultimately the responsibility of the employer to follow regulatory guidelines established by local authorities.

#### **Exposure Controls**

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below level of overexposure (from known, suspected or apparent adverse effects).

#### **Eve Protection**

Wear safety glasses in compliance with OSHA regulations. (Consult your safety representative.)

## **Skin and Body Protection**

Wear normal work clothing covering arms and legs. Wear resistant gloves such as: Neoprene

#### **Respiratory Protection**



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TETRASOD PYROPHOS TECH GR 56301

If needed, use a NIOSH-approved dust respirator. (Ask your safety representative.)

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| Physical state            | solid   |
|---------------------------|---------|
| -                         |         |
| Form                      | No data |
| Colour                    | white   |
| Odour                     | No data |
| Boiling point/range       | No data |
| pH                        | No data |
| Flash point               | No data |
| Evaporation rate          | No data |
| Explosion limits          | No data |
| Vapour pressure           | No data |
| Vapour density            | No data |
| Density                   | No data |
|                           | No data |
| Solubility                | No data |
| Partition coefficient (n- | No data |
| octanol/water)            |         |
| Autoignition temperature  | No data |

## **10. STABILITY AND REACTIVITY**

#### Stability

<u>2</u>-3

Stable.

#### **Conditions to Avoid**

Avoid contact with:, moisture

#### **Incompatible Products**

Avoid contact with strong mineral acids and strong organic acids., Avoid contact with:

#### **Hazardous Decomposition Products**

May form:, phosphorous oxides, sodium oxide

#### **Hazardous Reactions**

Product will not undergo hazardous polymerization.



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TETRASOD PYROPHOS TECH GR 56301

Thermal Decomposition No data

### **11. TOXICOLOGICAL INFORMATION**

**Acute Oral Toxicity** 

TETRASODIUM PYROPHOSPHATE LD 50 Rat: 4 g/kg

**Acute Inhalation Toxicity** 

**Acute Dermal Toxicity** 

## **12. ECOLOGICAL INFORMATION**

**Aquatic Toxicity** 

Acute and Prolonged Toxicity to Fish No data

Acute Toxicity to Aquatic Invertebrates No data

## **Environmental Fate and Pathways**

No data

## **13. DISPOSAL CONSIDERATIONS**

#### **Waste Disposal Methods**

Deposit in a landfill in accordance with local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution's Environmental Services Group at 800-637-7922.

## **14. TRANSPORT INFORMATION**



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# TETRASOD PYROPHOS TECH GR 56301

Dangerous goods descriptions may not reflect package size, quantity, end-use or regionspecific exceptions that can be applied to shipments. Consult shipping documents for material-specific descriptions.

### **15. REGULATORY INFORMATION**

### California Prop. 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

### SARA Hazard Classification Acute Health Hazard

SARA 313 Component(s)

| OSHA Hazards |        | Moderate skin irritant<br>Moderate eye irritant |            |       |
|--------------|--------|-------------------------------------------------|------------|-------|
|              | Health | Flammability                                    | Reactivity | Other |
| HMIS         | 1      | 1                                               | 0          |       |
| NFPA         | 1      | 0                                               | 0          |       |

## **16. OTHER INFORMATION**

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

This MSDS has been prepared by Ashland's Environmental Health and Safety Department (1-800-325-3751).



Univar USA Inc. 17425 NE Union Hill Road Redmond, WA 98052 (425) 889-3400

For Emergency Assistance involving chemicals call - CHEMTREC (800) 424-9300

The Version Date and Number for this MSDS is : 07/05/2006 - #005

|               | *************************************** |
|---------------|-----------------------------------------|
| ISSUED BY:    | 007115                                  |
| SUPERSEDES:   | 11/01/2005                              |
| DATE ISSUED:  | 04/21/2006                              |
| MSDS NUMBER:  | AS010060                                |
| PRODUCT NAME: | TETRASODIUM PYROPHOSPHATE ANHYDROUS     |

Material Safety Data Sheet

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Identification

| Product Name:     | TETRASODIUM PYROPHOSPHATE ANHYDROUS |
|-------------------|-------------------------------------|
| Reference Number: | ASTI 0060                           |
| Synonyms:         | TSPP; Sodium Pyrophosphate          |

Use of substance or preparation

Food ingredient, sequestrate, buffer, deflocculate, water treatment, metal cleaner, soil stabilizer, consumer and industrial cleaning products, paper coating and filling, pigment dispersant, detergent

Company/Undertaking Identification

ICL PERFORMANCE PRODUCTS LP 622 Emerson Road - Suite 500 St. Louis, Missouri 63141

Emergency telephone: In USA call CHEMTREC: 1-800-424-9300 In Canada call CANUTEC: 1-613-996-6666

neral Information: 1-800-244-6169 (Worldwide)

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2. COMPOSITION/INFORMATION ON INGREDIENTS

Composition

| Substance                 | CAS       | EINECS NO | 8w/w | Risk Phrase |
|---------------------------|-----------|-----------|------|-------------|
| Tetrasodium Pyrophosphate | 7722-88-5 | 231-767-1 | 95+  | R36/37/38   |

3. HAZARDS IDENTIFICATION

Classification of the substance/preparation

EC Classification Xi - Irritant Safety phrase S26 S36

Human Health Effects

The product causes eye irritation and may cause respiratory tract irritation.

Environmental Effects

This material is not expected to produce any significant environmental effects when recommended use instructions are followed.

4. FIRST-AID MEASURES

WARNING STATEMENTS CAUTION! CAUSES EYE IRRITATION MAY CAUSE RESPIRATORY TRACT IRRITATION

General

Treatment is symptomatic and supportive. This product causes eye irritation and may cause respiratory tract irritation. Eye irritation symptoms include stinging, tearing, redness and swelling. Inhalation of this dust may cause coughing, chest pain, runny nose and burning throat. Ingestion of large doses (e.g. 20 g) may cause vomiting and nausea. If vomiting is not spontaneous, do NOT induce it Phosphates are laxatives.

Eye contact

Immediately flush eyes with water for at least 15 minutes, lifting the upper and lower eyelids intermittently. See a medical doctor or ophthalmologist immediately.

Skin contact

Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

Inhalation

Remove to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Inhalation of the dust may cause coughing, runny nose, and sneezing.

#### Ingestion

Rinse mouth with plenty of water. Dilute by drinking 1 to 2 glasses of water. Do NOT induce vomiting. Never give anything by mouth to an unconscious

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person. Get medical attention. Contact a Poison Control Center.

5. FIRE FIGHTING MEASURES

extinguishing media

----

Non-combustible. No special requirement.

Unsuitable extinguishing media

Non-combustible No special requirement.

Exposure hazards

No special considerations.

Protective equipment

As a general precaution, firefighters, and others exposed, wear selfcontained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

No special requirement.

Environmental precautions

small quantities: Presents no environmental problems. Large quantities: As general precaution, avoid discharge into the environment.

Methods for cleaning up

Sweep, scoop or vacuum and place into containers for disposal.

7. HANDLING AND STORAGE

Handling

Avoid contact with eyes. Avoid breathing dust Keep container closed Use only with adequate ventilation Avoid contact with skin. Wash thoroughly after handling. Do not taste or swallow

Engineering measures

Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see Section 8 below). The use of local mechanical exhaust ventilation is preferred at sources of air contamination such as open process equipment. If ventilation is inadequate or not available, use spiratory and eye protection to prevent irritation.

Storage

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Store is cool, dry place to maintain product performance.

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

| Occupational exp<br>State<br>Australia<br>Belgium<br>Denmark<br>Finland<br>France<br>Norway | Standard<br>Occupation Exposure Limit<br>Occupation Exposure Limit<br>Occupation Exposure Limit<br>Occupation Exposure Limit<br>Occupation Exposure Limit<br>Occupation Exposure Limit | Limit<br>5 mg/m3 8-hr. TWA<br>5 mg/m3 8-hr. TWA<br>5 mg/m3 8-hr. TWA<br>5 mg/m3 8-hr. TWA, 3 mg/m3<br>VME 5 mg/m3<br>5 mg/m3 8-hr. TWA<br>MBK week 5 mg/m3 |
|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                             |                                                                                                                                                                                        |                                                                                                                                                            |

#### Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment; a dust and vapor respirator is recommended by HMIS. Use approved respiratory protective equipment as described in the U.S. OSHA 29 CFR 1910.134 or European Standard EN149.

#### Hand/skin protection

Wearing protective clothes is recommended; protective gloves and synthetic apron is recommended by HMIS. Wash hand and contaminated skin thoroughly after handling this product.

Eye protection

Wear appropriate protective eyeglasses or chemical safety goggles as described in the U.S. OSHA 29 CFR 1910.133 or European Standard EN 166. Splash goggles are recommended by HMIS.

9. PHYSICAL AND CHEMICAL PROPERTIES

#### General Information

| Chemical Formula:<br>Form<br>Color<br>Odor                                               | Na4 P207<br>powder, free flowing<br>White<br>Odorless                                                                       |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <pre>Important health, safety an pH (1* solution) Water solubility: Melting point:</pre> | d environmental information<br>10.3<br>6.4 (g/10042 H20) @ 25 deg C<br>Incongruently @ 622 deg C, completely @ 985<br>deg C |
| Bulk density:                                                                            | 0.88 (g/cc)                                                                                                                 |

#### 10. STABILITY AND REACTIVITY

Product is stable under normal conditions of storage and handling. Store in a cool, dry place to maintain product performance.

Conditions to avoid

Excessive moisture.

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Materials to avoid

#### ne

Hazardous decomposition products

Oxides of sodium and oxides of phosphorus.

11. TOXICOLOGICAL INFORMATION

Laboratory data

Data from ICL Performance Products LP single-dose (acute) animal studies with this material are given below:

Oral - rat LD50:3,770 mg/kg; slightly toxicDermal - rabbit LD50:> 7,940 mg/kg; practically nontoxicEye Irritation - rabbit:43.0/110.0; extremely irritatingSkin Irritation - rabbit (24-hr exp.):0.0/8.0; non-irritating

Rats fed this material in their diet for four months showed a reduced weight gain, urinary changes, increased organ-to-body weight ratios, and slight kidney damage. No birth defects were reported in rabbits, hamsters, mice or rats given this material during pregnancy. This material produced no genetic changes in standard tests using bacterial and yeast cells.

This material has been defined as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

. ECOLOGICAL INFORMATION

Environmental Toxicity

The following data have been classified using the criteria adopted by the European Economic Community (EEC) for aquatic organism toxicity.

| Invertebrate:   | 48-hr EC50 Daphnia magna: | 391 mg/L; Practically Nontoxic  |
|-----------------|---------------------------|---------------------------------|
| Fish:           | 96-hr LC50 Mosquito fish: | 1380 mg/L; Practically Nontoxic |
| 48-hr LC50 High | -eyes Medaka:             | 700 mg/L; Practically Nontoxic  |

No algal toxicity data was available for this material.

Environmental Fate

Inorganic compounds in contact with the soil, sub-surface or surface waters may be taken up by plants and utilized as essential nutrients. Phosphates may also form precipitates, usually with calcium or magnesium. The resultant compounds are insoluble in water and become a part of the soil or sediment. The term biodegradability, as such, is not applicable to inorganic compounds.

13. DISPOSAL CONSIDERATIONS

European waste catalog number

Unknown

sposal Considerations

This material when discarded is not a hazardous waste as that term is defined

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by the U.S. Resource, Conservation and Recovery Act (RCRA), 40 CFR 261. Dry material may be land filled or recycled in accordance with local, state and federal regulations. Consult your attorney or appropriate regulatory officials for information on such disposal.

#### 14. TRANSPORT INFORMATION

Road/Rail, Sea and Air

| IMDG/UN      | Not classified |
|--------------|----------------|
| ICAO/IATA    | Not classified |
| RID/ADR      | Unknown        |
| Canadian TDG | Not classified |
| U.S. DOT     | Not classified |

15. REGULATORY INFORMATION

EC label

| Hazard symbol: | Xi - Irritant                                                                                                                                            |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Risk phrase    | R36/37/38 irritating to eyes, respiratory system and                                                                                                     |
| Safety phrase  | skin.<br>S26 In case of contact with eyes, immediately flush<br>with plenty of water and seek medical attention<br>S36 Wear suitable protective clothing |

Chemical Inventory

| USA TSCA:   | Listed |
|-------------|--------|
| Canada DSL: | Listed |
| EC:         | Listed |
| Japan       | Listed |
| Australia   | Listed |
| Korea       | Listed |
| Philippines | Listed |
| China       | Listed |

Additional information

WHMIS Classification: D2(B) Materials causing other toxic effects

SARA Hazard NotificationHazard Categories Under Title III Rules (40 CFR 370): ImmediateSection 302 Extremely Hazardous Substances:NoneSection 313 Toxic Chemical(s):None

CERCLA Reportable Quantity:

Not applicable

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation and the MSDS contains all the information required by the Canadian Controlled Products Regulation.

16. OTHER INFORMATION

|                        | Healt | h Fire    | Reactivity    | Add   | itional Information |
|------------------------|-------|-----------|---------------|-------|---------------------|
| Suggested NFPA Rating  | 3     | 0         | 0             |       |                     |
| Suggested HMIS Rating  | 3     | 0         | 0             | J     |                     |
| J = Splash goggles, gl | oves, | synthetic | apron, dust & | vapor | respirator          |

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For Additional Information: Contact: MSDS Coordinator - Univar USA Puring business hours, Pacific Time - (425) 889-3400

#### NOTICE

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Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar USA Sales Office.

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END OF MSDS

| MA                          | TERIAL SAFE                                                                                      | TY DATA                                           | 7722                            | 88 5                                                                                   |                                                                                                |                                                  | FLAMMABILI<br>(RED)                             | ТҮ                                      |
|-----------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------|-----------------------------------------|
| ΤE                          | TRASODIUM                                                                                        | 1 PYROPI                                          | IOSPHATE                        |                                                                                        | NFPA Design                                                                                    | nation 704                                       |                                                 |                                         |
|                             | ERGENCY T<br>Ants: (3<br>(9                                                                      | 07) 875                                           | 5-2580 GR                       | EEN RIVER,<br>Wrence, Ks                                                               | DEGREE OF HAZ<br>4 = EXTREME<br>3 = HIGH<br>2 = MODERATE<br>1 = SLIGHT<br>0 = INSIGNFICA       | HEALTH<br>(BLUE)                                 |                                                 | 0 REACT                                 |
|                             | EMTREC:<br>DICAL:                                                                                |                                                   |                                 | TRANSPORT<br>Rocky Mtn                                                                 |                                                                                                |                                                  | SPECIAL<br>HAZARD                               | ,<br>                                   |
| RE                          | VISION: O                                                                                        | 7                                                 |                                 | EFFECTIVE                                                                              | : 02/07/91                                                                                     |                                                  | PRINTED:                                        | 01/04/9                                 |
| PR                          | EPARED FO                                                                                        | R USE E                                           | SY                              | RHEOX COR                                                                              | PORATION                                                                                       |                                                  | <u> </u>                                        |                                         |
| 2 <b>-</b> -                |                                                                                                  |                                                   |                                 | IDENTIFIC                                                                              | ATION =====                                                                                    | =======================================          |                                                 | ======================================= |
| IN                          | FDRMATION                                                                                        | PROVID                                            | ED BY:                          | FMC CORPO<br>1735 MARK<br>PHILADELP                                                    |                                                                                                | .03                                              | ×                                               |                                         |
| ==:                         | *======                                                                                          |                                                   | *****                           | PRODUCT I                                                                              | NFORMATION                                                                                     | 9#2902851                                        |                                                 |                                         |
| SY                          | NONYMS                                                                                           |                                                   |                                 |                                                                                        | ROPHOSPHATE                                                                                    | , TETRASC                                        | DIUM DIPH                                       | DSPHATE,                                |
| .701<br>CHI                 | IPPING NA<br>RMULA<br>EMICAL FA<br>DDUCT USE                                                     | IA<br>IM<br>MILY                                  | T                               | NONE, NOT<br>NONE, NOT<br>NA4P207<br>PHOSPHATE<br>DETERGENTS<br>ING MUDS,<br>BLEACH BA | REGULATED<br>REGULATED<br>REGULATED<br>5, CLAY DIS<br>WATER TREA<br>TH STABILIZ<br>YSTEMS, MOI | TMENT, TE<br>ER, DISPE                           | EXTILE PROG<br>ERSANT AND                       | CESSING,<br>Coagulai                    |
| ==:                         |                                                                                                  | ======                                            | *******                         | PRECAUTION                                                                             | NARY INFORM                                                                                    | ATION ===                                        | ============                                    | *=======                                |
| (PL<br>T(<br>L/<br>Of<br>C( | ECAUTIONA<br>LEASE USE<br>D SATISFY<br>ABELING R<br>MELING R<br>THÈ OSH<br>MMUNICAT<br>ACFR 1910 | THIS S<br>THE IN<br>EQUIREM<br>A HAZAR<br>IONS ST | TATEMENT<br>-PLANT<br>ENTS<br>D | THROAT.<br>IRRITATI<br>FIRST AID:<br>MINUTES.<br>HANDLING:<br>PROTECTI                 |                                                                                                | NTACT WIT<br>S WITH WA<br>N WITH WA<br>MSHA APPR | H EYES MAN<br>TER FOR AT<br>TER.<br>NOVED RESPI | ( PRODUCE<br>[ LEAST- 1<br>[RATORY      |
| ==:                         |                                                                                                  | ======                                            | =======                         | INGREDIENT                                                                             | [S ========                                                                                    | #========                                        |                                                 |                                         |
| CAS                         | S# AND CD                                                                                        | MPONENT                                           |                                 | MATERIAL (<br>PERCENT<br>CAS #                                                         | DR COMPONEN                                                                                    | T: TETRAS<br>: 100<br>: 7722-8                   |                                                 | PHOSPHAT                                |
| CAN                         | IADIAN PRI                                                                                       |                                                   | BER:                            |                                                                                        |                                                                                                |                                                  |                                                 |                                         |

| MA          | TERIAL SAFETY DATA                 | 7722                     | 88 5                      | · · · · · · · · · · · · · · · · · · ·                      | FLAMMABILITY<br>(RED) |        |
|-------------|------------------------------------|--------------------------|---------------------------|------------------------------------------------------------|-----------------------|--------|
|             | TRASODIUM PYRO                     | PHOSPHATE                |                           | NFPA Designation 70                                        |                       |        |
| • • • • • • |                                    | •••                      |                           |                                                            | 0                     |        |
|             |                                    |                          |                           | DEGREE OF HAZARD<br>4 = EXTREME                            |                       | ACTIVI |
|             |                                    |                          |                           | 3 = HIGH<br>2 = MODERATE<br>1 = SLIGHT<br>0 = INSIGNFICANT |                       |        |
| - · ·       |                                    | ) 424-9300<br>) 595-9048 | TRANSPORTAT:<br>Rocky Mtn | ION ·                                                      | SPECIAL<br>HAZARD     |        |
| RE          | VISION: 07                         |                          | EFFECTIVE: (              | 02/07/91                                                   | PRINTED: 01/04/       | /93    |
| ==          |                                    |                          | PHYSICAL DA               | TA =========                                               |                       | - 2 2  |
|             | LTING/FREEZING                     |                          | 988*C                     |                                                            |                       |        |
| 4           | ILING POINT<br>POR PRESSURE        |                          | OVER 1000*C               | E                                                          |                       |        |
| VA          | POR DENSITY (A                     | IR = 1)                  | NON-VOLATIL               | E                                                          |                       |        |
| RO          | DM TEMPERATURE<br>APPEARANCE       |                          | WHITE POWDE               | R OR GRANULES                                              | 5<br>5                |        |
| 00          | OR                                 |                          | NONE                      |                                                            |                       |        |
|             | ECIFIC GRAVITY                     |                          | BULK DENSIT               | Y 1.0 G/ML                                                 |                       |        |
|             | LUBILITY IN H2<br>VOLATILES BY V   |                          | 7 @25C<br>NON-VOLATIL     | E ·                                                        |                       |        |
|             | APORATION RATE                     |                          |                           |                                                            |                       |        |
| ~           | (BUTYL ACET                        | ATE = 1).;               | NON-VOLATIL               |                                                            | · · ·                 |        |
|             | (AS IS)<br>  (1% Solution)         |                          | 10                        |                                                            |                       |        |
| 1           | OR THRESHOLD                       |                          | NOT APPLICA               | BLE                                                        |                       |        |
|             | ENSITY (GMS/ML)<br>DEFF. WATER/DIL |                          | 1.0<br>NOT AVAILAB        | LE                                                         |                       |        |
|             |                                    |                          |                           |                                                            | CTIVITY DATA =======  | ===    |
|             | A OLL DOTNE                        |                          | NON COMPLICT              | TRIE                                                       |                       |        |
|             | ASH POINT                          |                          |                           |                                                            |                       |        |
|             | AMMABLE LIMITS                     | UPPER                    | NOT APPLICA               | BLE                                                        |                       |        |
|             | (AIR)<br>XTINGUISHING ME           |                          | NOT APPLICA               |                                                            |                       | -      |
|             | PECIAL FIREFIGH                    |                          |                           |                                                            |                       |        |
|             | PROCEDUR                           | RES                      |                           |                                                            |                       |        |
| DI          | EGREE OF FIRE A<br>EXPLOSION       |                          | NUNE                      |                                                            |                       |        |
|             | TABILITY                           |                          |                           |                                                            |                       |        |
|             | AZARDOUS POLYME<br>ONDITIONS TO AV |                          |                           | CUR                                                        |                       |        |
|             | AJOR CONTAMINAL                    |                          |                           |                                                            |                       |        |
| CI          | ONTRIBUTE TO IN                    | STABILITY                |                           |                                                            |                       |        |
|             | NCOMPATIBILITY.<br>Azardous decom  |                          |                           |                                                            |                       |        |
| "           | PRODUC                             |                          |                           |                                                            |                       |        |
| ł           |                                    |                          |                           |                                                            |                       |        |
| 1           |                                    |                          |                           |                                                            | PAGE 0                | 12     |
| P           | CD                                 |                          |                           |                                                            | PAGE U                | 1 C    |

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| MATERIAL SAFETY DATA 7722                                               | 88 5                                                                                                                                                                                                                            | FLAMMABILITY<br>(RED)                                                                                                                    |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| TETRASODIUM PYROPHOSPHATE                                               | NFPA Designation                                                                                                                                                                                                                | 704                                                                                                                                      |
| EMERGENCY TELEPHONES:<br>PLANTS: (307) 875-2580 GF<br>(913) 749-8100 LA | DEGREE OF HAZARD<br>4 = EXTREME<br>3 = HIGH<br>2 = MODERATE<br>1 = SLIGHT<br>WRENCE, KS                                                                                                                                         | HEALTH<br>(BLUE)                                                                                                                         |
| CHEMTREC: (800) 424-9300<br>Medical: (303) 595-9048                     | TRANSPORTATION<br>Rocky Mtn                                                                                                                                                                                                     | SPECIAL<br>HAZARD                                                                                                                        |
| REVISION: 07                                                            | EFFECTIVE: 02/07/91                                                                                                                                                                                                             | PRINTED: 01/04/93                                                                                                                        |
|                                                                         | FIRE, EXPLOSION AND REA                                                                                                                                                                                                         | CTIVITY DATA =========                                                                                                                   |
| SENSITIVITY TO MECH                                                     | NONE                                                                                                                                                                                                                            |                                                                                                                                          |
| SENSITIVITY TO STATIC<br>DISCHARGE                                      | NONE                                                                                                                                                                                                                            |                                                                                                                                          |
| ======================================                                  | ROUTES OF EXPOSURE ====                                                                                                                                                                                                         | ********************                                                                                                                     |
| EYE CONTACT                                                             | EXTREMELY IRRITATING TO<br>MINIMALLY IRRITATING TO<br>WITH UNWASHED EYES SHOW<br>DAMAGE ON DAY 22, THE L<br>WASHING THE EYES SHORTL<br>DECREASED THE DURATION<br>IRRITATION. WASHED EYE<br>BY DAY 3.<br>SOURCE: FMC REPORT 186- | WASHED EYES. RABBITS<br>ED PERSISTING OCULAR<br>AST DAY OF THE STUDY.<br>Y AFTER EXPOSURE<br>AND SEVERITY OF THE<br>S RETURNED TO NORMAL |
| SKIN CONTACT                                                            |                                                                                                                                                                                                                                 | /KG (RABBIT)                                                                                                                             |
| SKIN ABSORPTION                                                         | SOURCE: FMC REPORT 188-                                                                                                                                                                                                         |                                                                                                                                          |
| INGESTION                                                               | ACGIH (1986) TLV = 5 MG                                                                                                                                                                                                         | 4000 MG/KG (RAT)                                                                                                                         |
| ~*************************************                                  | EXPOSURE LIMITS ======                                                                                                                                                                                                          | **********************                                                                                                                   |
|                                                                         | TLV = 5 MG/CU.M<br>PEL = 5 MG/CU.M 8 HR TW                                                                                                                                                                                      | ACGIH 1985-86<br>A OSHA 1989                                                                                                             |
|                                                                         | EFFECTS OF OVEREXPOSURE                                                                                                                                                                                                         |                                                                                                                                          |
| ACUTE EXPOSURE                                                          | EXTREME EYE IRRITANT.<br>LOW ORAL AND DERMAL TOX                                                                                                                                                                                |                                                                                                                                          |

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| •<br>•<br>• |                                                                                                                                                                                                                                                      | -FMC                                                                                                                                                  |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | MATERIAL SAFETY DATA 7722                                                                                                                                                                                                                            | 88 5 FLAMMABILITY<br>(RED)                                                                                                                            |
|             | TETRASODIUM PYROPHOSPHATE                                                                                                                                                                                                                            | NFPA Designation 704                                                                                                                                  |
| C.          | EMERGENCY TELEPHONES:<br>PLANTS: (307) 875-2580 GRE<br>(913) 749-8100 LAW                                                                                                                                                                            | DEGREE OF HAZARD<br>4 = EXTREME<br>3 + HIGH<br>2 = MODERATE<br>1 = SLIGHT<br>EEN RIVER, WY 0 = INSIGNFICANT                                           |
|             | CHEMTREC: (800) 424-9300<br>MEDICAL: (303) 595-9048                                                                                                                                                                                                  | TRANSPORTATION SPECIAL HAZARD                                                                                                                         |
|             | REVISION: 07                                                                                                                                                                                                                                         | EFFECTIVE: 02/07/91 PRINTED: 01/04/93                                                                                                                 |
| -           |                                                                                                                                                                                                                                                      | EFFECTS OF OVEREXPOSURE ====================================                                                                                          |
| C           | CHRONIC EXPOSURE<br>(EFFECTS CONSIDERED<br>INCLUDE: SENSITIVITIES,<br>CARCINOGENICITY,<br>TERATOGENICITY,<br>MUTAGENICITY,<br>SYNERGISTIC<br>PRODUCTS, AND<br>ANY MEDICAL CONDITIONS<br>GENERALLY RECOGNIZED AS<br>BEING AGGRAVATED BY<br>EXPOSURE.) | HUMAN INDUSTRIAL EXPERIENCE HAS SHOWN NO<br>SIGNIFICANT INHALATION HAZARD OR SKIN<br>IRRITATION WHEN GOOD PERSONAL HYGIENE<br>PRACTICES ARE FOLLOWED. |
|             |                                                                                                                                                                                                                                                      | EMERGENCY AND FIRST AID PROCEDURES =========                                                                                                          |
|             | EYES<br>SKIN<br>INHALATION                                                                                                                                                                                                                           | REMOVE FROM EXPOSURE. IF DISCOMFORT OR<br>BREATHING DIFFICULTY OCCURS, OBTAIN MEDICAL                                                                 |
|             | INGESTION                                                                                                                                                                                                                                            | ATTENTION.<br>RINSE MOUTH WITH WATER, GIVE WATER TO CAUSE<br>DILUTION IN STOMACH. IF DISCOMFORT OCCURS,<br>OBTAIN MEDICAL ATTENTION.                  |
|             | DECONTAMINATION PROCEDURE:<br>NOTES TO PHYSICIAN                                                                                                                                                                                                     |                                                                                                                                                       |
|             |                                                                                                                                                                                                                                                      | SPECIAL PROTECTION ====================================                                                                                               |
| (           | VENTILATION REQUIREMENTS.                                                                                                                                                                                                                            | PROVIDE GENERAL ROOM VENTILATION OR LOCAL<br>EXHAUST VENTILATION TO MAINTAIN EXPOSURE<br>BELOW THE TLV.                                               |
| ν.          | RECOMMENDED PERSONAL<br>  PROTECTIVE EQUIPMENT                                                                                                                                                                                                       | SEE BELOW                                                                                                                                             |
|             | PCD                                                                                                                                                                                                                                                  | PAGE 04                                                                                                                                               |

|               | • • • · ·                                                                                                                                           | -FMC                                                                                                                                                                                                     |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| - <del></del> | MATERIAL SAFETY DATA 7722<br>TETRASODIUM PYROPHOSPHATE                                                                                              | 88 5<br>NFPA Designation 704                                                                                                                                                                             |
| C.            | EMERGENCY TELEPHONES:                                                                                                                               | DEGREE OF HAZARD<br>4 = EXTREME<br>3 = HIGH<br>2 = MODERATE<br>1 = SLIGHT<br>VRENCE, KS                                                                                                                  |
|               | CHEMTREC: (800) 424-9300<br>MEDICAL: (303) 595-9048                                                                                                 | TRANSPORTATION SPECIAL HAZARD                                                                                                                                                                            |
|               | REVISION: 07                                                                                                                                        | EFFECTIVE: 02/07/91 PRINTED: 01/04/93                                                                                                                                                                    |
|               |                                                                                                                                                     | SPECIAL PROTECTION ====================================                                                                                                                                                  |
|               | RESPIRATORY                                                                                                                                         | USE NIDSH/MSHA APPROVED RESPIRATORY<br>PROTECTION, IF AIRBORNE DUST IS<br>EXPECTED.                                                                                                                      |
|               | EYES<br>GLOVES<br>SPECIAL CLOTHING;                                                                                                                 | WEAR CHEMICAL GOGGLES, IF AIRBORNE DUST<br>IS EXPECTED.<br>NO SPECIAL REQUIREMENT.<br>NO SPECIAL REQUIREMENT.                                                                                            |
|               | AND EQUIPMENT<br>FOOTWEAR                                                                                                                           | ND SPECIAL REQUIREMENT.                                                                                                                                                                                  |
| Ċ             |                                                                                                                                                     | STORAGE AND HANDLING ====================================                                                                                                                                                |
|               | (PLEASE USE THIS STATEMENT<br>TO SATISTY THE IN-PLANT<br>LABELING REQUIREMENTS<br>OF THE OSHA HAZARD<br>COMMUNICATIONS STANDARD<br>29CFR 1910.1200) | USE NIOSH/MSHA APPROVED RESPIRATORY<br>PROTECTION AND CHEMICAL GOGGLES, IF<br>AIRBORNE DUST IS EXPECTED.<br>STORE IN DRY AREA, FOR PRODUCT QUALITY<br>ASSURANCE.                                         |
|               |                                                                                                                                                     | DISPOSAL, SPILL OR LEAK PROCEDURES =========                                                                                                                                                             |
|               | OR SPILL                                                                                                                                            | MATERIAL SHOULD BE SWEPT UP FOR SALVAGE OR<br>DISPOSAL.<br>IF MATERIAL CAN NOT BE SALVAGED, A METHOD<br>OF DISPOSAL IS IN A LANDFILL IN ACCORDANCE<br>WITH ALL LOCAL, STATE, AND FEDERAL<br>REGULATIONS. |
|               |                                                                                                                                                     | TRANSPORTATION DATA ==================================                                                                                                                                                   |
|               | DOT PROPER SHIPPING NAME.:<br>DOT CLASSIFICATION<br>DOT LABELS<br>DOT MARKING                                                                       | NOT REGULATED<br>NOT REQUIRED<br>NOT REQUIRED                                                                                                                                                            |
|               |                                                                                                                                                     |                                                                                                                                                                                                          |
|               | PCD                                                                                                                                                 | PAGE 05                                                                                                                                                                                                  |

|    | · • •                                                                                                                             | -FMC                                                                                                                                                                                |
|----|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | MATERIAL SAFETY DATA 7722                                                                                                         | 88 5 FLAMMABILITY<br>(RED)                                                                                                                                                          |
| 19 |                                                                                                                                   | NFPA Designation 704                                                                                                                                                                |
| 6  | TETRASODIUM PYROPHOSPHATE                                                                                                         |                                                                                                                                                                                     |
|    | EMERGENCY TELEPHONES:<br>PLANTS: (307) 875-2580 GRE<br>(913) 749-8100 LAW                                                         | DEGREE OF HAZARD<br>4 = EXTREME<br>3 = HIGH<br>2 = MODERATE<br>1 = SLIGHT<br>NRENCE, KS                                                                                             |
|    | CHEMTREC: (800) 424-9300<br>MEDICAL: (303) 595-9048                                                                               | TRANSPORTATION SPECIAL HAZARD                                                                                                                                                       |
| ſ  | REVISION: 07                                                                                                                      | EFFECTIVE: 02/07/91 PRINTED: 01/04/93                                                                                                                                               |
|    |                                                                                                                                   | TRANSPORTATION DATA ==================================                                                                                                                              |
|    | UN NUMBER<br>HAZARDDUS SUBSTANCE/RQ<br>49 STCC NUMBER<br>EMERGENCY ACCIDENT                                                       | NOT LISTED<br>NONE                                                                                                                                                                  |
|    | PRECAUTIONS AND PROCEDURE:<br>PRECAUTIONS TO BE TAKEN:<br>IN TRANSPORTATION                                                       | NONE                                                                                                                                                                                |
|    | TYPE PACKAGES<br>OTHER SHIPPING IDS                                                                                               | BULK; MULTIWALL PAPER BAGS.<br>NONE                                                                                                                                                 |
| C  |                                                                                                                                   | ADDITIONAL REGULATORY INFORMATION =========                                                                                                                                         |
|    | MATERIAL IS REPORTED IN<br>EPA TSCA INVENTORY LIST?<br>MATERIAL IS LISTED AS A<br>CARCINDGEN/POTENTIAL<br>CARCINDGEN IN FOLLOWING | YES                                                                                                                                                                                 |
|    | NTP ANNUAL REPORT ?<br>IARC GROUP I OR II?<br>OSHA 29CFR PART 1910                                                                |                                                                                                                                                                                     |
|    | SUBPART Z ?<br>ACGIH APPENDIX A?                                                                                                  |                                                                                                                                                                                     |
|    |                                                                                                                                   | USDA PERMITTED IN MEATS.<br>CONTAINS UP TO 100 PPM ARSENIC, 2 PPM CADMIUM<br>AND 7 PPM LEAD FROM CALIFORNIA'S "PROPOSITION<br>65" LISTS OF CARCINOGENIC AND REPRODUCTIVE<br>TOXINS. |
|    | DOES PRODUCT CONTAIN A<br>TOXIC CHEMICAL(S) SUBJECT<br>TO SARA TITLE III SECTION<br>313 REPORTING                                 | NO                                                                                                                                                                                  |
|    | CHEMICAL(S)<br>SARA TITLE III SECTION<br>311/312 CLASSIFICATION                                                                   | MSDS REQUIRED; INVENTORY REPORTING REQUIRED.                                                                                                                                        |
| (  | <b>1</b>                                                                                                                          |                                                                                                                                                                                     |
|    | PCD                                                                                                                               | PAGE 06                                                                                                                                                                             |

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| ;<br>; ; | MATERIAL SAFETY DATA 7722                                                 | 88 5                                     | · · · · ·                                                                                       | FLAM                           | MABILITY<br>RED)     |
|----------|---------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------|----------------------|
|          | TETRASODIUM PYROPHOSPHATE                                                 |                                          | NFPA Designation 704                                                                            | 1                              |                      |
|          | EMERGENCY TELEPHONES:<br>Plants: (307) 875-2580 GRI<br>(913) 749-8100 LAN |                                          | DEGREE OF HAZARD<br>4 = EXTREME<br>3 = HIGH<br>2 = MODERATE<br>7 1 = SLIGHT<br>0 = INSIGNFICANT | HEALTH<br>(BLUE)               | 0 REACTIVI<br>(YELLO |
|          | CHEMTREC: (800) 424-9300<br>MEDICAL: (303) 595-9048                       |                                          | ON                                                                                              | SF                             | PECIAL<br>AZARD      |
|          | REVISION: 07                                                              | EFFECTIVE: 0                             | 2/07/91                                                                                         | PRINT                          | ED: 01/04/93         |
|          | 5=555555555555555555555555555555555555                                    | ADDITIONAL I                             | NFORMATION ==                                                                                   |                                |                      |
|          |                                                                           | 96 HR LC50 ><br>Menidia, F<br>FMC Studie | CITY DATA (F)<br>100 MG/L, N(<br>AINBOW TROUT)<br>S 189-1089, 1<br>100 MG/L, N(<br>189-1092     | DN-TDXIC (M<br>)<br>189-1090 & | 189-1091             |
|          |                                                                           |                                          |                                                                                                 |                                |                      |
| 5        |                                                                           |                                          |                                                                                                 | •                              |                      |
|          | I                                                                         |                                          |                                                                                                 |                                |                      |
|          |                                                                           |                                          |                                                                                                 |                                |                      |
|          |                                                                           |                                          |                                                                                                 |                                |                      |
|          |                                                                           |                                          |                                                                                                 |                                |                      |
|          |                                                                           |                                          |                                                                                                 |                                |                      |
|          |                                                                           |                                          |                                                                                                 |                                |                      |
|          |                                                                           |                                          |                                                                                                 |                                |                      |
|          |                                                                           |                                          |                                                                                                 |                                |                      |
|          |                                                                           |                                          |                                                                                                 |                                |                      |
| 1        |                                                                           |                                          |                                                                                                 |                                |                      |
|          | PCD                                                                       |                                          |                                                                                                 |                                | PAGE 07              |



EMERGENCY PHONE (203) 356-2345

Corporation, 120 Long Ridge Road

# HEALTH SPECIAL

HAZARD RATING SAFETY DATA

|                          | SECTION I – IDENTIFICA  | TION       |  |
|--------------------------|-------------------------|------------|--|
| CHEMICAL NAME & SYNONYMS |                         |            |  |
| Tetrasodium pyroph       | osphate                 |            |  |
| CHEMICAL FAMILY          | FORMULA                 | TRADE NAME |  |
|                          | Na4P207                 | TSPP       |  |
| DESCRIPTION              |                         | CAS NO.    |  |
| White colorless por      | vder or granular solid. | 7722-88-5  |  |

# SECTION II – NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Do not get in eyes, on skin or on clothing. Do not take internally. Avoid breathing dust. Wash all contaminated clothing before reuse.

| CORROSIVE ACTION ON MATERIALS (Metals, Plastic, Rubber, Etc.) |                                              |                                                                                             |  |  |  |
|---------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------|--|--|--|
| PROTECTIVE EQUIPMENT VENTILATION REQUIREMENTS                 |                                              |                                                                                             |  |  |  |
| Eyes<br>Glaves<br>Other                                       | Goggles<br>Impervious<br>Coveralls and boots | Local exhaust or general ventilation<br>required as dictated by airborne<br>concentrations. |  |  |  |

# SECTION III - HAZARDOUS INGREDIENTS

| BASIC MATERIAL | APPROX. | OSHA<br>PEL | LD 50 | LC 50 | SIGNIFICANT EFFECTS |
|----------------|---------|-------------|-------|-------|---------------------|
|                |         |             |       |       |                     |
|                |         |             |       |       |                     |
|                |         |             |       |       |                     |

# SECTION IV - FIRE AND EXPLOSION HAZARD DATA

| FLASH POINT<br>METHOD | NA            | FLAMMABLE<br>EXPLOSIVE<br>LIMITS | LOWER | UPPER |
|-----------------------|---------------|----------------------------------|-------|-------|
| EXTINGUISHING         | S MEDIA<br>NA |                                  |       |       |

SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire.

# SECTION V - HEALTH HAZARD DATA

| THRESHOLD L | IMIT VALUE                                                                                |  |  |  |
|-------------|-------------------------------------------------------------------------------------------|--|--|--|
|             | None established.                                                                         |  |  |  |
| SYMPTOMS OF | FOVER EXPOSURE Nausea, vomiting, diarrhea, eye and mucous memorane                        |  |  |  |
|             | on. May cause skin irritation.                                                            |  |  |  |
|             | EMERGENCY FIRST-AID PROCEDURES                                                            |  |  |  |
| SKIN        | Flush with water for 15 minutes, call a physician.                                        |  |  |  |
| EYES        | Flush with water for 15 minutes, call a physician.                                        |  |  |  |
| INGESTION   | Give water to drink. Induce vomiting by sticking finger down throat.<br>Call a physician. |  |  |  |
|             | Remove victim to fresh air, call a physician.                                             |  |  |  |

No.

1/22-88-5

# SECTION VI - TOXICOLOGY (Product)

| ACUTE ORAL LD 50 | 4.0  g/kg | (rat) |
|------------------|-----------|-------|
|------------------|-----------|-------|

ACUTE DERMALLD 50 NOT KNOWN

ACUTE INHALATION LC 50 NOT KNOWN

CARCINOGENIC Not known to be carcinogen\_c MUTAGENIC Not known to be mutagenic EYEIRRITATION Irritant

PRIMARY SKIN IRRITATION May be an irritant

PRINCIPAL ROUTES OF ABSORPTION

Oral.

EFFECTS OF ACUTE EXPOSURE Nausea, vomiting, dairrhea, eye and mucous membrane irritation. May cause skin irritation.

EFFECTS OF CHRONIC EXPOSURE

None expected at industrial use levels.

# SECTION VII - SPILL OR LEAKAGE PROCEDURES (Control Procedures)

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wear goggles, coveralls and impervious gloves and boots. If material is in powdered form, wear NIOSH/MSHA approved dust respirator. Follow OSHA regulations for respirator use. (See 29 CFR 1910.134). Shovel or sweep up and place in an approved DOT container and seal. Flush any residual material with water.

In the event of a massive spill, use the emergency phone number shown on the front of this sheet.

WASTE DISPOSAL METHOD

Dispose of unused and contaminated product in a manner approved for this material. Consult appropriate Federal, State and Local regulatory agencies to ascertain proper disposal procedures.

# SECTION VIII - REACTIVITY DATA

| STABLE X UNSTABLE AT                | °c   | °F | HAZAROOUS      | MAY OCCUR      |          |
|-------------------------------------|------|----|----------------|----------------|----------|
| CONDITIONS TO AVOID                 |      |    | POLYMERIZATION | WILL NOT OCCUR | <u>X</u> |
| INCOMPATABILITY (Material To Avoid) | None |    |                |                |          |
| HAZAROOUS DECOMPOSITION PRODUC      | TS   |    |                |                |          |

SECTION IX - PHYSICAL DATA

| MELTING POINT LOLUOF          | VAPOR PRESSURE NA             | VOLATILES NORE             |  |
|-------------------------------|-------------------------------|----------------------------|--|
| BOILING POINT                 | SOLUBILITY IN WATER 57 3 750- | EVAPOPATION PATE 11        |  |
| SPECIFIC GRAVITY (H20 -1) 2.5 |                               | VAPOR DENSITY AIR + 1. 111 |  |
| · .                           |                               |                            |  |

INFORMATION FURNISHED BY:

C. J. Michaels

DATE 3/19/80

Department of Environmental Hygiene and Toxicology

CORPORATION 120 Long Ridge Road, Stamford, Connecticut 06904 EMERGENCY PHONE (203) 356 - 2345

# BOY - 342 -5198



199 Pomeroy Road Parsippany, NJ 07054 phone 973-599-4400 fax 973-428-6048

### MATERIAL SAFETY DATA SHEET

### Product: ECON-ABATOR© LCO CATALYST

### SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Common Name: Chemical Name: Formula: Product CAS No.: Product Use: CHROME-COPPER ALUMINA CATALYST CHEMICAL MIXTURE CHEMICAL MIXTURE CHEMICAL MIXTURE Industrial catalyst

Supplier:

AirPol, Inc. 199 Pomeroy Road Parsippany, NJ 07054 973-599-4400

FOR CHEMICAL EMERGENCY CALL CHEMTREC (24 HOURS): 1-800-424-9300 (US, Canada, Puerto Rico, Virgin Islands) 1-703-527-3887 (Outside Above Area)

# SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

| INGREDIENT:            | CAS NO.           | % Wt. |
|------------------------|-------------------|-------|
| ALUMINA                | 1 <b>344-28-1</b> | 80-90 |
| CHROMIUM (3+) OXIDE    | 1308-38-9         | 8-12  |
| CHROMIUM (6+) TRIOXIDE | 1333-82-0         | 0-3   |
| COPPER OXIDE           | 1317-38-0         | 1-3   |

INGREDIENT NOTES

NOTE: The percentage by weight values reported above for the ingredients in this product represent typical formulation values.

NOTE: See Section 8 for Exposure Limits and Section 11 for Toxicological Information.

# AN MPM TECHNOLOGIES COMPANY

# 11/10/2004

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OKE EXHAUSTICS AND A

CC00076076 01.01

# Material Safety Data Sheet

# SECTION 3: HAZARDS IDENTIFICATION

# EMERGENCY OVERVIEW

Brown green spheres

Odorless

Flash Point: Not Applicable

Contains SUSPECT CANCER HAZARD - Risk of cancer depends on route, duration and level of exposure.

Prolonged or repeated exposure may cause damage to the lungs, liver, kidneys, and may cause blood disorders.

Causes eye, skin and respiratory tract irritation.

May cause allergic skin and respiratory reaction. Harmful if swallowed. May cause nausea, vomiting, diarrhea, coma, convulsions and death. Not a fire or explosion hazard. However, toxic emissions are possible in a fire situation.

### **ROUTES OF ENTRY**

Ingestion? YES Inhalation? YES Skin? YES Eyes? YES

POTENTIAL HEALTH EFFECTS

EYE CONTACT causes irritation and possible corneal injury.

IARC? YES

SKIN CONTACT causes irritation and may cause itching. Sensitization and allergic reactions are possible. Absorption of large amounts through damaged skin may lead to systemic toxicity.

INHALATION causes irritation of the respiratory tract and possibly symptoms similar to that of the common cold. May also cause allergic respiratory reactions. Prolonged or excessive exposure may result in COPPER poisoning.

INGESTION is harmful. May cause abdominal pain, cramps, nausea, vomiting, diarrhea and weakness. Systemic toxicity may result in convulsions, shock, coma and death.

CARCINOGENICITY

NTP? YES

OSHA? NO

Certain CHROMIUM +6 compounds have been listed as suspect human carcinogens by both the National Toxicology Program (NTP) and the International Agency for Research on Cancer IARC - Group 1), and as confirmed human carcinogens (A1) by the American Conference of Governmental Industrial Hygienists (ACGIH). There is insufficient evidence on the carcinogenicity of CHROMIUM and CHROMIUM +3 compounds. This product contains both CHROMIUM +3 and CHROMIUM +6 compounds.

### Page 2

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### Material Safety Data Sheet

### CHRONIC HEALTH HAZARDS

Overexposure may lead to COPPER poisoning, resulting in hemolytic anemia and liver, kidney and spleen damage.

Prolonged or repeated exposure to CHROMATES may cause damage to the lungs, liver, kidneys, and may cause blood disorders.

Refer to Potential Health Effects and Carcinogenicity.

### MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

May adversely affect existing medical conditions, such as eye, skin, respiratory, blood, liver and/or kidney ailments.

May aggravate existing heart or cardiovascular disorders.

Individuals with Wilson's disease are at increased risk of COPPER poisoning.

NOTE: See Section 8 for Exposure Limits, Section 11 for Toxicological Information and Section 12 for Ecological Information.

### SECTION 4: FIRST AID MEASURES

EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Call a physician or poison center.

SKIN CONTACT: Immediately wash skin with suap and plenty of water. If irritation persists, call a physician or poison center.

INHALATION: Remove to fresh air. If breathing is difficult, qualified personnel should administer oxygen. Call a physician or poison center.

INGESTION: Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

# SECTION 5: FIRE-FIGHTING MEASURES

Not Applicable Flash Point: Auto-Ignition: Not Applicable Not Applicable LEL: Not Applicable UEL:

# NFPA HAZARD CLASSIFICATION

Health: 2

Flammable: 0

Reactivity: 0

Page 3

### Material Safety Data Sheet

# HMIS HAZARD CLASSIFICATION

Health: 2\* Flammable: 0 Reactivity: 0 Special: C

\*Indicates the possibility of chronic health effects. See Chronic Health Hazards in Section 3 for more information.

# EXTINGUISHING MEDIA

Use water, carbon dioxide or foam.

# SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH/MSHA approved positive-pressure self-contained breathing apparatus and protective clothing as specified in 29 CFR 1910.156.

# UNUSUAL FIRE AND EXPLOSION HAZARDS

Not a fire or explosion hazard. However, toxic emissions are possible in a fire situation.

# SECTION 6: ACCIDENTAL RELEASE MEASURES

Contain spillage and scoop up or vacuum. Avoid dusting. Notification of the National Response Center (800/424-8802) may be required. Refer to EPA, DOT and applicable state and local regulations for current response information.

It is recommended that each user establish a spill prevention, control and countermeasure plan (SPCC). Such plan should include procedures applicable to proper storage, control and clean up of spills, including reuse or disposal as appropriate (see Section 13: Disposal Considerations).

**\*\*NOTE\*\*** In the event of an accidental release of this material, the above procedures should be followed. Additionally, proper exposure controls and personal protection equipment should be used (see Section 8: Exposure Control/Personal Protection), and disposal of the material should be in accordance with Section 13: Disposal Considerations.

# SECTION 7: HANDLING AND STORAGE

Wash thoroughly after handling. Keep storage container closed. Store in a cool, dry location away from incompatible materials. Avoid generating or breathing dust. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation.

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Material Safety Data Sheet

### SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

| EXPOSURE LIMITS INGREDIENT | PEL-OSHA                                           | TLV-ACGIH              |
|----------------------------|----------------------------------------------------|------------------------|
| ALUMINA                    |                                                    |                        |
| CAS NO.: 1344-28-1         | 10 mg/m3 (Total dust)<br>5 mg/m3 (Respirable dust) | 10 mg/m3 (as Al, dust) |
| CHROMIUM (3+) ÖXIDE        |                                                    |                        |
| CAS NO.: 1308-38-9         | 1 mg/m3 (as Cr)                                    | 0.5 mg/m3 (as Cr)      |
| CHROMIUM (6+) TRIOXIDE     |                                                    |                        |
| CAS NO.: 1333-82-0         | 0.1 mg/m3<br>(as CrO3) Ceiling                     | 0.05 as mg/m3 (as Cr)  |
| COPPER OXIDE               |                                                    |                        |
| CAS NO.: 1317-38-0         | 1 mg/m3 (as Cu)                                    | 1 mg/m3 (as Cu)        |

Unless otherwise noted, all values are reported as 8-hour Time-Weighted Averages (TWAs) and total dust (particulates only). All ACGIH TLVs refer to the 2000 Standards. Unless otherwise noted, all OSHA PELs refer to 29 CFR Part 1910 Air Contaminants: Final Rule, January 19, 1989.

### RESPIRATORY PROTECTION

A NIOSH/MSHA approved dust respirator is recommended if dust is generated. If respiratory protection is used, follow all requirements for respiratory programs set forth in OSHA regulations (29 CFR 1910.139).

### VENTILATION

General; local exhaust ventilation as necessary to control any air contaminants to within their PELs or TLVs during the use of this product.

PROTECTIVE EQUIPMENT

Safety glasses (with side shields). Appropriate chemical resistant gloves should be worn. Body protection as necessary to prevent skin contact.

# PERSONNEL SAMPLING PROCEDURE

For HEXAVALENT CHROMIUM: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, Methods 7600, 7604, 9101. For CHROMIUM: Refer to NIOSH Manual of Analytical Methods (NMAM), 4<sup>th</sup> Edition, Method 7024. For COPPER (dust & fume): Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, Method 7029. For NUISANCE DUST: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, and Method 0500.

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# SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Brown green spheres Odor: Odorless Boiling Point: Not Applicable Specific Gravity (H2O=1): 0.9 g/cc (Bulk Density) Melting Point: Not Applicable Vapor Pressure (mm Hg): Not Applicable Vapor Density (Air=1): Not Applicable Evaporation Rate: Not Applicable % Solubility In Water: Slightly Soluble pH: Not Applicable

# SECTION 10: STABILITY AND REACTIVITY

Stability: Generally considered stable. Avoid: High temperatures.

# INCOMPATIBILITY (Materials to Avoid)

Strong oxidizers, ammonia and bases.

Acids and reducing agents.

May undergo an exothermic hydration reaction with water.

# HAZARDOUS DECOMPOSITION OR BY-PRODUCTS

Thermal decomposition will produce metal oxides fumes.

Polymerization: Polymerization is not expected to occur. Avoid: Not applicable.

# SECTION 11: TOXICOLOGICAL INFORMATION

| CHEMICAL NAME                                | % WL LD50              | LC50          |
|----------------------------------------------|------------------------|---------------|
| ALUMINA<br>CAS NO.: 1344-28-1                | 80-90 Not Available    | Not Available |
| CHROMIUM (3+) OXIDE<br>CAS NO.: 1308-38-9    | 8-12 Not Available     | Not Available |
| CHROMIUM (6+) TRIOXIDE<br>CAS NO.: 1333-82-0 | 0-3 80 mg/kg RAT, oral | Not Available |
| COPPER OXIDE<br>CAS NO.: 1317-38-0           | 1-3 Not Available      | Not Available |

NOTE: See Sections 3, 8 and 12 for additional information.

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Material Safety Data Sheet

# SECTION 12: ECOLOGICAL INFORMATION

### ECOTOXICITY

No data available.

ENVIRONMENTAL FATE

No data available.

### SECTION 13: DISPOSAL CONSIDERATIONS

US EPA Waste Number: D007

This product, if disposed of by itself, is a hazardous waste under the EPA hazardous waste regulations because of extractable CHROMIUM. Waste mixtures containing this product should be tested for Toxicity Characteristics (TC) using the current Toxicity Characteristic Leaching Procedure (TCLP).

Federal, state and local disposal laws and regulations will determine the proper waste disposal/recycling/reclamation procedure. Disposal requirements are dependent on the hazard classification and will vary by location and the type of disposal selected. Refer to 40 CFR Part 261 et al. for details.

\*\*NOTE\*\* Chemical additions, processing or otherwise altering this material may make the waste management information presented above incomplete, inaccurate or otherwise inappropriate.

As local regulations may vary; all waste must be disposed/recycled/re-claimed in accordance with federal, state, and local environmental control regulations.

# SECTION 14: TRANSPORT INFORMATION

INTERNATIONAL UN Number: Not Regulated

UNITED STATES

EPA Waste Number: D007 DOT Classification: Not Regulated

CANADA PIN Number: Not Regulated TDG Class: Not Regulated

EC DGL: Not Determined

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Material Safety Data Sheet

# SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

TSCA: IN TSCA

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SARA 311 AND 312 HAZARD CATEGORIES

IMMEDIATE (Acute) Health Hazard: YES DELAYED (Chronic) Health Hazard: YES FIRE Hazard: NO REACTIVITY Hazard: NO Sudden Release of PRESSURE: NO

# SARA SECTION 313 NOTIFICATION

This product contains a toxic chemical (or chemicals) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

| CHEMICAL NAME          | CAS Number | % Wt. |
|------------------------|------------|-------|
| CHROMIUM (3+) OXIDE    | 1308-38-9  | 8-12  |
| CHROMIUM (6+) TRIOXIDE | 1333-82-0  | 0-3   |
| COPPER OXIDE           | 1317-38-0  | 1-3   |

OZONE DEPLETING SUBSTANCES (ODS)

This product neither contains nor is manufactured with an ozone depleting substance subject to the labeling requirements of the Clean Air Act Amendments 1990 and 40 CFR Part 82.

VOLATILE ORGANIC COMPOUNDS (VOC)

Not Applicable

# US STATE REGULATIONS

CALIFORNIA: The State of California has a regulation (Proposition 65), which identifies specific chemicals known to the State of California to cause cancer or birth defects. Proposition 65 requires a disclosure for products sold within the State of California containing an identified chemical. The following information is required by the State of California for this product:

\*WARNING: This product contains chemicals known to the State of California to cause cancer.

VOLATILE ORGANIC COMPOUND (CARB): Not Applicable

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Material Safety Data Sheet

CANADIAN REGULATIONS

DSL/NDSL: DSL WHMIS Classification:

Class D Division 1 Subdivision B Class D Division 2 Subdivision A Class D Division 2 Subdivision B

### **EUROPEAN REGULATIONS**

EINECS: Yes

**OTHER REGULATIONS** 

MIT1 (Japan): Yes

AICS (Australia): Yes

# SECTION 16: OTHER INFORMATION

REVISIONS

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November 10, 2004 Revision Number: 2

### PREPARATION INFORMATION

Prepared By: AirPol, Inc. Phone Number: See Section 1

The information in this Material Safety Data Sheet should be provided to all who will use, handle, store, transport, or otherwise be exposed to this product. This information has been prepared for the guidance of plant engineering, operations, and management and for persons working with or handling this product. The information presented in the MSDS is premised upon proper handling and anticipated uses and is for the material without chemical additions/alterations. We believe this information to be reliable and up-to-date as of the date of publication, but make no warranty that it is. Additionally, if this Material Safety Data Sheet is more than three years old, please contact the supplier at the phone number listed in Section 1 to make certain that this sheet is current. End of MSDS..

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199 Pomeroy Road Parsippany, NJ 07054 phone 973-599-4400 fax 973-428-6048

### MATERIAL SAFETY DATA SHEET

# Product: ECON-ABATORO LCO CATALYST

# SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Common Name: Chemical Name: Formula: Product CAS No.: Product Use: CHROME-COPPER ALUMINA CATALYST CHEMICAL MIXTURE CHEMICAL MIXTURE CHEMICAL MIXTURE Industrial catalyst

Supplier:

AirPol, Inc. 199 Pomeroy Road Parsippany, NJ 07054 973-599-4400

FOR CHEMICAL EMERGENCY CALL CHEMTREC (24 HOURS): 1-800-424-9300 (US, Canada, Puerto Rico, Virgin Islands) 1-703-527-3887 (Outside Above Area)

# SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

| INGREDIENT:            | CAS NO.            | % Wt  |
|------------------------|--------------------|-------|
| ALUMINA                | 1344-28-1          | 80-90 |
| CHROMIUM (3+) OXIDE    | 1308 <b>-</b> 38-9 | 8-12  |
| CHROMIUM (6+) TRIOXIDE | 1333-82-0          | 0-3   |
| COPPER OXIDE           | 1317-38-0          | 1-3   |

INGREDIENT NOTES

NOTE: The percentage by weight values reported above for the ingredients in this product represent typical formulation values.

NOTE: See Section 8 for Exposure Limits and Section 11 for Toxicological Information.

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Econ-Abator® LCO Catalyst

Material Safety Data Sheet

# SECTION 3: HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

Brown green spheres

Odoriess

Flash Point: Not Applicable

Contains SUSPECT CANCER HAZARD - Risk of cancer depends on route, duration and level of exposure.

Prolonged or repeated exposure may cause damage to the lungs, liver, kidneys, and may cause blood disorders.

Causes eye, skin and respiratory tract irritation.

May cause allergic skin and respiratory reaction.

Harmful if swallowed. May cause nausea, vomiting, diarrhes, comz, convulsions and death. Not a fire or explosion hazard. However, toxic emissions are possible in a fire situation.

ROUTES OF ENTRY

Eyes? YES Skin? YES Inhalation? YES Ingestion? YES

POTENTIAL HEALTH EFFECTS

EYE CONTACT causes irritation and possible corneal injury.

SKIN CONTACT causes irritation and may cause itching. Sensitization and allergic reactions are possible. Absorption of large amounts through damaged skin may lead to systemic toxicity.

INHALATION causes irritation of the respiratory tract and possibly symptoms similar to that of the common cold. May also cause allergic respiratory reactions. Prolonged or excessive exposure may result in COPPER poisoning.

INGESTION is harmful. May cause abdominal pain, cramps, nausea, vomiting, diarrhea and weakness. Systemic toxicity may result in convulsions, shock, coma and death.

CARCINOGENICITY

NTP? YES

TES IARC? YES

OSHA? NO

Certain CHROMIUM +6 compounds have been listed as suspect human carcinogens by both the National Toxicology Program (NTP) and the International Agency for Research on Cancer IARC - Group 1), and as confirmed human carcinogens (A1) by the American Conference of Governmental Industrial Hygienists (ACGIH). There is insufficient evidence on the carcinogenicity of CHROMIUM and CHROMIUM +3 compounds. This product contains both CHROMIUM +3 and CHROMIUM +6 compounds.

### Page 2

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### Material Safety Data Sheet

# CHRONIC HEALTH HAZARDS

Overexposure may lead to COPPER poisoning, resulting in hemolytic anemia and liver, kidney and spleen damage.

Prolonged or repeated exposure to CHROMATES may cause damage to the lungs, liver, kidneys, and may cause blood disorders.

Refer to Potential Health Effects and Carcinogenicity.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

May adversely affect existing medical conditions, such as eye, skin, respiratory, blood, liver and/or kidney ailments.

May aggravate existing heart or cardiovascular disorders.

Individuals with Wilson's disease are at increased risk of COPPER poisoning.

NOTE: See Section 8 for Exposure Limits, Section 11 for Toxicological Information and Section 12 for Ecological Information.

### SECTION 4: FIRST AID MEASURES

EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Call a physician or poison center.

SKIN CONTACT: Immediately wash skin with susp and plenty of water. If irritation persists, call a physician or poison center.

INHALATION: Remove to fresh air. If breathing is difficult, qualified personnel should administer oxygen. Call a physician or poison center.

INGESTION: Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

# SECTION 5: FIRE-FIGHTING MEASURES

Flash Point:Not ApplicableAuto-Ignition:Not ApplicableLEL:Not ApplicableUEL:Not Applicable

# NFPA HAZARD CLASSIFICATION

Health: 2

Flammable: 0

Reactivity: 0

Page 3

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# Material Safety Data Sheet

# HMIS HAZARD CLASSIFICATION

Health: 2\* Flammable: 0 Reactivity: 0 Special: C

\*Indicates the possibility of chronic health effects. See Chronic Health Hazards in Section 3 for more information.

### EXTINGUISHING MEDIA

Use water, carbon dioxide or foam.

# SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH/MSHA approved positive-pressure self-contained breathing apparatus and protective clothing as specified in 29 CFR 1910.156.

# UNUSUAL FIRE AND EXPLOSION HAZARDS

Not a fire or explosion hazard. However, toxic emissions are possible in a fire situation.

# SECTION 6: ACCIDENTAL RELEASE MEASURES

Contain spillage and scoop up or vacuum. Avoid dusting. Notification of the National Response Center (800/424-8802) may be required. Refer to EPA, DOT and applicable state and local regulations for current response information.

It is recommended that each user establish a spill prevention, control and countermeasure plan (SPCC). Such plan should include procedures applicable to proper storage, control and clean up of spills, including reuse or disposal as appropriate (see Section 13: Disposal Considerations).

**\*\*NOTE\*\*** In the event of an accidental release of this material, the above procedures should be followed. Additionally, proper exposure controls and personal protection equipment should be used (see Section 8: Exposure Control/Personal Protection), and disposal of the material should be in accordance with Section 13: Disposal Considerations.

# SECTION 7: HANDLING AND STORAGE

Wash thoroughly after handling. Keep storage container closed. Store in a cool, dry location away from incompatible materials. Avoid generating or breathing dust. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation.

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Material Safety Data Sheet

### SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

| EXPOSURE LIMITS INGREDIENT                   | PEL-OSHA                                           | TLV-ACGIH              |
|----------------------------------------------|----------------------------------------------------|------------------------|
| ALUMINA<br>CAS NO.: 1344-28-1                | 10 mg/m3 (Total dust)<br>5 mg/m3 (Respirable dust) | 10 mg/m3 (as Al, dust) |
| CHROMIUM (3+) OXIDE<br>CAS NO.: 1308-38-9    | l mg/m3 (as Cr)                                    | 0.5 mg/m3 (as Cr)      |
| CHROMIUM (6+) TRIOXIDE<br>CAS NO.: 1333-82-0 | 0.1 mg/m3                                          | 0.05 as mg/m3 (as Cr)  |
| COPPER OXIDE<br>CAS NO.: 1317-38-0           | (as CrO3) Ceiling<br>1 mg/m3 (as Cu)               | 1 mg/m3 (as Cu)        |

Unless otherwise noted, all values are reported as 8-hour Time-Weighted Averages (TWAs) and total dust (particulates only). All ACGIH TLVs refer to the 2000 Standards. Unless otherwise noted, all OSHA PELs refer to 29 CFR Part 1910 Air Contaminants: Final Rule, January 19, 1989.

### **RESPIRATORY PROTECTION**

A NIOSH/MSHA approved dust respirator is recommended if dust is generated. If respiratory protection is used, follow all requirements for respiratory programs set forth in OSHA regulations (29 CFR 1910.139).

### VENTILATION

General; local exhaust ventilation as necessary to control any air contaminants to within their PELs or TLVs during the use of this product.

# PROTECTIVE EQUIPMENT

Safety glasses (with side shields). Appropriate chemical resistant gloves should be worn. Body protection as necessary to prevent skin contact.

# PERSONNEL SAMPLING PROCEDURE

For HEXAVALENT CHROMIUM: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, Methods 7600, 7604, 9101. For CHROMIUM: Refer to NIOSH Manual of Analytical Methods (NMAM), 4<sup>th</sup> Edition, Method 7024. For COPPER (dust & fume): Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, Method 7029. For NUISANCE DUST: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, and Method 0500.

### Material Safety Data Shoet

# SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Brown green spheres Odor: Odorless Boiling Point: Not Applicable Specific Gravity (H2O-1): 0.9 g/cc (Bulk Density) Melting Point: Not Applicable Vapor Pressure (mm Hg): Not Applicable Vapor Density (Air=1): Not Applicable Evaporation Rate: Not Applicable % Solubility In Water: Slightly Soluble pH: Not Applicable

# SECTION 10: STABILITY AND REACTIVITY

Stability: Generally considered stable. Avoid: High temperatures.

# INCOMPATIBILITY (Materials to Avoid)

Strong oxidizers, ammonia and bases.

Acids and reducing agents.

May undergo an exothermic hydration reaction with water.

# HAZARDOUS DECOMPOSITION OR BY-PRODUCTS

Thermal decomposition will produce metal oxides fumes.

Polymerization: Polymerization is not expected to occur. Avoid: Not applicable.

# SECTION 11: TOXICOLOGICAL INFORMATION

| CHEMICAL NAME                                | % WL LD50              | LC50          |
|----------------------------------------------|------------------------|---------------|
| ALUMINA<br>CAS NO.: 1344-28-1                | 80-90 Not Available    | Not Available |
| CHROMIUM (3+) OXIDE<br>CAS NO.: 1308-38-9    | 8-12 Not Available     | Not Available |
| CHROMIUM (6+) TRIOXIDE<br>CAS NO.: 1333-82-0 | 0-3 80 mg/kg RAT, oral | Not Available |
| COPPER OXIDE<br>CAS NO.: 1317-38-0           | 1-3 Not Available      | Not Available |

NOTE: See Sections 3, 8 and 12 for additional information.

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Material Safety Data Sheet

# SECTION 12; ECOLOGICAL INFORMATION

ECOTOXICITY

No data available.

ENVIRONMENTAL FATE

No data available.

# SECTION 13: DISPOSAL CONSIDERATIONS

US EPA Waste Number: D007

This product, if disposed of by itself, is a hazardous waste under the EPA hazardous waste regulations because of extractable CHROMIUM. Waste mixtures containing this product should be tested for Toxicity Characteristics (TC) using the current Toxicity Characteristic Leaching Procedure (TCLP).

Federal, state and local disposal laws and regulations will determine the proper waste disposal/recycling/reclamation procedure. Disposal requirements are dependent on the hazard classification and will vary by location and the type of disposal selected. Refer to 40 CFR Part 261 et al. for details.

\*\*NOTE\*\* Chemical additions, processing or otherwise altering this material may make the waste management information presented above incomplete, inaccurate or otherwise inappropriate.

As local regulations may vary; all waste must be disposed/recycled/re-claimed in accordance with federal, state, and local environmental control regulations.

# SECTION 14: TRANSPORT INFORMATION

INTERNATIONAL UN Number: Not Regulated

UNITED STATES

EPA Waste Number: D007 DOT Classification: Not Regulated

CANADA PIN Number: Not Regulated TDG Class: Not Regulated

EC DGL: Not Determined

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Material Safety Data Sheet

# SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

TSCA: IN TSCA

SARA 311 AND 312 HAZARD CATEGORIES

IMMEDIATE (Acute) Health Hazard: YES DELAYED (Chronic) Health Hazard: YES FIRE Hazard: NO REACTIVITY Hazard: NO Sudden Release of PRESSURE: NO

# SARA SECTION 313 NOTIFICATION

This product contains a toxic chemical (or chemicals) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

| CHEMICAL NAME          | CAS Number | % Wt. |
|------------------------|------------|-------|
| CHROMIUM (3+) OXIDE    | 1308-38-9  | 8-12  |
| CHROMIUM (6+) TRIOXIDE | 1333-82-0  | 0-3   |
| COPPER OXIDE           | 1317-38-0  | 1-3   |

OZONE DEPLETING SUBSTANCES (ODS)

This product neither contains nor is manufactured with an ozone depleting substance subject to the labeling requirements of the Clean Air Act Amendments 1990 and 40 CFR Part 82.

VOLATILE ORGANIC COMPOUNDS (VOC)

Not Applicable

US STATE REGULATIONS

CALIFORNIA: The State of California has a regulation (Proposition 65), which identifies specific chemicals known to the State of California to cause cancer or birth defects. Proposition 65 requires a disclosure for products sold within the State of California containing an identified chemical. The following information is required by the State of California for this product:

\*WARNING: This product contains chemicals known to the State of California to cause cancer.

VOLATILE ORGANIC COMPOUND (CARB): Not Applicable

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CHROITCHNT NU

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Material Safety Data Sheet

CANADIAN REGULATIONS

DSL/NDSL: DSL WHMIS Classification:

Class D Division 1 Subdivision B Class D Division 2 Subdivision A Class D Division 2 Subdivision B

# EUROPEAN REGULATIONS

**EINECS: Yes** 

OTHER REGULATIONS

MITI (Japan): Yes

AICS (Australia): Yes

# SECTION 16: OTHER INFORMATION

### REVISIONS

November 10, 2004 Revision Number: 2

# PREPARATION INFORMATION

Prepared By: AirPol, Inc. Phone Number: See Section 1

The information in this Material Safety Data Sheet should be provided to all who will use, handle, store, transport, or otherwise be exposed to this product. This information has been prepared for the guidance of plant engineering, operations, and management and for persons working with or handling this product. The information presented in the MSDS is premised upon proper handling and anticipated uses and is for the material without chemical additions/alterations. We believe this information to be reliable and up-to-date as of the date of publication, but make no warranty that it is. Additionally, if this Material Safety Data Sheet is more than three years old, please contact the supplier at the phone number listed in Section 1 to make certain that this sheet is current. End of MSDS..

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# MATERIAL SAFETY DATA SHEET INDEX RAW MATERIALS - CLAY PLANT

Attagel (R) (All) Attagel 50 / Attagel 20 Attagel <sup>TM</sup> 50 Attapulgite Clay Hectorite Crude National Bentonite Min-U-Gel and Florigel

> Scan all these MSDSs + libel pdf "MSDSs Dave Materials - Clay"

Attaged 50 Attaged 20 ENGELHARD MATERIAL SAFETY DATA SHEET Code: ATTPLGT-NCAL Date: 01 JUN 2000 Printed: 02 JUN 2000 Printed: 02 JUN 2000 ATTAGEL (R) (ALL) / ATTAFULGUS (R) (ALL) / ATTACLAY (R) RVM (ALL) / ATTACOTE (R) RVM (ALL) / ATTASORB (R) RVM (ALL) / ATTACOTE (R) R

Product: (ATTAGEL(R) (ALL) / ATTAPULGUS(R) (ALL) / ATTACLAY(R) RVM (ALL) / ATTACOTE(R) RVM (ALL) / ATTASORB(R) RVM (ALL) / ATTACOTE(R) R (ALL) / FLOREX(R) RVM (ALL) / MICROSORB(R) RVM (ALL) / RVM (ALL) / CPL 631 / DC 150 / HARWICK(R) #4 / UNISOIL(R) / 1890 POULTICE(R) / M-8113 / M-8125 / M-8214 / M-8355 / M-8484 / M-86178 / M-87190 / M-91008 / M-91011 / M-92014 / M-92025 / M-97005

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

| Chemical Name :<br>Formula :               | ATTAPULGITE CLAY<br>HYDRATED ALUMINUM-MAGNESIUN SILICATE<br>(Mg, Al)5518022 (OH)4.4H20<br>CHEMICAL MIXTURE                                                                                        |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Freduce com Morr                           | CHENICAL HIXTORE                                                                                                                                                                                  |
| Product Use :                              | Industrial filler and extender                                                                                                                                                                    |
| Supplier :<br>Address :<br>City, St, Zip : | ENGELHARD CORPORATION, SPECIALTY PIGMENTS & ADDITIVES<br>101 WOOD AVENUE<br>ISELIN, NJ 08830-0770<br>1-732-205-6913 FOR CUSTOMER SERVICE<br>1-502-775-7288 FOR ENVIRONMENT, HEALTH, AND<br>SAFETY |

FOR CHEMICAL EMERGENCY CALL CHEMTREC (24 HOURS): 1-800-424-9300 (US, Canada, Puerto Rico, Virgin Islands) 1-703-527-3887 (Outside Above Area)

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

| INGREDIENT                   | CAS NO.    | 8 Wt.   |
|------------------------------|------------|---------|
| MAGNESIUM ALUMINUM SILICATE* | 12174-11-7 | 87 - 99 |
| MAGNESIUM OXIDE              | 1309-48-4  | < 3     |
| SILICA, CRYSTALLINE (QUARTZ) | 14808-60-7 | 1 - 10  |

INGREDIENT NOTES

\*Naturally occurring chemical substance per TSCA, 40 CFR 710.4(b).

NOTE: See Section 8 for Exposure Limits and Section 11 for Toxicological Information.

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Tan powder or particles

Odorless

-2 -3 -3 -4

Flash Point: Nonflammable

Contains Suspect Cancer Hazard (Attapulgite contains naturally occurring crystalline silica). However, in reviewing this material, IARC has determined that there is inadequate evidence of carcinogenicity to humans and experimental animals (Group 3). May cause mechanical irritation to eyes and skin. Prolonged or repeated inhalation of dust may cause a disabling, progressive pulmonary fibrosis. This product is not a fire or explosion hazard.

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ROUTES OF ENTRY

Eyes? NO 5kin? NO Inhalation? YES Ingestion? NO

POTENTIAL HEALTH EFFECTS

EYE CONTACT may cause mechanical irritation if exposed to large amounts of dust.

SKIN CONTACT may cause irritation.

INHALATION may cause irritation to respiratory tract and lung damage if exposure is repeated or prolonged.

INGESTION: No adverse effects expected.

CARCINOGENICITY

NTP? YES LARC? NO

OSHA? NO

In evaluating a naturally occurring clay component of this product, the International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence of carcinogenicity to humans and experimental animals (Group 3). However, this component, like other naturally occurring minerals, contains crystalline silica. Crystalline silica has been classified by the National Toxicology Program (NTP) as reasonably anticipated to be carcinogenic. Inhaled quartz or cristobalite have been classified by IARC as carcinogenic to humans (Group 1).

CHRONIC HEALTH HAZARDS

NIOSH has studied the exposure effects of a clay component of this product, which contains crystalline silica, on pulmonary function and has determined that there is no evidence of significant respiratory morbidity. However, crystalline silica (quartz) by itself may cause disabling, progressive pulmonary fibrosis (silicosis) characterized by coughing, dyspnea, wheezing and impairment of pulmonary function.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

May aggravate pre-existing medical conditions, such as asthma and inflammatory or fibrotic lung disease.

NOTE: See Section 8 for Exposure Limits, Section 11 for Toxicological Information and Section 12 for Ecological Information.

SECTION 4: FIRST AID MEASURES

EYE CONTACT: Flush eyes with plenty of water. If irritation develops, call a physician.

SKIN CONTACT: Procedures normally not needed. If skin contact occurs flush with plenty of water. If irritation develops, call a physician.

INHALATION: Remove to fresh air. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician.

INGESTION: Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

SECTION 5: FIRE-FIGHTING MEASURES

Flash Point: Nonflammable Auto-Ignition: Not Applicable LEL: Not Applicable UEL: Not Applicable

NFPA HAZARD CLASSIFICATION

IU: AUGUA, INC.

-<u>\*</u>

·) \*: ,

Health: 0 Flammable: 0 Reactivity: 0

HMIS HAZARD CLASSIFICATION

Health: 1\* Flammable: 0 Reactivity: 0

\* Indicates the possibility of chronic health effects. See

Chronic Health Hazards in Section 3 for more information.

EXTINGUISHING MEDIA

Product will not burn. Use appropriate extinguishing media to extinguish combustible materials stored near-by.

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH/MSHA approved positive-pressure self-contained breathing apparatus and protective clothing as specified in 29 CFR 1910.156.

UNUSUAL FIRE AND EXPLOSION HAZARDS

This product is not a fire or explosion hazard.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Contain spillage and scoop up or vacuum. Do not use a cleaning method that will generate dust.

\*\*NOTE\*\* In the event of an accidental release of this material, the above procedures should be followed. Additionally, proper exposure controls and personal protection equipment should be used (see Section 8: Exposure Control/Personal Protection), and disposal of the material should be in accordance with Section 13: Disposal Considerations.

SECTION 7: HANDLING AND STORAGE

Wash thoroughly after handling.

Keep container closed. Avoid breakage of bagged material or spills of bulk material. Use dustless systems for handling, storage, and clean up so that airborne dust does not exceed the PEL. Use adequate ventilation and dust collection. Practice good housekeeping. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain, clean, and fit test respirators in accordance with OSHA regulations. Maintain and test ventilation and dust collection equipment. Wash or vacuum clothing which has become dusty. We recommend that smoking be prohibited in all areas where respirators must be used. See also American Society for Testing and Materials (ASTM) standard practice E 1132-86, "Standard Practice for Health Requirements Relating to Occupational Exposure to Quartz Dust."

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Avoid breathing dust.

EXPOSURE LIMITS

Avoid contact with eyes.

Use only with adequate ventilation.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

| INGREDIENT                                          | PEL-OSHA                                                                    | TLV-ACGIH                                                                    |
|-----------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| MAGNESIUM ALUMINUM SILICATE*<br>CAS NO.: 12174-11-7 | 15 mg/m3 (Total<br>dust)<br>5 mg/m3<br>(Respirable dust)                    | <pre>10 mg/m3 (Inhalable particulate) 3 mg/m3 (Respirable particulate)</pre> |
| MAGNESIUM OXIDE<br>CAS NO.: 1309-48-4               | 10 mg/m3 (Fume,<br>total dust)<br>5 mg/m3 (Fume,<br>respirable<br>fraction) | 10 mg/m3 (Fume)                                                              |
| SILICA, CRYSTALLINE (QUARTZ)<br>CAS NO.: 14808-60-7 | 0.1 mg/m3<br>(Respirable dust)                                              | 0.05 mg/m3<br>(Respirable<br>fraction)                                       |

Unless otherwise noted, all values are reported as 8-hour Time-Weighted Averages (TWAs) and total dust (particulates only). All ACGIH TLVs refer to the 1999 Standards. All OSHA PELs refer to 29 CFR Part 1910 Air Contaminants: Final Rule, January 19, 1989.

RESPIRATORY PROTECTION

A NIOSH/MSHA-approved respirator as necessary.

VENTILATION

General; local exhaust ventilation as necessary to control any air contaminants to within their PELs or TLVs during the use of this product.

PROTECTIVE EQUIPMENT

Safety glasses (with side shields).

PERSONNEL SAMPLING PROCEDURE

- -- -- ---- P. 3 UL /

For CRYSTALLINE SILICA: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, Methods 7500, 7601 and 7602. For NUISANCE DUST: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, Method 0500.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Tan powder or particles Odor: Odorless Boiling Point: Not Applicable Specific Gravity (H2O=1): > 1.0 Melting Point: Not Applicable Vapor Pressure (mm Hg): Not Applicable Vapor Density (Air=1): Not Applicable Evaporation Rate: Not Applicable % Solubility In Water: Insoluble pH: Not Determined

SECTION 10: STABILITY AND REACTIVITY

Stability: Generally considered stable. Avoid: Not applicable.

INCOMPATIBILITY (Materials to Avoid)

None expected.

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HAZARDOUS DECOMPOSITION OR BY-PRODUCTS

No hazardous decomposition or by-products are expected.

Polymerization: Polymerization will not occur. Avoid: Not applicable.

SECTION 11: TOXICOLOGICAL INFORMATION

| CHEMICAL NAME                                       | % Wt. LD50                    | LC50          |
|-----------------------------------------------------|-------------------------------|---------------|
| MAGNESIUM ALUMINUM SILICATE*<br>CAS NO.: 12174-11-7 | 87 - 99 Not Available         | Not Available |
| MAGNESIUM OXIDE<br>CAS NO.: 1309-48-4               | < 3 Not Available             | Not Available |
| SILICA, CRYSTALLINE (QUARTZ)<br>CAS NO.: 14808-60-7 | 1 - 10 Not Available          | Not Available |
| NOTE: See Sections 3, 8 and                         | 12 for additional information | ion.          |

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY

No data available.

ENVIRONMENTAL FATE

No data available.

### SECTION 13: DISPOSAL CONSIDERATIONS

US EPA Waste Number: Not Regulated

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This product, if disposed as received, is a non-hazardous waste on the basis of TCLP testing under current EPA Hazardous Waste Regulation as defined by 40 CFR Part 261 et al. Disposal/recycling/reclamation requirements will vary by location and type of disposal selected. Consult with state and local regulatory authorities.

\*\*NOTE\*\* Chemical additions, processing or otherwise altering this material may make the waste management information presented above incomplete, inaccurate or otherwise inappropriate.

As local regulations may vary; all waste must be disposed/recycled/reclaimed in accordance with federal, state, and local environmental control regulations.

SECTION 14: TRANSPORT INFORMATION

INTERNATIONAL UN Number: Not Regulated

### UNITED STATES

EPA Waste Number: Not Regulated DOT Classification: Not Regulated

CANADA PIN Number: Not Regulated TDG Class: Not Regulated

EC DGL: Not Determined

### SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

TSCA: IN TSCA

SARA 311 AND 312 HAZARD CATEGORIES

IMMEDIATE (Acute) Health Hazard: NO DELAYED (Chronic) Health Hazard: YES FIRE Hazard: NO REACTIVITY Hazard: NO Sudden Release of PRESSURE: NO

SARA SECTION 313 NOTIFICATION

This product does not contain toxic chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

OZONE DEPLETING SUBSTANCES (ODS)

This product neither contains nor is manufactured with an ozone depleting substance subject to the labelling requirements of the Clean

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,TEL=7276232

Air Act Amendments 1990 and 40 CFR Part 82.

VOLATILE ORGANIC COMPOUNDS (VOC)

None

US STATE REGULATIONS

CALIFORNIA: The State of California has a regulation (Proposition 65) which identifies specific chemicals known to the State of California to cause cancer or birth defects. Proposition 65 requires a disclosure for products sold within the State of California containing an identified chemical. The following information is required by the State of California for this product:

\*WARNING: This product contains chemicals known to the State of California to cause cancer.

VOLATILE ORGANIC COMPOUND (CARB): None

CANADIAN REGULATIONS

DSL/NDSL: DSL WHMIS Classification: Class D Division 2 Subdivision A

EUROPEAN REGULATIONS

EINECS: Yes

OTHER REGULATIONS

MITI (Japan): Yes

AICS (Australia): Yes

SECTION 16: OTHER INFORMATION

**REVISIONS** Revision Number: 6

PREPARATION INFORMATION

Prepared By: Corporate Environment, Health & Safety Group Phone Number: See Section 1

The information in this Material Safety Data Sheet should be provided to all who will use, handle, store, transport, or otherwise be exposed to this product. This information has been prepared for the guidance of plant engineering, operations, and management and for persons working with or handling this product. The information presented in the MSDS is premised upon proper handling and anticipated uses and is for the material without chemical additions/alterations. We believe this information to be reliable and up-to-date as of the date of publication, but make no warranty that it is. Additionally, if this Material Safety Data Sheet is more than three years old, please contact the supplier at the phone number listed in Section 1 to make certain that this sheet is current. Copyright Engelhard Corporation. License granted to make unlimited copies for internal use only. End of MSDS.....

Carlos Caram Prot Mars

Sent DI CARELAND

:10-19-94 ; 15:14 ; CUSTONER SERVICE-

509 443 2482;#14



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# ATTAGEL = 50

# Typical Properties

**Property** Typical Value Average Particle Size, microns 0.1 Residue, + 325 mesh (vet, wt %) 0.01 & maximum Oil Absorption (ASTM D281) 115 Free Moisture, as produced (Wt \* @ 220\*2) 12 ¥ Volatile matter, as produced (Wt € € 1200'F, 10 ł moisture-free basis) Bulking Value (lbs./gal.) 19.70 (gr/liter) 2360 pH (ASTM D1208) 7.5 - 9.5 Color Light Cream Specific Gravity 2.36 Tamped Bulk Density (lbs./ft<sup>3</sup>) 19 - 22(kgs./m<sup>1</sup>) 300 - 350 B.E.T. surface area, m<sup>2</sup>/ga 150 (moisture-free basis) EWT. 2/75

Schnical information and data reparting the composition, properties, or use of the products described herein is believed to be reliable. However, no representation or warranty is made with respect thereto encept as made by Engelhard in writing at the time of sale. Engeliard Corporation cannot assume responsibility for any patent Kabliky which may arise from the use of any product in a process, manner or formula net designed by Engelhard.

ENGELHARD CORPORATION SPECIALTY MINERALS AND COUDES GROUP 301 WOOD AVENUE ISELIN, NEW JERSEY 0000-0770 U.S.A. TELEPHONE: (505) 205-5000

Code: ATTAGEL Date: 03 APR 1996 Printed: 06 MAY 1996

# ENGELHARD

# **MATERIAL SAFETY DATA SHEET**

Product: ATTAGEL(R), ALL

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| Common Name : ATTAPULGITE C                        | ATTAPULGITE CLAY                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
|----------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| Chemical Name : HYDRATED ALUM                      | INUM-MAGNESIUM SILT                                                  | CATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |
| $\mathbf{rormula} \qquad : (Nq, \lambda 1), S1.0($ | $[M(r, A)] - S(r, O) + AH_O$                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| Product CAS No.: CHEMICAL MIXTO                    | CHEMICAL MIXTURE                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| Product Use : Absorbent and                        | Absorbent and extender                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
|                                                    |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| Supplier : ENGELHARD CORE                          | ENGELHARD CORPORATION, PIGMENTS & ADDITIVES GROUP<br>101 WOOD AVENUE |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| Address : 101 WOOD AVENT                           | 101 WOOD AVENUE                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| oter, oc, alp . ISCOIN, NO US                      | ISEDIN, NJ 08830-0770                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| 1 1-300-203-6933                                   | T 1 JUG 205 6933 FOR CUSTOMER SERVICE                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| 1-502-775-7288 FOR ENVIRONMENT, HEALTH, AND        |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| SAFETY                                             | · · · · · ·                                                          | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |
|                                                    |                                                                      | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  |  |
| FOR CHENICAL EMERGING                              | Y CALL CHENTREC (2)                                                  | HOURS):                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |  |  |  |
| A GOO ANG ON CADEG                                 | <b>4. Puerto Miso. Vi</b>                                            | trin Telendel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |
| 1-202-483-7616                                     | (Outside Above Are                                                   | a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |
|                                                    |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
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| ALL SALES OF A DECEMPENT ON THE CONTON             | AUTEN SUN OPPORTON                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
|                                                    |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| INGREDIENT                                         |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
|                                                    | CAS NO.                                                              | ł Wt.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |  |  |
| MAGNESIUM ALUMINUM SILICATE*                       |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| STREAMING SIDICATES                                |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| •                                                  | 12174-11-7                                                           | 90 - 99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |  |  |  |
| MAGNESIUM OXIDE                                    |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
|                                                    | 1200 42 4                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
|                                                    | 1309-48-4                                                            | 1 - 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |  |  |
| SILICA, CRYSTALLINE (QUARTZ)                       |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
| (Rounda)                                           | 14808 65 5                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
|                                                    | 14808-60-7                                                           | 1 - 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |
|                                                    |                                                                      | , in the second s |  |  |  |  |
|                                                    |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
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|                                                    |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |
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|                                                    |                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |  |

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| ··· · · ·   | v <sup>(</sup>                                                                                                                                                                                                              |                                                         |                                                                                       |                                       |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------|
| •<br>•<br>• | ENGELHARD<br>MATERIAL SAFETY DATA SHE                                                                                                                                                                                       | Page ;                                                  |                                                                                       | : ATTAGEL                             |
|             | INGREDIENT NOTES                                                                                                                                                                                                            |                                                         | Date                                                                                  | 9: 03 APR 1996                        |
|             | *Naturally occurring cher                                                                                                                                                                                                   | mical substance                                         |                                                                                       |                                       |
|             | NOTE: See Section 8 for<br>Toxicological Information                                                                                                                                                                        | Dama a success of the tax                               | and Section 11 fo                                                                     | и.4(b).                               |
|             | (Decentro)                                                                                                                                                                                                                  | a any rose do z                                         | 11-11.(7).010                                                                         |                                       |
|             | EMERGENCY OVERVIEW                                                                                                                                                                                                          |                                                         |                                                                                       |                                       |
|             | Tan powder or particles                                                                                                                                                                                                     |                                                         |                                                                                       |                                       |
|             | Odorless                                                                                                                                                                                                                    |                                                         |                                                                                       |                                       |
|             | Flash Point: Nonflammable                                                                                                                                                                                                   |                                                         |                                                                                       |                                       |
|             | May cause mechanical irrit<br>Prolonged or repeated inha<br>progressive pulmonary fibr<br>This product is not a fire                                                                                                        | lation of dust                                          | may cause a disabl<br>azard.                                                          | ing,                                  |
|             | ROUTES OF ENTRY                                                                                                                                                                                                             |                                                         |                                                                                       |                                       |
|             | Eyes? NO Skin? NO POTENTIAL HEALTH EFFECTS                                                                                                                                                                                  | Inhalat:                                                | ion? YES I                                                                            | ngestion? NO                          |
|             |                                                                                                                                                                                                                             |                                                         |                                                                                       |                                       |
|             | EVE CONTACT may cause mecha<br>of dust.                                                                                                                                                                                     | anical irritatio                                        | on if exposed to la                                                                   | irge amounts                          |
|             | SKIN CONTACT may cause irri                                                                                                                                                                                                 |                                                         |                                                                                       |                                       |
|             | INHALATION may cause irrita<br>exposure is repeated or pro                                                                                                                                                                  | tion to respira<br>longed.                              | tory tract and lun                                                                    | g damage if                           |
|             | INGESTION: No adverse effe                                                                                                                                                                                                  | cts expected.                                           |                                                                                       |                                       |
|             | CARCINOGENICITY                                                                                                                                                                                                             |                                                         |                                                                                       |                                       |
|             | NTP? NO                                                                                                                                                                                                                     | IARC? NO                                                | ,                                                                                     | SHA? NO                               |
|             | In evaluating naturally occur<br>for Research on Cancer (IARC<br>evidence of carcinogenicity<br>carcinogenicity to experimen<br>like other naturally occurri<br>Crystalline silica has been<br>Program (NTP) and IARC as ha | to humans and 1<br>Ital animals (Gr<br>.ng minerals, co | TE, the Internation<br>d that there is in<br>imited evidence of<br>oup 3). However, A | nal Agency<br>adequate<br>ttapulgite, |
| 4           |                                                                                                                                                                                                                             |                                                         |                                                                                       |                                       |
|             |                                                                                                                                                                                                                             |                                                         |                                                                                       |                                       |

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# ENGELHARD NATERIAL SAFETY DATA SHEET

Page 3

Code: ATTAGEL Date: 03 APR 1996

to experimental animals and limited evidence of carcinogenicity to humans (Group 2A).

# CHRONIC HEALTH HAZARDS

NIOSH has studied the exposure effects of ATTAPULGITE, which contains crystalline silica, on pulmonary function and has determined that there is no evidence of significant respiratory morbidity. However, crystalline silica (quartz) by itself may cause disabling, progressive pulmonary fibrosis (silicosis) characterized by coughing, dyspnsa, wheezing and impairment of pulmonary function.

NEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

May aggravate pre-existing medical conditions, such as asthma and inflammatory or fibrotic lung disease.

NOTE: See Section 8 for Exposure Limits, Section 11 for Toxicological Information and Section 12 for Ecological Information.

EYE CONTACT: Flush eyes with plenty of water. If irritation develops, call a physician.

SKIN CONTACT: Procedures normally not needed. If skin contact occurs flush with plenty of water. If irritation develops, call a physician.

INHALATION: Remove to fresh air. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician.

INGESTION: Procedures normally not needed. If large quantities are ingested, seek medical advice.

Flash Point: Nonflammable Auto-Ignition: Not Applicable LEL: Not Applicable UEL: Not Applicable , VENT, VITENVELIMAN

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ENGELHARD MATERIAL SAFETY DATA BREET

Page 4

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Code: ATTAGEL Date: 03 APR 1996

# NFPA HASARD CLASSIFICATION

Realth: 0

Reactivity: 0

# HNIS MARARD CLASSIFICATION

Health: 1\*

Reactivity: 0

\* Indicates the possibility of chronic health effects. See Chronic Health Hazards in Section 3 for more information.

Flammable: 0

Flammable: 0

# EXTINGUISHING MEDIA

Product will not burn. Use appropriate extinguishing media to extinguish combustible materials stored near-by.

# SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH/MSHA approved positive-pressure self-contained breathing apparatus and protective clothing as specified in 29 CFR 1910.156.

# UNUSUAL FIRE AND EXPLOSION HASARDS

This product is not a fire or explosion hazard.

Contain spillage and scoop up or vacuum. Do not use a cleaning method that will generate dust.

\*\*NOTE\*\* In the event of an accidental release of this material, the above procedures should be followed. Additionally, proper exposure controls and personal protection equipment should be used (see Section 8: Exposure Control/Personal Protection), and disposal of the material should be in accordance with Section 13: Disposal Considerations.

Wash thoroughly after handling. Keep container closed. Avoid breakage of bagged material or spills of bulk material. Use dustless systems for handling, storage, and olean up so that airborne dust does not exceed the PEL. Use adequate ventilation and dust collection. Practice good housekeeping. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain, olean, and fit test respirators in accordance with OSHA

ENGELHARD Page 5 Code: ATTAGEL MATERIAL SAFETY DATA SHEET Date: 03 APR 1996 regulations. Maintain and test ventilation and dust collection equipment. Wash or vacuum clothing which has become dusty. We recommend that smoking be prohibited in all areas where respirators See also American Society for Testing and Materials (ASTM) standard practice E 1132-86, "Standard Practice for Health Requirements Relating to Occupational Exposure to Quartz Dust." Do not eat! Keep out of reach of children! Avoid breathing dust. Avoid contact with eyes. Use only with adequate vantilation. EXPOSURE LIMITS INGREDIENT PEL-OSHA TLV-ACGIH MAGNESIUM ALUMINUM SILICATE\* CAS NO.: 12174-11-7 15 mg/m<sup>3</sup> (Total  $10 \text{ mg/m}^3$ dust) (Inhalable  $5 \text{ mg/m}^3$ particulate) (Respirable dust) 3 mg/m<sup>3</sup> (Respirable particulate) MAGNESIUM OXIDE CAS NO.: 1309-48-4 10 mg/m<sup>3</sup> (Fume, 10 mg/m<sup>3</sup> (Fume) total dust) 5 mg/m<sup>3</sup> (Fume, respirable fraction) SILICA, CRYSTALLINE (QUARTZ) CAS NO.: 14808-60-7  $0.1 \text{ mg/m}^3$  $0.1 \text{ mg/m}^3$ (Respirable dust) (Respirable dust) Unless otherwise noted, all values are reported as 8-hour Time-Weighted Averages (TWAs) and total dust (particulates only). All ACGIH TLVs refer to the 1995-96 Standards. All OSHA PELS refer to 29 CFR Part 1910 Air Contaminants: Final Rule, January 19, 1989\*. (\*NOTE: As a result of the July 7, 1992 decision by the U.S. Circuit Court of Appeals (AFL-CIO v, OSHA) to vacate the 1989 PELS, OSHA will no longer enforce these new limits and will return to the pre-1989 PELE.)

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PAGE 06

Page 6

Coder ATTAGEL Date: 03 APR 1996

RESPIRATORY PROTECTION

A NIOSH/MSHA-approved respirator as necessary.

VENTILATION

General; local exhaust ventilation as necessary to control any air contaminants to within their PELs or TLVs during the use of this

# PROTECTIVE EQUIPMENT

Safety glasses (with side shields).

# PERSONNEL SAMPLING PROCEDURE

For CRYSTALLINE SILICA: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, Methoda 7500, 7601 and 7602. For NUISANCE DUST: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, Method 0500. For RESPIRABLE DUST: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, Method 0600.

Appearance: Tan powder or particles Odor: Odorless Boiling Point: Not Applicable Specific Gravity  $(H_2O=1)$ : > 1.0 Melting Point: Not Applicable Vapor Pressure (mm Hg): Not Applicable Vapor Density (Air=1): Not Applicable Evaporation Rate: Not Applicable f Solubility In Water: Insoluble pH: Not Determined

Stability: Generally considered stable.

INCOMPATIBILITY (Naterials to Avoid)

None expected.

ENGELHARD Page 7 Code: ATTAGEL NATERIAL SAFETY DATA SHEET Date: 03 APR 1996 HAMARDOUS DECOMPOSITION OR BY-PRODUCTS No hazardous decomposition or by-products are expected. Polymerization: Polymerization will not occur. Avoid: Not applicable. CHENICAL NAME % Wt. LD50 LC50 MAGNESIUM ALUMINUM SILICATE\* CAS NO.: 12174-11-7 90 - 99 Not Available Not Available MAGNESIUM OXIDE CAS NO.: 1309-48-4 1 - 5 Not Available Not Available SILICA, CRYSTALLINE (QUARTZ) CAS NO.: 14808-60-7 1 - 10 Not Available Not Available NOTE: See Sections 3, 8 and 12 for additional information. ECOTOXICITY No data available. ENVIRONMENTAL FATE No data available. 

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US EPA Waste Number: Not Regulated

This product, if disposed as received is a non-hazardous waste on the basis of TCLP testing under current EPA Hazardous Waste Regulation as defined by 40 CFR Part 261 et al. Disposal/recycling/reclamation requirements will vary by location and type of disposal selected. Consult with state and local regulatory authorities.

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#### Page 8

\*\*NOTE\*\* Chemical additions, processing or otherwise altering this material may make the waste management information presented above incomplete, inaccurate or otherwise inappropriate.

As local regulations may vary; all waste must be disposed/recycled/reclaimed in accordance with federal, state, and local environmental

STATISTICS STATES

INTERNATIONAL UN Number: Not Regulated

UNITED STATES

EPA Waste Number: Not Regulated DOT Classification: Not Regulated

# CANADA

PIN Number: Not Regulated TDG Class: Not Regulated

EC

DGL: Not Regulated

US FEDERAL REGULATIONS

TSCA: IN TSCA

SARA 311 AND 312 HAZARD CATEGORIES

INMEDIATE (Acute) Health Hazard: NO DELAYED (Chronic) Health Hazard: YES FIRE Hazard: NO REACTIVITY Hazard: NO Sudden Release of PRESSURE: NO

# BARA SECTION 313 NOTIFICATION

This product does not contain toxic chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and

Coder ATTAGEL Date: 03 APR 1996

Reauthorization Act of 1986 and 40 CFR Part 372.

OSONE DEPLETING SUBSTANCES (ODS)

This product neither contains nor is manufactured with an ozone depleting substance subject to the labelling requirements of the Clean Air Act Amendments 1990 and 40 CPR Part 82.

VOLATILE ORGANIC COMPOUNDS (VOC)

Nona

US STATE REGULATIONS

CALIFORNIA: The State of California has a regulation (Proposition 65) which identifies specific chemicals known to the state of California to cause cancer or birth defects. Proposition 65 requires a disclosure for products sold within the State of California containing an identified chemical. The following information is required by the State of California for this product:

\*WARNING: This product contains chemicals known to the State of California to cause cancer.

VOLATILE ORGANIC COMPOUND (CARB): None

CANADIAN REGULATIONS

DSL/NDSL: Not Determined WHMIS Classification: Class D Division 2 Subdivision B

SUROPEAN REGULATIONS

EINECS: Not Determined

OTHER REGULATIONS

NITI: Not Determined

AICS: Not Determined

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REVIBIONS Revision Number: 1

This MSDS has been revised in the following section(s):

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

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\*\* TOTAL PAGE.12 \*\*

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Code: ATTAGEL Date: 03 APR 1996

SECTION 11: TOXICOLOGICAL INFORMATION SECTION 15: REGULATORY INFORMATION LABEL COPY

# PREPARATION INFORMATION

Prepared By: Corporate Environment, Health & Safety Group Phone Number: See Section 1

The information in this Material Safety Data Sheet should be provided to all who will use, handle, store, transport, or otherwise be exposed to this product. This information has been prepared for the guidance of plant engineering, operations, and management and for persons working premised upon proper handling and anticipated uses and is for the material without chemical additions/alterations. We believe this information to be reliable and up-to-date as of the date of publication, but make no warranty that it is. Additionally, if this Material Safety the phone number listed in Section I to make certain that this sheet is unrent. Copyright Engelhard Corporation. License granted to make unlimited copies for internal use only. End of MSDS......

Code: ATTA-NC Date: 23 DEC 1996 Printed: 06 JAN 1997

# ENGELHARD

# MATERIAL SAFETY DATA SHEET

# Product: ALL NON-CALCINED ATTAPULGITE-BASED PRODUCTS

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SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

|               |   | ATTAPULGITE CLAY                                                           |  |  |
|---------------|---|----------------------------------------------------------------------------|--|--|
|               |   | HYDRATED ALUMINUM-MAGNESIUM SILICATE                                       |  |  |
| Formula       | : | $(Mg, Al)_{c}Si_{0}O_{c}(OH)_{c}4H_{0} & SiO_{c}$                          |  |  |
|               |   | $(Mg, Al)_{5}Si_{1}O_{22}(OH)_{4}\cdot 4H_{2}O \leq SiO_{2}$<br>12174-11-7 |  |  |
| Product Use   | : | Absorbent and extender                                                     |  |  |
|               |   |                                                                            |  |  |
| Supplier      | : | ENGELHARD CORPORATION, PIGMENTS & ADDITIVES GROUP                          |  |  |
| Address       | : | 101 WOOD AVENUE                                                            |  |  |
| City, St, Zip | : | ISELIN, NJ 08830-0770                                                      |  |  |
| Phone         | : | 1-908-205-6933 FOR CUSTOMER SERVICE                                        |  |  |
|               |   | 1-502-775-7288 FOR ENVIRONMENT, HEALTH, AND                                |  |  |
|               |   | SAFETY                                                                     |  |  |

FOR CHEMICAL EMERGENCY CALL CHEMTREC (24 HOURS): 1-800-424-9300 (US, Canada, Puerto Rico, Virgin Islands) 1-202-483-7616 (Outside Above Area)

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

| INGREDIENT                   | CAS NO.    | % Wt. |
|------------------------------|------------|-------|
| MAGNESIUM ALUMINUM SILICATE* | 12174-11-7 | 90-99 |
| MAGNESIUM OXIDE              | 1309-48-4  | 1-2   |
| SILICA, CRYSTALLINE (QUARTZ) | 14808-60-7 | 1-10  |

Code: ATTA-NC Date: 23 DEC 1996

#### ENGELHARD MATERIAL SAPETY DATA SHEET

INGREDIENT NOTES

\*Naturally occurring chemical substance per TSCA, 40 CFR 710.4(b).

NOTE: See Section 8 for Exposure Limits and Section 11 for Toxicological Information.

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Tan powder or particles

Odorless

Flash Point: Nonflammable

Contains Suspect Cancer Hazard (Attapulgite contains naturally occurring crystalline silica). However, in reviewing this material, IARC has determined that there is inadequate evidence of carcinogenicity to humans and limited evidence of carcinogenicity to experimental animals (Group 3). May cause mechanical irritation to eyes and skin. Prolonged or repeated inhalation of dust may cause a disabling, progressive pulmonary fibrosis. This product is not a fire or explosion hazard.

ROUTES OF ENTRY

Eyes? NO Skin? NO Inhalation? YES Ingestion? NO

POTENTIAL HEALTH EFFECTS

EYE CONTACT may cause mechanical irritation if exposed to large amounts of dust.

SKIN CONTACT may cause irritation.

INHALATION may cause irritation to respiratory tract and lung damage if exposure is repeated or prolonged.

INGESTION: No adverse effects expected.

CARCINOGENICITY

NTP? YES

IARC? NO

OSHA? NO

In evaluating a naturally occurring clay component of this product, the International Agency for Research on Cancer (IARC) has determined that

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there is inadequate evidence of carcinogenicity to humans and limited evidence of carcinogenicity to experimental animals (Group 3). However, this component, like other naturally occurring minerals, contains crystalline silica. Crystalline silica has been classified by both the National Toxicology Program (NTP) and IARC as having sufficient evidence of carcinogenicity to experimental animals and limited evidence of carcinogenicity to humans (Group 2A).

#### CHRONIC HEALTH HAZARDS

NIOSH has studied the exposure effects of a clay component of this product, which contains crystalline silica, on pulmonary function and has determined that there is no evidence of significant respiratory morbidity. However, crystalline silica (quartz) by itself may cause disabling, progressive pulmonary fibrosis (silicosis) characterized by coughing, dyspnea, wheezing and impairment of pulmonary function.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

May aggravate pre-existing medical conditions, such as asthma and inflammatory or fibrotic lung disease.

NOTE: See Section 8 for Exposure Limits, Section 11 for Toxicological Information and Section 12 for Ecological Information.

SECTION 4: FIRST AID MEASURES

EYE CONTACT: Flush eyes with plenty of water. If irritation develops, call a physician.

SKIN CONTACT: Procedures normally not needed. If skin contact occurs flush with plenty of water. If irritation develops, call a physician.

INHALATION: Remove to fresh air. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician.

INGESTION: Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

## SECTION 5: FIRE-FIGHTING MEASURES

Flash Point: Nonflammable Auto-Ignition: Not Applicable LEL: Not Applicable

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UEL: Not Applicable

#### NFPA HAZARD CLASSIFICATION

Health: 0

Flammable: 0

Reactivity: 0

HMIS HAZARD CLASSIFICATION

Health: 1\* Flammable: 0

Reactivity: 0

\* Indicates the possibility of chronic health effects. See Chronic Health Hazards in Section 3 for more information.

#### EXTINGUISHING MEDIA

Product will not burn. Use appropriate extinguishing media to extinguish combustible materials stored near-by.

#### SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH/MSHA approved positive-pressure self-contained breathing apparatus and protective clothing as specified in 29 CFR 1910.156.

## UNUSUAL FIRE AND EXPLOSION HAZARDS

This product is not a fire or explosion hazard.

#### SECTION 6: ACCIDENTAL RELEASE MEASURES

Contain spillage and scoop up or vacuum. Do not use a cleaning method that will generate dust.

\*\*NOTE\*\* In the event of an accidental release of this material, the above procedures should be followed. Additionally, proper exposure controls and personal protection equipment should be used (see Section 8: Exposure Control/Personal Protection), and disposal of the material should be in accordance with Section 13: Disposal Considerations.

#### SECTION 7: HANDLING AND STORAGE

Wash thoroughly after handling. Keep container closed. Avoid breakage of bagged material or spills of bulk material. Use dustless systems for handling, storage, and clean up so that airborne dust does not exceed the PEL. Use adequate ventilation and dust collection. Practice good housekeeping. Do not permit dust to

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Code: ATTA-NC Date: 23 DEC 1996

collect on walls, floors, sills, ledges, machinery, or equipment. Maintain, clean, and fit test respirators in accordance with OSHA regulations. Maintain and test ventilation and dust collection equipment. Wash or vacuum clothing which has become dusty. We recommend that smoking be prohibited in all areas where respirators must be used. See also American Society for Testing and Materials (ASTM) standard practice E 1132-86, "Standard Practice for Health Requirements Relating to Occupational Exposure to Quartz Dust. \*

Avoid breathing dust.

Avoid contact with eyes.

Use only with adequate ventilation.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

| EXPOSURE LIMITS<br>INGREDIENT                       | PEL-OSHA                                                 | TLV-ACGIH                                                                                               |
|-----------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| MAGNESIUM ALUMINUM SILICATE*<br>CAS NO.: 12174-11-7 | 15 mg/m³ (Total<br>dust)<br>5 mg/m³<br>(Respirable dust) | <pre>10 mg/m<sup>3</sup>  (Inhalable  particulate)  3 mg/m<sup>3</sup>  (Respirable  particulate)</pre> |
| MAGNESIUM OXIDE<br>CAS NO.: 1309-48-4               | None Established                                         | None Established                                                                                        |
| SILICA, CRYSTALLINE (QUARTZ)<br>CAS NO.: 14808-60-7 | 0.1 mg/m <sup>3</sup><br>(Respirable dust)               | 0.1 mg/m <sup>3</sup><br>(Respirable dust)                                                              |

Unless otherwise noted, all values are reported as 8-hour Time-Weighted Averages (TWAs) and total dust (particulates only). All ACGIH TLVs refer to the 1995-96 Standards. All OSHA PELs refer to 29 CFR Part 1910 Air Contaminants: Final Rule, January 19, 1989\*. (\*NOTE: As a result of the July 7, 1992 decision by the U.S. Circuit Court of Appeals (AFL-CIO v. OSHA) to vacate the 1989 PELS, OSHA will no longer enforce these new limits and will return to the pre-1989 PELs.)

#### RESPIRATORY PROTECTION

A NIOSH/MSHA-approved respirator as necessary.

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#### VENTILATION

General; local exhaust ventilation as necessary to control any air contaminants to within their PELs or TLVs during the use of this product.

#### PROTECTIVE EQUIPMENT

Safety glasses (with side shields).

#### PERSONNEL SAMPLING PROCEDURE

For CRYSTALLINE SILICA: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, Methods 7500, 7601 and 7602. For NUISANCE DUST: Refer to NIOSH Manual of Analytical Methods (NMAM), 4th Edition, Method 0500.

# SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Tan powder or particles Odor: Odorless Boiling Point: Not Applicable Specific Gravity (H,O=1): > 1.0 Melting Point: Not Applicable Vapor Pressure (mm Hg): Not Applicable Vapor Density (Air=1): Not Applicable Evaporation Rate: Not Applicable & Solubility In Water: Insoluble pH: Not Determined

#### SECTION 10: STABILITY AND REACTIVITY

Stability: Generally considered stable. Avoid: Not applicable.

INCOMPATIBILITY (Materials to Avoid)

None expected.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS

No hazardous decomposition or by-products are expected.

**Polymerization:** Polymerization will not occur. **Avoid:** Not applicable.

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| SECTION 11:                                                | TOXICOLOGICAL INFORMATION |               |  |
|------------------------------------------------------------|---------------------------|---------------|--|
| CHEMICAL NAME                                              | % Wt. LD50                | LC50          |  |
| MAGNESIUM ALUMINUM SILICATE*<br>CAS NO.: 12174-11-7        | 90-99 Not Available       | Not Available |  |
| MAGNESIUM OXIDE<br>CAS NO.: 1309-48-4                      | 1-2 Not Available         | Not Available |  |
| SILICA, CRYSTALLINE (QUARTZ)<br>CAS NO.: 14808-60-7        | 1-10 Not Available        | Not Available |  |
| NOTE: See Sections 3, 8 and 12 for additional information. |                           |               |  |

SECTION 12: ECOLOGICAL INFORMATION

#### ECOTOXICITY

No data available.

ENVIRONMENTAL FATE

No data available.

#### SECTION 13: DISPOSAL CONSIDERATIONS

US EPA Waste Number: Not Regulated

This product, if disposed as received is a non-hazardous waste on the basis of TCLP testing under current EPA Hazardous Waste Regulation as defined by 40 CFR Part 261 et al. Disposal/recycling/reclamation requirements will vary by location and type of disposal selected. Consult with state and local regulatory authorities.

\*\*NOTE\*\* Chemical additions, processing or otherwise altering this material may make the waste management information presented above incomplete, inaccurate or otherwise inappropriate.

As local regulations may vary; all waste must be disposed/recycled/re-

claimed in accordance with federal, state, and local environmental control regulations.

# SECTION 14: TRANSPORT INFORMATION

INTERNATIONAL UN Number: Not Regulated

MATERIAL SAFETY DATA SHEET

UNITED STATES

ENGELHARD

EPA Waste Number: Not Regulated DOT Classification: Not Regulated

#### CANADA

PIN Number: Not Regulated TDG Class: Not Regulated

EC

DGL: Not Determined

SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

TSCA: IN TSCA

SARA 311 AND 312 HAZARD CATEGORIES

IMMEDIATE (Acute) Health Hazard: NO DELAYED (Chronic) Health Hazard: YES FIRE Hazard: NO REACTIVITY Hazard: NO Sudden Release of PRESSURE: NO

SARA SECTION 313 NOTIFICATION

This product does not contain toxic chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

OZONE DEPLETING SUBSTANCES (ODS)

This product neither contains nor is manufactured with an ozone depleting substance subject to the labelling requirements of the Clean

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Air Act Amendments 1990 and 40 CFR Part 82.

VOLATILE ORGANIC COMPOUNDS (VOC)

None

US STATE REGULATIONS

CALIFORNIA: The State of California has a regulation (Proposition 65) which identifies specific chemicals known to the State of California to cause cancer or birth defects. Proposition 65 requires a disclosure for products sold within the State of California containing an identified chemical. The following information is required by the State of California for this product:

\*WARNING: This product contains chemicals known to the State of California to cause cancer.

VOLATILE ORGANIC COMPOUND (CARB): None

CANADIAN REGULATIONS

DSL/NDSL: DSL WHMIS Classification: Class D Division 2 Subdivision B

EUROPEAN REGULATIONS

EINECS: Yes

OTHER REGULATIONS

MITI (Japan): Yes

AICS (Australia): Yes

SECTION 16: OTHER INFORMATION

**REVISIONS** Revision Number: 1

PREPARATION INFORMATION

Prepared By: Corporate Environment, Health & Safety Group Phone Number: See Section 1 The information in this Material Safety Data Sheet should be provided to all who will use, handle, store, transport, or otherwise be exposed to this product. This information has been prepared for the guidance of plant engineering, operations, and management and for persons working with or handling this product. The information presented in the MSDS is premised upon proper handling and anticipated uses and is for the material without chemical additions/alterations. We believe this information to be reliable and up-to-date as of the date of publication, but make no warranty that it is. Additionally, if this Material Safety Data Sheet is more than three years old, please contact the supplier at the phone number listed in Section I to make certain that this sheet is current. Copyright Engelhard Corporation. License granted to make unlimited copies for internal use only. End of MSDS.....

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SPECIALTIES

Elementis Specialties P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No's. CHEMTREC: (800) 424-9300 Elementis Specialties: (609) 443-2000

# HECTORITE CRUDE

Approval Date: August 25, 2000 Supersedes: July 1, 1996

# 2. PRODUCT COMPOSITION

| Product Classification: Rheological Additive. |            |         |
|-----------------------------------------------|------------|---------|
| HAZARDOUS SUBSTANCES                          | C.A.8. No. | Percent |
| Crystalline Silica - Quartz                   | 14808-60-7 | <1.0    |

# **3. HAZARD IDENTIFICATION**

| <u>Warning:</u><br>Inhalation of airborne concentrations above<br>the recommended exposure limits may cause<br>lung damage. IARC has concluded occupational<br>exposure to crystalline silica, in the form of quartz,<br>is carcinogenic to humans.<br>Inhalation of quartz may cause silicosis. | <u>Protective Measures:</u><br>Avoid contact with the eyes.<br>Use in well ventilated areas.<br>Do not breathe dust. |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|

# 4. FIRST AID MEASURES

| Eye Contact:  | Rinse immediately with water for at least 15 minutes.                                             |
|---------------|---------------------------------------------------------------------------------------------------|
| Skin Contact: | Wash with scap and water.                                                                         |
| Ingestion:    | Provide symptomatic treatment and seek medical attention.                                         |
| Inhalation:   | Remove person to fresh air. If breathing is difficult, provide oxygen and seek medical attention. |
| Other:        | None known.                                                                                       |

# 5. FIRE FIGHTING MEASURES

| Flash Point : N.A.                           | Method: N.A.         | LEL: N.A. | UEL: N.A. |  |  |
|----------------------------------------------|----------------------|-----------|-----------|--|--|
| EXTINGUISHING MEDIA/FIRE FIGHTING PROCEDURES |                      |           |           |  |  |
| Water fog, foam, dry chemical                | , or carbon dioxide. |           |           |  |  |
| UNUSUAL HAZARDS                              |                      |           |           |  |  |
| None Known.                                  | ·                    |           |           |  |  |

# 6. ACCIDENTAL RELEASE MEASURES

**RELEASE RESPONSE** 

N.A.: Not Applicable

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SPECIALTIES

Elementis Specialties P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No's. CHEMTREC: (800) 424-8300 Elementis Specialties: (609) 443-2000

# HECTORITE CRUDE Approval Date: August 25, 2000 Supersedes: July 1, 1996

# 6. ACCIDENTAL RELEASE MEASURES

Minimize dusting. <u>Caution</u>: May cause a slippery condition when wet. Sweep/shovel up and transfer into a drum for re-use or disposal.

PERSONAL PROTECTIVE EQUIPMENT

Wear an air-purifying dust respirator and chemical resistant gloves. Wear eye protection to prevent dust from entering the eyes.

# 7. HANDLING AND STORAGE

# HANDLING

Avoid high dust concentrations while handling through the use of ventilation or other suitable controls.

## STORAGE

None.

# 8. EXPOSURE CONTROL INFORMATION

| OCCUPATIONAL EXPOSURE LIMITS                 |                                                                                                  |                             |                                                                                     |  |
|----------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|--|
| Particulates not<br>otherwise<br>classified: | <u>ACGiH - T</u><br>8 hr. TWA - 10 mg/<br>8 hr. TWA - 3 mg/                                      | m², inhalable               | <u>OSHA - PEL</u><br>8 hr. TWA - 10 mg/m³, total<br>8 hr. TWA - 5 mg/m², respirable |  |
| Quertz:                                      | 8 hr. TWA - 0.1 mg/m³, respirable                                                                |                             | 8 hr. TWA - 0.1 mg/m³, respirable                                                   |  |
| ENGINEERING C                                | INEERING CONTROL MEASURES                                                                        |                             |                                                                                     |  |
| Use iocal exhaust v                          | Use local exhaust ventilation if airborne concentrations are above recommended exposure limits.  |                             |                                                                                     |  |
| PERSONAL PROTECTION EQUIPMENT                |                                                                                                  |                             |                                                                                     |  |
| Respiratory:                                 | Use an air-purifying dust respirator if airborne concentration levels are above exposure limits. |                             |                                                                                     |  |
| Hand:                                        |                                                                                                  | Use gloves.                 |                                                                                     |  |
| Eye:                                         |                                                                                                  | Use safety glasses/goggies. |                                                                                     |  |
| Other:                                       |                                                                                                  | None.                       |                                                                                     |  |
| OTHER CONTRO                                 | OTHER CONTROL MEASURES                                                                           |                             |                                                                                     |  |
| Use good hygiene i                           | od hydiene practices. Wash hands and face before eating or drinking.                             |                             |                                                                                     |  |

SPECIALTIES

Elementis Specialties P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No's. CHEMTREC: (800) 424-9309 Elementis Specialties: (609) 443-2009

Approval Date: August 25, 2000 Supersedes: July 1, 1996

# 9. PROPERTIES

| Appearance: Whitish Powder | Ottor: None          | pH: N.A.                                |
|----------------------------|----------------------|-----------------------------------------|
| Boiling Range: N.A.        | Melting Range: N.A.  | Specific Gravity: 1.6 g/cm <sup>3</sup> |
| Solubility: Insoluble.     | Vapor Deasity: N.A.  | Vapor Pressure: N.A.                    |
| % Volatile: N.A.           | Freezing Point: N.A. | Density at 20° C: Not measured.         |

# **10. REACTIVITY INFORMATION**

| Conditions to Avoid:     | None known. |  |
|--------------------------|-------------|--|
| Materials to Avoid:      | None known. |  |
| Hazardous Decomposition: | None known. |  |
| Stability:               | Stable.     |  |

# 11. HEALTH/TOXICITY INFORMATION

| Effects of Acute Exposure<br>Inhalation: May cause slight irritation.<br>Skin Contact: Not expected to cause irritation.<br>Skin Absorption: Cannot be absorbed through the skin.<br>Eye Contact: May produce slight irritation.<br>Ingestion: Not expected to produce adverse effects.                                                                   |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| <u>Effects of Chronic Over Exposure</u><br>Crystalline Silica: Excessive exposure, over prolonged periods causes lung damage commonly<br>called "silicosis". The International Agency for Research on Cancer has concluded crystalline<br>silica, inhaled in the form of quartz or cristobalite, from occupational sources,<br>is carcinogenic to humans. |  |  |  |
| Listed as a suspected carcinogen on: IARC: Yes NTP: Yes-Respirable. OSHA: No                                                                                                                                                                                                                                                                              |  |  |  |
| Medical Conditions Aggravated: Respiratory disorders.                                                                                                                                                                                                                                                                                                     |  |  |  |
| TOXICITY INFORMATION                                                                                                                                                                                                                                                                                                                                      |  |  |  |
| None determined.                                                                                                                                                                                                                                                                                                                                          |  |  |  |

SPECIALTIES

Elementis Specialties P.O. Box 700 Hightstown, NJ 08520 Customer Service: (800) 866-6800 Emergency Telephone No's. CHEMTREC: (800) 424-0300 Elementis Specialties: (609) 443-2000

On the DSL

| HECTORITE CRUDE | Approval Date: August 25, 2000 |
|-----------------|--------------------------------|
|                 | Supersedes: July 1, 1996       |

# ENVIRONMENTAL/DISPOSAL CONSIDERATIONS

| 49  | ENVIRONMENTAL      | HAZARDS     |
|-----|--------------------|-------------|
| 14. | <b>EUAU/AWEUIV</b> | FUNCTION OF |

None known.

13. DISPOSAL CONSIDERATIONS

Dispose of in a manner in accordance with local and federal regulations. Use a licensed waste handler.

# **14. TRANSPORTATION**

| Shipping Name: Not regulated. |                     | Label: N.A. |
|-------------------------------|---------------------|-------------|
|                               | Packing Group: N.A. | UNII: N.A.  |

# **15. REGULATORY INFORMATION**

CHEMICAL INVENTORIES In compliance denotes that all components are on the inventory or exempt.

U.S. TSCA Inventory: On the Inventory

Cenedian DSL:

SARA 313 Information

None known.

OTHER REGULATORY INFORMATION

Canada / WHMIS Controlled Product Contains > 0.1% Crystalline Silica.

California Proposition 65 - Crystalline Silica is listed as "Known to the State to Cause Cancer".

# 16. OTHER INFORMATION

H.M.I.S. CODES Health: 2 Flammability: 0 Readivity: 0



# **MATERIAL SAFETY DATA SHEET**

**Product Trade Name:** 

# NATIONAL® BENTONITE

Revision Date:

11-Jan-2005

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: Synonyms: Chemical Family: Application: NATIONAL® BENTONITE None Mineral Additive

Manufacturer/Supplier

BPM Minerals LLC 1125 17th St., Suite 1900 Denver, CO 80202-2024

Telephone: (303) 571-8240 Emergency Telephone: (800) 666-9260 or (713) 753-3000

**Prepared By** 

Chemical Compliance Telephone: 1-580-251-4335

# 2. COMPOSITION/INFORMATION ON INGREDIENTS

| SUBSTANCE                        | CAS Number | PERCENT   | ACGIH TLV-TWA          | OSHA PEL-TWA                       |
|----------------------------------|------------|-----------|------------------------|------------------------------------|
| Crystalline silica, cristobalite | 14464-46-1 | 0 - 1%    | 0.05 mg/m <sup>3</sup> | 1/2 × <u>10 mg/m³</u><br>%SiO2 + 2 |
| Crystalline silica, tridymite    | 15468-32-3 | 0 - 1%    | 0.05 mg/m <sup>3</sup> | 1/2 x <u>10 mg/m³</u><br>%SiO2 + 2 |
| Crystalline silica, quartz       | 14808-60-7 | 1 - 5%    | 0.05 mg/m <sup>3</sup> | <u>10 mg/m³</u><br>%SiO2 + 2       |
| Bentonite                        | 1302-78-9  | 60 - 100% | Not applicable         | Not applicable                     |

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

# 3. HAZARDS IDENTIFICATION

#### Hazard Overview

# CAUTION! - ACUTE HEALTH HAZARD

May cause eye and respiratory irritation.

# DANGER! - CHRONIC HEALTH HAZARD

Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

> NATIONAL® BENTONITE Page 1 of 6

# 4. FIRST AID MEASURES

| Inhalation         | If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.    |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Skin               | Wash with soap and water. Get medical attention if irritation persists.                                                                   |
| Eyes               | In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists. |
| Ingestion          | Under normal conditions, first aid procedures are not required.                                                                           |
| Notes to Physician | Treat symptomatically.                                                                                                                    |

# 5. FIRE FIGHTING MEASURES

| Flash Point/Range (F):                  | Not Determined |
|-----------------------------------------|----------------|
| Flash Point/Range (C):                  | Not Determined |
| Flash Point Method:                     | Not Determined |
| Autoignition Temperature (F):           | Not Determined |
| Autoignition Temperature (C):           | Not Determined |
| Flammability Limits in Air - Lower (%): | Not Determined |
| Flammability Limits In Air - Upper (%): | Not Determined |

Fire Extinguishing Media All standard firefighting media.

Special Exposure Hazards Not applicable.

Special Protective Equipment for Not applicable. Fire-Fighters

NFPA Ratings:Health 0, Flammability 0, Reactivity 0HMIS Ratings:Flammability 0, Reactivity 0, Health 0\*

## 6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary<br/>MeasuresNone known.Procedure for Cleaning /<br/>AbsorptionCollect using du<br/>toxic or fire haze

Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

# 7. HANDLING AND STORAGE

| Handling Precautions | This product contains quartz, cristobalite, and/or tridymite which may become<br>airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty<br>conditions. Use only with adequate ventilation to keep exposure below<br>recommended exposure limits. Wear a NIOSH certified, European Standard En 149,<br>or equivalent respirator when using this product. Material is slippery when wet. |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage Information  | Use good housekeeping in storage and work areas to prevent accumulation of dust.<br>Close container when not in use. Do not reuse empty container.                                                                                                                                                                                                                                                           |

# 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

NATIONAL® BENTONITE Page 2 of 6

| Engineering Controls   | Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.                                                      |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Respiratory Protection | Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when<br>using this product.                                                                                             |
| Hand Protection        | Normal work gloves.                                                                                                                                                                                |
| Skin Protection        | Wear clothing appropriate for the work environment. Dusty clothing should be<br>laundered before reuse. Use precautionary measures to avoid creating dust when<br>removing or laundering clothing. |
| Eye Protection         | Wear safety glasses or goggles to protect against exposure.                                                                                                                                        |
| Other Precautions      | None known.                                                                                                                                                                                        |

# 9. PHYSICAL AND CHEMICAL PROPERTIES

| Physical State:                             |
|---------------------------------------------|
| Color:                                      |
| Odor:                                       |
| pH:                                         |
| Specific Gravity @ 20 C (Water=1):          |
| Density @ 20 C (lbs./gallon):               |
| Bulk Density @ 20 C (lbs/ft3):              |
| Boiling Point/Range (F):                    |
| Boiling Point/Range (C):                    |
| Freezing Point/Range (F):                   |
| Freezing Point/Range (C):                   |
| Vapor Pressure @ 20 C (mmHg):               |
| Vapor Density (Air=1):                      |
| Percent Volatiles:                          |
| Evaporation Rate (Butyl Acetate=1):         |
| Solubility in Water (g/100mi):              |
| Solubility in Solvents (g/100ml):           |
| VOCs (lbs./gallon):                         |
| Viscosity, Dynamic @ 20 C (centipoise):     |
| Viscosity, Kinematic @ 20 C (centistrokes): |
| Partition Coefficient/n-Octanol/Water:      |
| Molecular Weight (g/mole):                  |
|                                             |

Solid Various Odorless 8-10 2.65 Not Determined 50-70 Not Determined Insoluble Not Determined Not Determined Not Determined Not Determined Not Determined Not Determined

# 10. STABILITY AND REACTIVITY

| Stability Data:                         | Stable                                                                                                 |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------|
| Hazardous Polymerization:               | Will Not Occur                                                                                         |
| <b>Conditions to Avoid</b>              | None anticipated                                                                                       |
| Incompatibility (Materials to<br>Avoid) | Hydrofluoric acid.                                                                                     |
| Hazardous Decomposition<br>Products     | Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C). |
| Additional Guidelines                   | Not Applicable                                                                                         |
|                                         | FORMATION                                                                                              |

# 11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure

Eye or skin contact, inhalation. NATIONAL© BENTONITE Page 3 of 6 Inhalation

Skin Contact

Eye Contact

Ingestion

Aggravated Medical Conditions

Chronic Effects/Carcinogenicity

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

May cause mechanical skin irritation.

May cause eye irritation.

None known

Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to <u>IARC Monograph 68, Silica, Some Silicates and Organic Fibres.</u> (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

#### Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

**Toxicity Tests** 

| Oral Toxicity:             | Not determined         |
|----------------------------|------------------------|
| Dermal Toxicity:           | Not determined         |
| Inhalation Toxicity:       | Not determined         |
| Primary Irritation Effect: | Not determined         |
| <b>Carcinogenicity</b>     | Refer to <u>IARC N</u> |

Refer to <u>IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June</u> 1997).

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Genotoxicity:Not determinedReproductive /Not determinedDevelopmental Toxicity:Not determined

# 12. ECOLOGICAL INFORMATION

| Mobility | (Water/Soil/Air) | Not determined |
|----------|------------------|----------------|
|----------|------------------|----------------|

Persistence/Degradability Not determined

Bio-accumulation Not Determined

#### **Ecotoxicological Information**

| Acute Fish Toxicity:<br>Acute Crustaceans Toxic | TLM96: 10000 ppm (Oncorhynchus mykiss)<br>ity:Not determined |
|-------------------------------------------------|--------------------------------------------------------------|
| Acute Algae Toxicity:                           | Not determined                                               |
| <b>Chemical Fate Information</b>                | Not determined                                               |

Other Information Not applicable

# 13. DISPOSAL CONSIDERATIONS

Disposal Method

Follow all applicable national or local regulations.

Bury in a licensed landfill according to federal, state, and local regulations.

**Contaminated Packaging** 

# 14. TRANSPORT INFORMATION

## Land Transportation

DOT Not restricted

Canadian TDG Not restricted

**ADR Not restricted** 

#### Air Transportation

ICAO/IATA Not restricted

#### Sea Transportation

IMDG Not restricted

## **Other Shipping Information**

Labels:

None

NATIONAL® BENTONITE Page 5 of 6

# 15. REGULATORY INFORMATION

| US Regulations                                                      |                                                                                                                                      |
|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| US TSCA Inventory                                                   | All components listed on inventory.                                                                                                  |
| EPA SARA Title III Extremely<br>Hazardous Substances                | Not applicable                                                                                                                       |
| <b>EPA SARA (311,312) Hazard</b><br>Class                           | Acute Health Hazard<br>Chronic Health Hazard                                                                                         |
| <b>EPA SARA (313) Chemicals</b>                                     | This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372). |
| EPA CERCLA/Superfund<br>Reportable Spill Quantity For Th<br>Product | Not applicable.<br>Is                                                                                                                |
| EPA RCRA Hazardous Waste<br>Classification                          | If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.                             |
| California Proposition 65                                           | The California Proposition 65 regulations apply to this product.                                                                     |
| MA Right-to-Know Law                                                | One or more components listed.                                                                                                       |
| NJ Right-to-Know Law                                                | One or more components listed.                                                                                                       |
| PA Right-to-Know Law                                                | One or more components listed.                                                                                                       |
| Canadian Regulations                                                | · · · · · · · · · · · · · · · · · · ·                                                                                                |
| Canadian DSL Inventory                                              | All components listed on inventory.                                                                                                  |
| WHMIS Hazard Class                                                  | D2A Very Toxic Materials<br>(Crystalline silica)                                                                                     |

# 16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

**Disclaimer Statement** 

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

#### \*\*\*END OF MSDS\*\*\*

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A Division of ITC Industrials, Inc.

# **Material Safety Data Sheet**

# Product: MIN-U-GEL and FLORIGEL Brand Products

MSDS Date: 6-16-05

Product Name:MIN-U-GEL and FLORIGELManufacturer:FLORIDIN A Division of ITC Industrials, Inc.

# I. Product and Company Description

FLORIDIN A Division of ITC Industrials, Inc. 6 North Park Drive Suite 105 Hunt Valley, MD 21030 USA

Product Information/Emergency Phone Number: 800-258-2600 800-228-1131

Chemical Name or Synonym:

Magnesium Alumino Silicate, Fullers Earth, Attapulgite Clay

# II. Chemical Composition

| Component                    | CAS#       | % Composition |
|------------------------------|------------|---------------|
| Hydrous Alumino Silicate     | 12174-11-7 | ~94           |
| Crystalline Silica as quartz | 14808-60-7 | ~6            |

<u>Hazarcious Ingredient</u>: Some Magnesium Alumino Silicate deposits may contain free crystalline silica. MIN-U-GEL and FLORIGEL are believed to contain less than 1.0% respirable free silica, crystalline quartz (defined as less than 10 microns in size). See SECTION 8 - Exposure Controls/Personal Protection.

## III. Hazards Identification

## A. Emergency Overview:

Information Pertaining To Particular Dangers For Man And Environment:

Pulmonary function may be reduced by inhalation of respirable crystalline silica. Lung scarring produced by such inhalation of crystalline silica may lead to a progressive massive fibrosis of the lung which may aggravate other pulmonary conditions and diseases and which increases susceptibility to pulmonary tuberculosis. Progressive massive fibrosis may be accompanied by right heart enlargement, heart failure, and pulmonary failure. Smoking aggravates the effects of exposure.

Physical Appearance: Tan or Grey powder.



A Division of ITC Industrials, Inc.

# **Material Safety Data Sheet**

Product: MIN-U-GEL and FLORIGEL Brand Products

# **B. Potential Health Effects:**

#### Acute Eye:

Crystalline silica (quartz) may cause abrasion of the cornea

#### Acute Skin:

Not anticipated under normal use conditions.

#### Acute Inhalation:

Prolonged exposure to Magnesium Alumino Silicate may cause delayed (chronic) lung injury (silicosis) due to the presence of respirable crystalline silica. Silicosis is a form of disabling pulmonary fibrosis, which can be progressive and may lead to death.

#### Acute ingestion:

Not anticipated under normal use conditions. In the event of ingestion of this product, contact a poison control center or other emergency service and obtain the appropriate medical attention.

#### **Chronic effects:**

The adverse health effects from crystalline silica exposure - silicosis, cancer, scleroderma, tuberculosis, and nephrotoxicity - are chronic effects

# IV. First Aid Measures

# First Aid Measures for Accidental:

#### Eye Exposure:

Immediately flush eyes with plenty of water for 15 minutes. Get medical attention, if irritation persists.

#### Skin Exposure:

Remove contaminated clothing as needed and launder before reuse. Wash skin thoroughly with mild soap/water. Get medical attention if irritation develops or persists.

#### Inhalation:

Remove to fresh air. If breathing has stopped, administer artificial respiration and supply oxygen. Seek medical attention.

#### Ingestion:

If a significant quantity (> 5 ml) is ingested, seek medical advice. Note: Magnesium Alumino Silicate is an active ingredient in some over-the-counter anti-diarrhea treatments. Ingestion of too much Magnesium Alumino Silicate can result in the excess absorption of fluids in the gastrointestinal tract and can cause severe blockage.

## V. Fire Fighting Measures

## **Fire Hazard Data:**

| Flash Point:  | NA |
|---------------|----|
| Autoignition: | NA |
| Method Used:  | NA |



# Material Safety Data Sheet

# Product: MIN-U-GEL and FLORIGEL Brand Products

Flammability Limits (vol/vol%):

Lower: NA

Upper: NA

#### **Extinguishing Media:**

Product itself has no risk of fire or explosion. Use extinguishing media appropriate for surrounding materials.

#### **Special Fire Fighting Procedures:**

Firefighters should be equipped with self-contained breathing apparatus and turn out gear. Magnesium Alumino Silicate disperses readily in water and may create a slippery slurry. Caution should be exercised when using water on a nearby fire to avoid creating a slip hazard.

Unusual Fire and Explosion Hazards: None

Hazardous Decomposition Materials (Under Fire Conditions): None

## VI. Accidental Release Measures

#### **Cleanup and Disposal of Spill:**

Use dustless methods (vacuum) and place into a closed container for disposal, or flush with water. Do not dry sweep or blow with compressed air. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. Dispose of materials according to the applicable regulations.

# VII. Handling and Storage

#### Handling and Storage:

Store in a dry location to avoid the absorption of moisture. Use dustless systems for handling, storage, and clean up so that airborne dust does not exceed the PEL. Use adequate ventilation and dust collection. Do not allow dust to accumulate.

## VIII. Exposure Controls / Personal Protection

#### **Exposure Guidelines:**

|                              | Exposure limits |                |               |  |
|------------------------------|-----------------|----------------|---------------|--|
| Component                    | ACGIH           | NIOSH          | OSHA-PELs     |  |
| Hydrous Alumino Silicate     | ND              | ND             | ND            |  |
| Crystalline Silica as quartz | TWA 0.1 mg/m3   | 0.05 mg/m3 TWA | TWA 0.1 mg/m3 |  |

#### Engineering Controls:

Use sufficient local exhaust to reduce the level of dust containing respirable crystalline silica to below the PEL.

#### **Respiratory Protection:**

Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH/MSA approved respirator when necessary.



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# Material Safety Data Sheet

# Product: MIN-U-GEL and FLORIGEL Brand Products

The following chart specifies the types of respirators which may provide respiratory protection for dust containing crystalline silica (quartz).

| CONDITION<br>Particulate<br>Concentration                                        | MINIMUM RESPIRATORY PROTECTION*<br>"Use only NIOSH-approved equipment. See 42 CFR §84                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 x PEL or less                                                                  | Any particulate respirator.                                                                                                                                                                                                                                                                                                                                                                                                          |
| 10 x PEL or less                                                                 | Any particulate respirator, except single-use or quarter-mask respirator.<br>Any fume respirator or high efficiency particulate filter respirator.<br>Any supplied-air respirator.<br>Any self-contained breathing apparatus.                                                                                                                                                                                                        |
| 50 x PEL or less                                                                 | A high efficiency particulate filter respirator with a full face piece.<br>Any supplied-air respirator with a full face piece, helmet, or hood.<br>Any self-contained breathing apparatus with a full face piece.                                                                                                                                                                                                                    |
| 500 x PEL or less                                                                | A powered air-purifying respirator with a high efficiency particulate filter.<br>A Type C supplied-air respirator operated in pressure-demand or other positive<br>pressure or continuous -flow mode.                                                                                                                                                                                                                                |
| Greater than 500 x PEL<br>or entry and escape<br>from unknown<br>concentrations. | Self-contained breathing apparatus with a full face piece operated in pressure-<br>demand or other positive pressure mode.<br>A combination respirator which includes a Type C supplied-air respirator with a full<br>face piece operated in pressure-demand or other positive pressure continuous-flow<br>mode and an auxiliary self-contained breathing apparatus operated in pressure-<br>demand or other positive pressure mode. |

#### Eye / Face Protection:

Wear safety glasses with side shields or goggles.

#### Skin Protection:

Wear chemical resistant gloves and protective clothing to minimize skin contact. Wash thoroughly after handling.

In the event that this product is used as a component in a polymeric formulation used to mold, cast, form or in any other manner to produce a finished part which may require machining or other finishing procedure, dust may be generated which may contain free crystalline silica. Observe all safety precautions as listed above.

# IX. Physical and Chemical Properties

| Physical Appearance: | Tan or Grey powder |
|----------------------|--------------------|
| Odor:                | None               |
| pH:                  | 9.0                |



A Division of ITC Industrials, Inc.

# Material Safety Data Sheet

# Product: MIN-U-GEL and FLORIGEL Brand Products

| Specific Gravity:     | 2.62                                                               |
|-----------------------|--------------------------------------------------------------------|
| Water Solubility:     | Insoluble                                                          |
| Melting Point Range:  | NA                                                                 |
| Freezing Point Range: | NA                                                                 |
| Boiling Point:        | NA                                                                 |
| Vapor Pressure:       | NA                                                                 |
| Density:              | tapped, 37 lbs/ft <sup>3</sup><br>untapped, 32 lbs/ft <sup>3</sup> |

Percent Volatiles by Volume: NA

Viscosity:

ND

# X. Stability and Reactivity

Chemical Stability: Stable

Conditions to Avoid: Avoid creating dusts.

#### Materials / Chemicals to be Avoided:

Contact of dry Magnesium Alumino Silicate with turpentine, vegetable oil, or other unsaturated organic compounds, or with hydrofluoric acid may generate heat.

#### Hazardous Decomposition Products: None

Hazardous Polymerization:

Will not occur

#### XI. Toxicological Information

#### SILICOSIS

The major concern is *silicosis*, caused by the inhalation and retention of respirable crystalline silica dust. Silicosis can exist in several forms: chronic (or ordinary), accelerated, or acute.

Chronic or ordinary silicosis is the most common form of silicosis, and can occur after many years of exposure to relatively low levels of airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis.

Simple silicosis is characterized by lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter, primarily in the upper lung zones. Often, simple silicosis is not associated with symptoms, detectable changes in lung function, or disability.



# **Material Safety Data Sheet**

# Product: MIN-U-GEL and FLORIGEL Brand Products

Simple silicosis may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF). Complicated silicosis or PMF is characterized by lung lesions (shown as radiographic opacities) greater than 1 centimeter in diameter. Although there may be no symptoms associated with complicated silicosis or PMF, the symptoms, if present, are shortness of breath, wheezing, cough and sputum production. Complicated silicosis or PMF may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease (cor pumonale).

Accelerated silicosis can occur with exposure to high concentrations of respirable crystalline silica over a relatively short period; the lung lesions can appear within five (5) years of the initial exposure. The progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that the lung lesions appear earlier and progression is more rapid.

Acute silicosis can occur with exposures to very high concentrations of respirable crystalline silica over a very short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis is fatal.

#### CANCER

The International Agency for Research on Cancer (IARC) concluded that there was "sufficient evidence in humans for the carcinogenicity of crystalline silica in the forms of quartz or cristobalite from occupational sources", and that there is "sufficient evidence in experimental animals for the carcinogenicity of quartz and cristobalite." The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1)". The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." For further information on the IARC evaluation, see <u>IARC Monographs on the Evaluation of Carcinogenic Risks to Humans</u>, Volume 68, Silica, Some Silicates (1997).

The National Toxicology Program (NTP), in its Ninth Annual Report on Carcinogens, concluded that silica, crystalline (respirable) is "known to be a carcinogen, based on sufficient evidence in experimental animals and in humans."

The U.S. Occupational Safety and Health Administration (OSHA) does not regulate crystalline silica (quartz) as a carcinogen.

There is substantial literature on the issues of the carcinogenicity of crystalline silica, which the reader should consult for additional information. A summary of the literature is set forth in *Exposure to Crystalline Silica & Risk of Lung Cancer: The Epidemiological Evidence*, <u>Thorax</u>, Volume 51, pp. 97-102 (1996). The official statement of the American Thoracic Society on the issue of silica carcinogenicity was published in *Adverse Effects of Crystalline Silica Exposure*, <u>American Journal of Respiratory and Critical Care Medicine</u>, Vol. 155, pp. 761-765 (1997). The official statement concluded that "The available data support the conclusion that silicosis produces increased risk for bronchogenic carcinoma. The cancer risk may also be increased by smoking and other carcinogens in the workplace. Epidemiologic studies provide convincing evidence for increased cancer risk among tobacco smokers with silicosis. Less information is



A Division of ITC Industrials, Inc.

# **Material Safety Data Sheet**

# Product: MIN-U-GEL and FLORIGEL Brand Products

available for never-smokers and for workers exposed to silica but who do not have silicosis. For workers with silicosis, the risks for lung cancer are relatively high and consistent among various countries and investigators. Silicosis should be considered a condition that predisposes workers to an increased risk of lung cancer." Id. at 763.

#### SCLERODERMA

There is evidence that exposure to respirable crystalline silica or that the disease silicosis is associated with the increased incidence of scleroderma, an immune system disorder manifested by a fibrosis (scarring) of the lungs, skin and other internal organs. Recently, the American Thoracic Society noted that "there is persuasive evidence relating scleroderma to occupational silica exposures in settings where there is appreciable silicosis risk" The following may be consulted for additional information on silica, silicosis and scleroderma (also known as progressive systemic sclerosis): <u>Occupational Lung Disorders</u>, Third Edition, Chapter 12, entitled Silicosis and Related Diseases, Parkes, W. Raymond (1994); Adverse Effects of Crystalline Silica Exposure, <u>American Journal of Respiratory and Critical Care Medicine</u>, Vol. 155, pp. 761-765 (1997).

#### TUBERCULOSIS

Individuals with silicosis are at increased risk to develop tuberculosis, if exposed to persons with tuberculosis. The following may be consulted for further information: <u>Occupational Lung</u> <u>Disorders</u>, Third Edition, Chapter 12, Silicosis & Related Diseases, Parkes, W. Raymond (1994). Adverse Effects of Crystalline Silica Exposure, <u>American Journal of Respiratory and Critical Care</u> <u>Medicine</u>, Vol. 155, pp. 761-765 (1997).

#### NEPHROTOXICITY

There are several recent studies suggesting that exposure to respirable crystalline silica or that the disease silicosis is associated with the increased incidence of kidney disorders. The following may be consulted for additional information on silica, silicosis and nephrotoxicity: <u>Occupational Lung Disorders</u>, Third Edition, Chapter 12, *Silicosis & Related Diseases*, Parkes, W. Raymond (1994); *Further Evidence of Human Silica Nephrotoxicity in Occupationally Exposed Workers*, <u>British Journal of Industrial Medicine</u>, Vol. 50, No. 10, pp. 907-912 (1993); *Adverse Effects of Crystalline Silica Exposure*, <u>American Journal of Respiratory and Critical Care Medicine</u>, Vol. 155, pp. 761-765 (1997).

# XII. Ecological Information

#### Ecotoxicological Information: None

Chemical Fate Information: ND

## XIII. Disposal Considerations

#### Waste Disposal Method:

Discard any product, residue, disposable container or liner in full compliance with applicable regulations.

#### **Container Handling and Disposal:**

Dispose of container and unused contents in accordance with applicable regulations.



A Division of ITC Industrials, Inc.

# Material Safety Data Sheet

Product: MIN-U-GEL and FLORIGEL Brand Products

# XIV. Transportation Information

Shipping Name:

| ADR/RID/IMO/ICAO<br>/US DOT | Proper Shipping Name | Not Regulated |
|-----------------------------|----------------------|---------------|
|                             | Hazard Class         | Not Regulated |
|                             | ID Number            | Not Regulated |
|                             | Packaging Group      | Not Regulated |
|                             | Label Statement      | Not Regulated |

#### XV. Regulatory information

#### **U.S. Federal Regulations:**

TSCA Inventory Status: Listed on Inventory: Yes

RCRA Haz. Waste No.: NA

SARA Title III: Section 302 No SARA Title III Hazard Classes: Fire Hazard: N Reactive Hazard: N Release of Pressure: N Acute Health Hazard: N Chronic Health Hazard: Y

# **U.S. State Regulations:**

The components identified with an X are present on the respective state's Right To Know lists:

| Component                    | MA | PA | MN | NJ | CA | MI |
|------------------------------|----|----|----|----|----|----|
| Hydrous Alumino Silicate     |    |    |    |    |    |    |
| Crystalline Silica as quartz | Х  | X  |    | Х  | X  |    |

California Prop 65 List: Crystalline silica (quartz) is classified as a substance known to the state of California to be a carcinogen

# XVI. Other Information

National Fire Protection Association Hazard Ratings – NFPA(R):

| Health Hazard: | 0 |
|----------------|---|
| Flammability:  | 0 |
| Reactivity:    | 0 |



# Material Safety Data Sheet

Product: MIN-U-GEL and FLORIGEL Brand Products

**HMIS Rating:** 

| Health Hazard:      | 1 |
|---------------------|---|
| Flammability:       | 0 |
| Reactivity:         | 0 |
| Personal Protection | Ε |

Key Legend Information:

N/A -- Not Applicable

ND - Not Determined

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

TLV - Threshold Limit Value

PEL – Permissible Exposure Limit

TWA - Time Weighted Average

STEL - Short Term Exposure Limit

NTP – National Toxicology Program

IARC - International Agency for Research on Cancer

The information contained herein is based on the data available to us and is believed to be correct. However FLORIDIN makes no warranty expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof.

# MATERIAL SAFETY DATA SHEET INDEX PRODUCTION SUPPLIES PLANT

Carbon Dioxide, Liquid Ion Exchange Resin, USF C-381 Amberlite @ 200C Resin Sodium Carbonate (Soda Ash) Behenic Acid Sulfamic Acid Quartz Gravel

Scan all these MSDSs + label polt. as MSDS. NSDSs supplies

# **Praxair Material Safety Data Sheet**

| Product Name: Carbon dioxide<br>(MSDS No. P-4574-J)           | Trade Names: Carbon Dioxide, Medipure <sup>®</sup> Carbon Dioxide                                                                                                                                                     |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chemical Name: Carbon dioxide                                 | Synonyms: Carbonic anhydride, carbonic acid gas, refrigeran gas R744                                                                                                                                                  |
| Chemical Family: Acid anhydride                               | Product Grades: Industrial; 3.0; 4.0 anaerobic, instrument,<br>laser; 4.5, 5.0, 5.5 LaserStar™; 4.8 research, supercritical fluid<br>chromatography, semiconductor process gas; 5.0 supercritical<br>fluid extraction |
| CHEMTREC: 1-8<br>Routine: 1-8<br>*Call emergency numbers 24 h | 00-PRAXAIR Danbury, CT 06810-5113<br>ours a day only for spills, leaks, fire, exposure, or accidents<br>tine information, contact your supplier, Praxair sales                                                        |
| ·····                                                         | 2. Hazards Identification                                                                                                                                                                                             |
| <b>CAUTIO</b><br>Ca<br>Can Inc                                | EMERGENCY OVERVIEW<br>N! High-pressure liquid and gas.<br>In cause rapid suffocation.<br>rease respiration and heart rate.<br>ause nervous system damage.<br>May cause frostbite.<br>use dizziness and drowsiness.    |

POTENTIAL HEALTH EFFECTS:

Effects of a Single (Acute) Overexposure

Inhalation. Carbon dioxide gas is an asphyxiant with effects due to lack of oxygen. It is also physiologically active, affecting circulation and breathing. Moderate concentrations may cause headache, drowsiness, dizziness, stinging of the nose and throat, excitation,

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A vertical line in the left margin indicates revised or new material.

rapid breathing and heart rate, excess salivation, vomiting, and unconsciousness. Lack of oxygen can kill.

- Skin Contact. No harm expected from vapor. Cold gas, or liquid or solid carbon dioxide may cause severe frostbite.
- Swallowing. An unlikely route of exposure. This product is a gas at normal temperature and pressure.
- Eye Contact. No harm expected from vapor. Cold gas, or liquid or solid carbon dioxide may cause severe frostbite.

Effects of Repeated (Chronic) Overexposure. No harm expected.

Other Effects of Overexposure. Damage to retinal or ganglion cells and central nervous system may occur.

Medical Conditions Aggravated by Overexposure. The toxicology and the physical and chemical properties of carbon dioxide suggest that overexposure is unlikely to aggravate existing medical conditions.

CARCINOGENICITY: Carbon dioxide is not listed by NTP, OSHA, or IARC.

**POTENTIAL ENVIRONMENTAL EFFECTS:** None known. For further information, see section 12, Ecological Information.

# 3. Composition/Information on Ingredients

This section covers materials of manufacture only. See sections 8, 10, 11, and 16 for information on by-products generated during use in welding and cutting. See section 16 for important information about mixtures.

| COMPONENT      | CAS NUMBER | CONCENTRATION |
|----------------|------------|---------------|
| Carbon dioxide | 124-38-9   | >99%*         |

\*The symbol > means "greater than."

# 4. First Aid Measures

INHALATION: Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT: For exposure to cold vapor or solid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). In case of massive exposure, remove contaminated clothing while showering with warm water. Call a physician.

SWALLOWING: An unlikely route of exposure. This product is a gas at normal temperature and pressure.

EYE CONTACT: For exposure to cold vapor or solid, immediately flush eyes thoroughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

**NOTES TO PHYSICIAN:** There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

# 5. Fire Fighting Measures

# FLAMMABLE PROPERTIES: Nonflammable

SUITABLE EXTINGUISHING MEDIA: Carbon dioxide cannot catch fire. Use media appropriate for surrounding fire.

PRODUCTS OF COMBUSTION: Not applicable.

PROTECTION OF FIREFIGHTERS: CAUTION! High-pressure gas liquid and gas. Evacuate all personnel from danger area. Immediately deluge cylinders with water from maximum distance until cool; then move them away from fire area if without risk. Self-contained breathing apparatus may be required by rescue workers. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

Specific Physical and Chemical Hazards. Heat of fire can build pressure in cylinder and cause it to rupture. No part of cylinder should be subjected to a temperature higher than 125°F (52°C). Carbon dioxide cylinders are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.)

Protective Equipment and Precautions for Firefighters. Firefighters should wear personal protective equipment and fire-fighting turnout gear as appropriate for surrounding fire.

# 6. Accidental Release Measures

# STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

# CAUTION! High-pressure liquid and gas.

**Personal Precautions.** Carbon dioxide is an asphyxiant. Lack of oxygen can kill. Evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off leak if you can do so without risk. Ventilate area or move cylinder to a well-ventilated area. Test for sufficient oxygen, especially in confined spaces, before allowing reentry.

Environmental Precautions. Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

# 7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING: Avoid breathing gas. Do not get liquid in eyes, on skin, or clothing. *Protect cylinders from damage*. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. *Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings*; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. *Open valve slowly.* If valve is hard to open, discontinue use and contact your supplier. Keep cylinder upright when in use. *Never apply flame or localized heat directly to any part of the cylinder.* High temperatures may damage the cylinder and could cause the pressure relief device to fail prematurely, venting the cylinder contents. For other precautions in using carbon dioxide, see section 16.

**PRECAUTIONS TO BE TAKEN IN STORAGE:** Gas can cause rapid suffocation due to oxygen deficiency. Store and use with adequate ventilation. Store only where temperature will not exceed 125°F (52°C). Carbon dioxide is heavier than air. It tends to accumulate near

the floor of an enclosed space, displacing air and pushing it upward. This creates an oxygendeficient atmosphere near the floor. Ventilate space before entry. Verify sufficient oxygen concentration. Close cylinder valve after each use; keep closed even when empty. *Prevent reverse flow.* Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. *Do not strike an arc on the cylinder.* The defect produced by an arc burn could lead to cylinder rupture. Do not ground the cylinder or allow it to become part of an electrical circuit. *Firmly secure cylinders upright to keep them from falling or being knocked over.* Screw valve protection cap firmly in place by hand. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

**RECOMMENDED PUBLICATIONS:** For further information on storage, handling, and use, see Praxair publications P-14-153, *Guidelines for Handling Gas Cylinders and Containers;* P-15-073, *Safety Precautions for Carbon Dioxide;* and P-3499, *Safety Precautions and Emergency Response Planning.* Obtain from your local supplier.

| 8. Exposure Controls/Persona | I Protection |
|------------------------------|--------------|
|------------------------------|--------------|

See section 16 for important information on by-products generated during use in welding and cutting.

| COMPONENT      | OSHA PEL  | ACGIH TLV-TWA (2007)              |
|----------------|-----------|-----------------------------------|
| Carbon dioxide | 5,000 ppm | 5,000 ppm, 30,000 ppm 15 min STEL |

TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

IDLH = 40,000 ppm

### **ENGINEERING CONTROLS:**

Local Exhaust. Use a local exhaust system, if necessary, to keep the concentration of carbon dioxide below all applicable exposure limits in the worker's breathing zone.

Mechanical (General). Under certain conditions, general exhaust ventilation may be acceptable to keep carbon dioxide below the exposure limits.

Special. None

Other. None

PERSONAL PROTECTIVE EQUIPMENT:

Skin Protection. Wear insulated neoprene gloves for cylinder handling; welding gloves for welding. Metatarsal shoes for cylinder handling. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. See section 16 for requirements when using carbon dioxide or carbon dioxide mixtures in welding and cutting. Regardless of protective equipment, never touch live electrical parts.

Eye/Face Protection. Select in accordance with OSHA 29 CFR 1910.133. See section 16 for requirements when using carbon dioxide or carbon dioxide mixtures in welding and cutting.

**Respiratory Protection.** None required under normal use. An air-supplied respirator must be used in confined spaces. Respiratory protection must conform to OSHA rules as specified in 29 CFR 1910.134. Select per OSHA 29 CFR 1910.134 and ANSI Z88.2.

Page 4 of 12

| 9. Physical and C                                                | hemical Properties                                              |
|------------------------------------------------------------------|-----------------------------------------------------------------|
| APPEARANCE:<br>ODOR:                                             | Colorless gas<br>Odorless. It is felt by some to have a slight, |
|                                                                  | pungent odor and biting taste.                                  |
| ODOR THRESHOLD:                                                  | Not applicable.                                                 |
| PHYSICAL STATE:                                                  | Gas at normal temperature and pressure                          |
| pH:                                                              | 3.7 (for carbonic acid)                                         |
| SUBLIMATION POINT at 1 atm:                                      | -109.3°F (-78.5°C)                                              |
| BOILING POINT at 1 atm:                                          | Not applicable.                                                 |
| FLASH POINT (test method):                                       | Not applicable.                                                 |
| EVAPORATION RATE (Butyl Acetate = 1):                            | High                                                            |
| FLAMMABILITY:                                                    | Nonflammable                                                    |
| FLAMMABLE LIMITS IN AIR, % by volume:                            | LOWER: Not UPPER: Not applicable. applicable.                   |
| VAPOR PRESSURE at 68°F (20°C):                                   | 838 psig (5778 kPa)                                             |
| LIQUID DENSITY (saturated) at 70°F (21.1°C) and 1 atm:           | 47.6 lb/ft <sup>3</sup> (762 kg/m <sup>3</sup> )                |
| <b>SPECIFIC GRAVITY</b> (H <sub>2</sub> O = 1) at 19.4°F (-7°C): | 1.22                                                            |
| SPECIFIC GRAVITY (Air = 1) at 70°F (21.1°C)                      |                                                                 |
| and 1 atm:                                                       | 1.52                                                            |
| SOLUBILITY IN WATER volvol at 68°F (20°C):                       | 0.90                                                            |
| PARTITION COEFFICIENT: n-octanol/water:                          | Not available.                                                  |
| AUTOIGNITION TEMPERATURE:                                        | Not applicable.                                                 |
| DECOMPOSITION TEMPERATURE:                                       | Not available.                                                  |
| PERCENT VOLATILES BY VOLUME:                                     | 100                                                             |
| MOLECULAR WEIGHT:                                                | 44.01                                                           |
| MOLECULAR FORMULA:                                               | CO <sub>2</sub>                                                 |

# 10. Stability and Reactivity

CHEMICAL STABILITY: Unstable 🛛 Stable

**CONDITIONS TO AVOID:** Contact with incompatible materials, exposure to electrical discharges, and/or high temperatures as stated below.

INCOMPATIBLE MATERIALS: Alkali metals, alkaline earth metals, metal acetylides, chromium, titanium above 1022°F (550°C), uranium above 1382°F (750°C), magnesium above 1427°F (775°C)

HAZARDOUS DECOMPOSITION PRODUCTS: Electrical discharges and high temperatures decompose carbon dioxide into carbon monoxide and oxygen.

POSSIBILITY OF HAZARDOUS REACTIONS: X May Occur Will Not Occur Decomposition into toxic, flammable, and/or oxidizing materials under above-stated conditions.

# 11. Toxicological information

ACUTE DOSE EFFECTS: LCLo = 90,000 ppm, 5 min., human

The welding process may generate hazardous fumes and gases. (See sections 10 and 16.)

Carbon dioxide is an asphyxiant. It initially stimulates respiration and then causes respiratory depression. High concentrations result in narcosis. Symptoms in humans are as follows:

| EFFECT:                                                                                                                                                                                               | CONCENTRATION: |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--|
| Breathing rate increases slightly.                                                                                                                                                                    | 1%             |  |
| Breathing rate increases to 50% above normal level. Prolonged exposure can cause headache, tiredness.                                                                                                 | 2%             |  |
| Breathing increases to twice normal rate and becomes labored. Weak<br>narcotic effect. Impaired hearing, headache, increased blood pressure<br>and pulse rate.                                        | 3%             |  |
| Breathing increases to approximately four times normal rate, symptoms of intoxication become evident, and slight choking may be felt.                                                                 | 4 - 5%         |  |
| Characteristic sharp odor noticeable. Very labored breathing,<br>headache, visual impairment, and ringing in the ears. Judgment may<br>be impaired, followed within minutes by loss of consciousness. | 5 - 10%        |  |
| Unconsciousness occurs more rapidly above 10% level. Prolonged exposure to high concentrations may eventually result in death from asphyxiation.                                                      | 10 - 100%      |  |

**REPRODUCTIVE EFFECTS:** A single study has shown an increase in heart defects in rats exposed to 6% carbon dioxide in air for 24 hours at different times during gestation. There is no evidence that carbon dioxide is teratogenic in humans.

# 12. Ecological Information

ECOTOXICITY: No known effects.

OTHER ADVERSE EFFECTS: No adverse ecological effects expected. Carbon dioxide does not contain any Class I or Class II ozone-depleting chemicals.

# **13. Disposal Considerations**

**WASTE DISPOSAL METHOD:** Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

# 14. Transport Information

| DOT/IMO :        | SHIP | PING NAME:             | Carbon | dioxide                 |              |              |            |
|------------------|------|------------------------|--------|-------------------------|--------------|--------------|------------|
| HAZARD<br>CLASS: |      | PACKING<br>GROUP/Zone: | NA*    | IDENTIFICATI<br>NUMBER: | ON<br>UN1013 | PRODU<br>RQ: | CT<br>None |
| SHIPPING         |      |                        | NONFL  | AMMABLE GAS             | <u></u>      |              |            |
| PLACARD          | (whe | en required):          | NONFL  | AMMABLE GAS             |              |              |            |

## \*NA = Not applicable.

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of a vehicle can present serious safety hazards.

Shipment of compressed gas cylinders that have been filled without the owner's consent is a violation of federal law [49 CFR 173.301(b)].

MARINE POLLUTANTS: Carbon dioxide is not listed as a marine pollutant by DOT.

# 15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

# **U.S. FEDERAL REGULATIONS:**

EPA (ENVIRONMENTAL PROTECTION AGENCY)

CERCLA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (40 CFR Parts 117 and 302):

# Reportable Quantity (RQ): None

# SARA: SUPERFUND AMENDMENT AND REAUTHORIZATION ACT:

SECTIONS 302/304: Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of Extremely Hazardous Substances (EHS) (40 CFR Part 355):

# TPQ: None

### EHS RQ (40 CFR 355): None

SECTIONS 311/312: Require submission of MSDSs and reporting of chemical inventories with identification of EPA hazard categories. The hazard categories for this product are as follows:

| IMMEDIATE: Yes | PRESSURE: Yes  |
|----------------|----------------|
| DELAYED: No    | REACTIVITY: No |
|                | FIRE: No       |

**SECTION 313:** Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

Carbon dioxide is not subject to reporting under Section 313.

**40 CFR 68:** RISK MANAGEMENT PROGRAM FOR CHEMICAL ACCIDENTAL RELEASE PREVENTION: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Carbon dioxide is not listed as a regulated substance.

1

TSCA: TOXIC SUBSTANCES CONTROL ACT: Carbon dioxide is listed on the TSCA inventory.

OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119: PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Carbon dioxide is not listed in Appendix A as a highly hazardous chemical.

## STATE REGULATIONS:

CALIFORNIA: Carbon dioxide is not listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

**PENNSYLVANIA:** Carbon dioxide is subject to the PENNSYLVANIA WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

# 16. Other Information

Be sure to read and understand all labels and instructions supplied with all containers of this product.

ADDITIONAL SAFETY AND HEALTH HAZARDS: Using carbon dioxide or mixtures containing carbon dioxide in welding and cutting may create additional hazards.

Read and understand the manufacturer's instructions and the precautionary labels on the products used in welding and cutting. Ask your welding products supplier for a copy of Praxair's free safety booklets, P-2035, *Precautions and Safe Practices for Gas Welding, Cutting, and Heating,* and P-52-529, *Precautions and Safe Practices for Electric Welding and Cutting,* and for other manufacturers' safety publications. For a detailed treatment, get ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes,* published by the American Welding Society (AWS), or see OSHA's Web site at http://www.osha-sic.gov/SLTC/weldingcuttingbrazing/. Order AWS documents from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5710, http://global.ihs.com/.

FUMES AND GASES can be dangerous to your health and may cause serious lung disease.

 Keep your head out of fumes. Do not breathe fumes and gases. Use enough ventilation, local exhaust, or both to keep fumes and gases from your breathing zone and the general area. Short-term overexposure to fumes may cause dizziness; nausea; and dryness or irritation of the nose, throat, and eyes; or may cause other similar discomfort.

Fumes and gases cannot be classified simply. The amount and type depend on the metal being worked and the process, procedure, equipment, and supplies used. Possible dangerous materials may be found in fluxes, electrodes, and other materials. Get an MSDS for every material you use.

Contaminants in the air may add to the hazard of fumes and gases. One such contaminant, chlorinated hydrocarbon vapors from cleaning and degreasing activities, poses a special risk.

 Do not use electric arcs in the presence of chlorinated hydrocarbon vapors highly toxic phosgene may be produced.

Metal coatings such as paint, plating, or galvanizing may generate harmful fumes when heated. Residues from cleaning materials may also be harmful.

 Avoid arc operations on parts with phosphate residues (anti-rust, cleaning preparations)—highly toxic phosphine may be produced.

To find the quantity and content of fumes and gases, you can take air samples. By analyzing these samples, you can find out what respiratory protection you need. One recommended sampling method is to take air from inside the worker's helmet or from the worker's breathing zone. See AWS F1.1, *Methods for Sampling and Analyzing Gases for Welding and Allied Processes*, available from the American Welding Society, 550 N.W. Le Jeune Rd., Miami, FL 33126.

## NOTES TO PHYSICIAN:

Acute: Gases, fumes, and dusts may cause irritation to the eyes, lungs, nose, and throat. Some toxic gases associated with welding and related processes may cause pulmonary edema, asphyxiation, and death. Acute overexposure may include signs and symptoms such as watery eyes, nose and throat irritation, headache, dizziness, difficulty breathing, frequent coughing, or chest pains.

Chronic: Protracted inhalation of air contaminants may lead to their accumulation in the lungs, a condition that may be seen as dense areas on chest x-rays. The severity of change is proportional to the length of exposure. The changes seen are not necessarily associated with symptoms or signs of reduced lung function or disease. In addition, the changes on x-rays may be caused by non-work-related factors such as smoking, etc.

# PROTECTIVE CLOTHING AND EQUIPMENT FOR WELDING OPERATIONS:

PROTECTIVE GLOVES: Wear welding gloves.

EYE PROTECTION: Wear a helmet or use a face shield with a filter lens. Select lens per ANSI Z49.1. Provide protective screens and flash goggles if needed to protect others; select per OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Wear hand, head, and body protection. (See ANSI Z49.1.) Worn as needed, these help prevent injury from radiation, sparks, and electrical shock. Minimum protection includes welder's gloves and a face shield. For added protection consider arm protectors, aprons, hats, shoulder protection, and dark, substantial clothing.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: High-pressure liquid and gas. Use piping and equipment adequately designed to withstand pressures to be encountered. Prevent reverse flow. Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. Do not strike an arc on the cylinder. The defect produced by an arc burn could lead to cylinder rupture. Never work on a pressurized system. If there is a leak, close the cylinder valve. Blow the system down in a safe and environmentally sound manner in compliance with all federal, state, and local laws; then repair the leak. Never place a compressed gas cylinder where it may become part of an electrical circuit. When using compressed gases in and around electric welding applications, never ground the cylinders. Grounding exposes the cylinders to damage by the electric welding arc.

**Mixtures.** When you mix two or more gases or liquefied gases, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Remember, gases and liquids have properties that can cause serious injury or death.

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# HAZARD RATING SYSTEMS:

| NFPA RATINGS: |           | HMIS RATINGS:               |                       |
|---------------|-----------|-----------------------------|-----------------------|
| HEALTH        | = 1       | HEALTH                      | <b>= 1</b>            |
| FLAMMABILITY  | = 0       | FLAMMABILITY                | = 0                   |
| INSTABILITY   | = 0       | PHYSICAL HAZARD             | = 3                   |
| SPECIAL       | = SA (CGA | recommends this to designat | e Simple Asphyxiant.) |

# STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

| THREADED:                        | CGA-320               |
|----------------------------------|-----------------------|
| PIN-INDEXED YOKE:                | CGA-940 (medical use) |
| ULTRA-HIGH-INTEGRITY CONNECTION: | CGA-716               |

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlet V-1 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information can be found in the following materials published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5<sup>th</sup> Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, http://www.cganet.com/Publication.asp.

- AV-1 Safe Handling and Storage of Compressed Gases
- AV-7 Characteristics and Safe Handling of Carbon Dioxide
- G-6 Carbon Dioxide

G-6.1 Standard for Low Pressure Carbon Dioxide Systems at Customer Sites

- G-6.2 Commodity Specification for Carbon Dioxide
- P-1 Safe Handling of Compressed Gases in Containers
- SB-2 Oxygen-Deficient Atmospheres
- V-1 Compressed Gas Cylinder Valve Inlet and Outlet Connections
- Handbook of Compressed Gases, Fourth Edition

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information. The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

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Praxair, Inc. 39 Old Ridgebury Road Danbury, CT 06810-5113

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Printed in USA

# **MATERIAL SAFETY DATA SHEET**



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# LIQUID CARBONIC INDUSTRIES

810 JORIE BLVD. - OAK BROOK, IL 60521-2216 - 708 572-7500

CARBON DIOXIDE, Refrigerated Liquid

DOT: UN 2187 HAZ.CL.: Division 2.2 LABEL: Nonflammable Gas

April 1994

| 24 Hour Emergency Phone N                                                                                             | umbers: (504) 67<br>TION I PRODUCT                                                                                    | 23-8831; CHEMTRE                                                                  | <u>c (800</u>                          | ) 424-9300                                 | ·                      |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------|------------------------|
| CHEMICAL NAME:<br>COMMON NAME AND SYNONYMS:<br>FORMULA:                                                               | Carbon Dioxide,<br>Liquid Carbon I<br>Liquid (D.O.T.)<br>Liquified CO2<br>TION II HAZARI                              | )ioxide, LCO2; C<br>); Liqui-Flow <sup>TM</sup><br>CHEMICAL FAN                   | ILY: 1                                 | Dioxide, Refr<br>Non-Metallic              |                        |
| MATERIAL                                                                                                              | VOLUME %                                                                                                              | CAS NO.                                                                           |                                        | SHOLD LIMIT V                              | ALUES                  |
| Carbon Dioxide                                                                                                        | 99.5+                                                                                                                 |                                                                                   | 31994 '<br>S'                          | TWA = 5,000<br>TEL = 30,000<br>PEL = 5,000 | Molar PPM<br>Molar PPM |
|                                                                                                                       | SECTION III PF                                                                                                        |                                                                                   |                                        |                                            |                        |
| SUBLIMATION POINT (°F.):<br>VAPOR PRESSURE:<br>VAPOR DENSITY (AIR=1):<br>SOLUBILITY IN WATER:<br>APPEARANCE AND ODOR: | -109.3<br>@ 70°F = 856 psia<br>@ 70°F = 1.65<br>Soluble<br>Colorless gas wit<br>white crystalline<br>cylinder/vessel. | SPECIFIC GRA<br>% VOLATILE E<br>EVAPORATION<br>th slight punger<br>particles (sno | Y VOLUI<br>RATE (1<br>t odor<br>w)when | BUTYL ACETATE<br>. Liquid con              | =1): N/A<br>verts to   |
| SECTION                                                                                                               | IV FIRE AND EX                                                                                                        | PLOSION HAZARD                                                                    | DATA                                   | · · · · · · · · · · · · · · · · · · ·      |                        |
|                                                                                                                       | onflammable Gas<br>rbon dioxide is u<br>CEDURES:<br>I in a fire, safel                                                | ly relocate or k                                                                  | guishi<br>eep co                       | N/A<br>ng media.                           | UEL<br>N/A             |
| UNUSUAL FIRE AND EXPLOSION None                                                                                       | ON HAZARDS:                                                                                                           |                                                                                   |                                        |                                            |                        |
|                                                                                                                       |                                                                                                                       | •                                                                                 |                                        |                                            |                        |
|                                                                                                                       | CTION V HEALTH                                                                                                        |                                                                                   |                                        |                                            |                        |
| Route(s) of Entry: Inhal<br>Carcinogenicity: NTP?<br>EFFECTS OF OVEREXPOSURE:                                         |                                                                                                                       | kin?<br>ARC Monographs?                                                           | Yes<br>No                              | Ingestion?<br>OSHA?                        | No<br>No               |
| Inhalation: At 2 to 3% of<br>causes increased respirat<br>vomiting and unconscious                                    | ion and headache<br>ness. Higher cond                                                                                 | up to 15% caus                                                                    | ses hea<br>se rapi                     | dache, nausea<br>d circulatory             | وا                     |

vasodilator known.

insufficiency leading to coma and death. CO2 is the most powerful cerebral

# SECTION V -- HEALTH HAZARD DATA (CONT'D)

EFFECTS OF OVEREXPOSURE (Cont'd):

<u>Skin Contact</u>: Prolonged contact with carbon dioxide "snow" (solid) could result in cryogenic "burn" or frostbite. Persons in ill health where such illness would be aggravated by exposure to liquid carbon dioxide should not be allowed to work with or handle this product.

# EMERGENCY AND FIRST AID PROCEDURE:

If Inhaled: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. If unconscious, provide assisted respiration and supplemental oxygen. Further treatment should be symptomatic and supportive. Self-contained breathing apparatus should be available for rescue personnel.

Skin Contact: (Frostbite) Flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface or deep tissue freezing.

| SECTION VI REACTIVITY DATA                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STABILITY: UNSTABLE () STABLE (X)                                                                                                                                                                                                                                                                                                                                                                                                                  |
| CONDITIONS TO AVOID: N/A                                                                                                                                                                                                                                                                                                                                                                                                                           |
| INCOMPATIBILITY (MATERIALS TO AVOID): Reacts with alkaline materials to form carbonates and bicarbonates. Can be explosive with reactive metals (Sodium, Potassium, Magnesium) and their hydrides.                                                                                                                                                                                                                                                 |
| HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide at high temperatures.<br>HAZARDOUS POLYMERIZATION: MAY OCCUR () WON'T OCCUR (X)                                                                                                                                                                                                                                                                                                                  |
| CONDITIONS TO AVOID: N/A                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| SECTION VII SPILL OR LEAK PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                               |
| Leaks should be vented to the atmosphere "outside" in a safe area. Follow all federal, state and local regulations.                                                                                                                                                                                                                                                                                                                                |
| SECTION VIII SPECIAL PROTECTION INFORMATION                                                                                                                                                                                                                                                                                                                                                                                                        |
| RESPIRATORY PROTECTION: In event of major leak, self-contained breathing apparatus may be required.                                                                                                                                                                                                                                                                                                                                                |
| VENTILATION: LOCAL EXHAUST (X) To prevent accumulation above the TWA,<br>MECHANICAL (GENERAL) (X) STEL or PEL.                                                                                                                                                                                                                                                                                                                                     |
| PROTECTIVE GLOVES: Loose fitting, insulated EYE PROTECTION: Safety goggles or<br>glasses plus trans-<br>parent full face                                                                                                                                                                                                                                                                                                                           |
| OTHER PROTECTIVE EQUIPMENT: Safety shoes; portable CO <sub>2</sub> shield<br>analyzer No. 124                                                                                                                                                                                                                                                                                                                                                      |
| No guaranty is made as to the accuracy of any data or statement contained herein. While this material is furnished in good faith, NO WARRANTY EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE IS MADE. This material is offered only for your consideration, investigation and verification and Liquid Carbonic shall not in any event be liable for special, incidental or consequential damages in connection with its publication. |

# CARBON DIOXIDE, REFRIGERATED LIQUID MATERIAL SAFETY DATA SHEET

# SECTION IX -- SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

FOR BULK SYSTEMS: Carbon dioxide, refrigerated liquid is delivered to a customer into stationary, insulated vessels at the customer's location. These stationary vessels may have mechanical refrigeration coils within the vapor space in order to maintain the pressure in the vessel or the temperature of the liquid in the vessel.

Stationary customer site vessels should be operated in accordance with the manufacturer's and your supplier's instructions. Do not attempt to repair, adjust or in any other way modify the operation of these vessels. If there is a malfunction or other type of operations problem with the vessel, contact the closest supplier location immediately.

<u>CYLINDERS</u>: This product is also delivered to users in transportable cryogenic containers (liquid cylinders). These cylinders should always be used in well ventilated areas and in accordance with the manufacturer's and your supplier's instructions. They must <u>always</u> be kept in an upright position. Specialized hand trucks are needed for their movement. A "first in - first out" inventory system should be used with these cylinders.

Protect cylinders against physical damage. Store in cool, dry, well-ventilated area away from sources of heat or direct sunlight. Do not allow areas where cylinders are stored to exceed 125°F. Use a check valve or trap in the cylinder discharge line to prevent hazardous backflow. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over.

### OTHER PRECAUTIONS:

1 :

Use only DOT or ASME coded containers. Use a pressure reducing regulator when connecting cylinder to lower pressure piping or systems. Close valve after each use and when empty. Cylinders may not be refilled except by or with the consent of Liquid Carbonic. For more information refer to CGA Pamphlets and Safety Bulletins P-1, SB-2, G-6, G-6.1, and G-6.3. All are associated with handling gases, handling carbon dioxide or oxygen deficient atmospheres.

Reporting under SARA, Title III, Section 313 required in quantities over 10,000 pounds.

NFPA 704 NO. for liquid carbon dioxide =  $2 \quad 0 \quad 0$ 

No. 124

No guaranty is made as to the accuracy of any data or statement contained herein. While this material is furnished in good faith, NO WARRANTY EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE IS MADE. This material is offered only for your consideration, investigation and verification and Liquid Carbonic shall not in any event be liable for special, incidental or consequential damages in connection with its publication.

No guaranty is made as to the accuracy of any data or statement contained herein. While this material is furnished in good faith, NO WARRANTY EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE IS MADE. This material is offered only for your consideration, investigation and verification and Liquid Carbonic shall not in any event be liable for special, incidental or consequential damages in connection with its publication.

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# **USFilter** Material Safety Data Sheet

Manufacturer's Name : U.S. Filter Corporation Address: 4669 Shepherd Trail, Rockford, IL 61103 Product/Technical Information Phone Number: (815) 877-3041 Medical/Handling Emergency Phone Number: Call CHEMTREC at (800) 424-9300 24 hours a day Transportation Emergency Phone Number: Call CHEMTREC at (800) 424-9300 24 hours a day

Issue Date: May 15, 2000 Revision Date/Revision Number: May 15, 2000/Rev 1

# SECTION 2 - COMPOSITION INFORMATION

|                                                                                              | · + + + + + + + + + + + + + + + + + + + + | **********                 |
|----------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------|
| <u>Chemical Name</u><br>Sulfonated copolymer of styrene and<br>divinylbenzene in sodium form | Percent by Weight<br>40 - 70 %            | <u>CAS#</u><br>069011-22-9 |

Water

Ъ.,

30 - 60 % 007732-18-5

# SECTION 3 - HAZARDS IDENTIFICATION

# \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Appearance & Odor: Spherical beads/Odorless to slight amine odor Emergency Overview:

- May cause eye irritation
- May cause toxic fumes/vapors if burned
- May react violently when exposed to oxidizing agents such as Nitric Acid (HNO<sub>3</sub>)

Fire & Explosion Hazards: This material will not burn until moisture is removed, then resin starts to burn in flame at 230°C. Under fire conditions some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Nitric acid and other strong oxidizing agents can cause explosive-type reactions when mixed with ion exchange resins. Proper design of equipment to prevent build up of pressure is necessary if use of an oxidizing agent such as nitric acid is contemplated.

Primary Route(s) of Exposure : skin and eye contact

# SECTION 3 - HAZARDS IDENTIFICATION (cont.)

Inhalation - Acute Effects: Vapors are unlikely due to physical properties.

Skin Contact - Acute Effects: Prolonged or repeated exposure is not likely to cause significant skin irritation. May cause more severe response if skin is scratched or cut. Skin absorption is unlikely due to physical properties.

Eye Contact - Acute Effects : May cause severe eye irritation. May cause moderate corneal injury. Effects are likely to heal.

Ingestion - Acute Effects: Single dose oral toxicity is considered to be low. No hazards anticipated from swallowing small amounts incidental to normal handling operation.

# **SECTION 4 - FIRST AID MEASURES**

Inhalation First Aid: Remove affected person from area to fresh air and provide oxygen if breathing is difficult. Give artificial respiration ONLY if breathing has stopped and give CPR ONLY if there is no breathing and no pulse. Obtain medical attention. No adverse effects anticipated by this route of exposure.

Skin Contact First Aid: Immediately remove clothing from affected area and wash skin vigorously with flowing water. Clothing should be washed before reuse. DO NOT instruct person to neutralize affected skin area.

Eye Contact First Aid: Immediately irrigate eyes with flowing water continuously for 15 minutes while holding eyes open. Contacts should be removed before or during flushing. Obtain medical attention. DO NOT instruct person to neutralize.

Ingestion First Aid: No adverse effects anticipated by this route of exposure incidental to proper industrial handling. If ingestion does occur, if victim is alert and not convulsing rinse mouth with water and give plenty of water to drink. If spontaneous vomiting occurs, have affected person lean forward with head down to avoid breathing in of vomitus. Rinse mouth again and give more water to drink. Obtain medical attention.

Medical Conditions Aggravated: There are no known conditions aggravated by exposure.

Note to Physician: No specific antidote. Supportive care. Treatment based on judgement of the physician in response to reactions of the patient.

## SECTION 5 - FIRE FIGHTING MEASURES

Flash Point/Method: Not applicable

Auto Ignition Temperature: Above 500°C (900°F) Upper/Lower Explosion Limits: Not applicable

Extinguishing Media: Water, carbon dioxide, dry chemical Fire Fighting Procedures: Keep people away. Isolate fire area and deny unnecessary entry. Cool surrounding area with water to localize fire zone. Soak thoroughly with water to cool and prevent reignition.

# SECTION 5 - FIRE FIGHTING MEASURES (cont.)

Fire-Fighting Equipment: NIOSH approved positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots and gloves). If protective equipment is not available or not used, fight fire from a protected location or a safe distance.

Fire & Explosion Hazards: This material will not burn until moisture is removed, then resin starts to burn in flame at 230°C. Under fire conditions some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Nitric acid and other strong oxidizing agents can cause explosive-type reactions when mixed with ion exchange resins. Proper design of equipment to prevent build up of pressure is necessary if use of an oxidizing agent such as nitric acid is contemplated.

Hazardous Products of Decomposition and/or Combustion: May include but not limited to hydrocarbons, sulfur oxides, organic sulfonates, carbon monoxide, carbon dioxide and benzene compounds.

#### NFPA Ratings:

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HEALTH-1 FLAMMABILITY-1 REACTIVITY-1 OTHER-none

# SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spill/Leak Procedures: Isolate spill area to prevent falls as material can be a slipping hazard. Avoid contact with eyes and skin. Material is heavier than water and has limited water solubility. It will collect on the lowest surface.

Cleanup: Clean up floor area. Sweep up.

Regulatory Requirements: Follow all applicable Federal, State, Local, or Provincial regulations. Disposal: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State, Local and Provincial laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

# SECTION 7 - HANDLING AND STORAGE

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Handling: Practice reasonable care and caution. Metal equipment should be compatible with feed, regenerant, resin form and effluent of that process.

Storage: Keep containers tightly closed when not in use. Store between  $2^{\circ}$ -  $38^{\circ}C$  ( $35^{\circ}$  -  $100^{\circ}F$ ).

General Comments: Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

# SECTION 8 – PERSONAL PROTECTION/ EXPOSURE CONTROL

Respiratory Protection: No respiratory protection should be needed.

Skin Protection: Wear gloves impervious to this material to prevent skin contact.

Eye Protection: Wear protective eyeglasses or chemical safety goggles. Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Ventilation Protection: Good general ventilation should be sufficient.

Other Protection: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Safety showers, with quick opening valves which stay open, and eye wash fountains, or other means of washing the eyes with a gentle flow of cool to tepid tap water, should be readily available in all areas where this material is handled or stored. Water should be supplied through insulated and heat-traced lines to prevent freeze-ups in cold weather.

### **Exposure Limits**:

\*N/A=Not applicable

Exposure limits have not been developed.

# SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Spherical beads/Odorless to slight amine odor

Vapor Pressure : N/A\* Bolling Point : N/A Specific Gravity : N/A Volatile Percentage : N/A Flash Point/method: N/A

Vapor Density (Air=1): N/A Melting Point: N/A Solubility in Water: Insoluble pH: N/A

 Flash Point/method:
 N/A
 Auto Ignition Temperature:
 Above 500°C (900°F)

 Upper/Lower Explosion Limits:
 N/A
 Other: none

# SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable under normal handling and storage conditions.

Incompatibilities: Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions and could result is slightly degraded resin up to an explosive reaction. Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

Polymerization: Hazardous polymerization cannot occur.

**Decomposition:** Hazardous decomposition products depend upon temperature, air supply, and the presence of other materials. Hazardous decomposition products may include and are not limited to: aromatic compounds, hydrocarbons, organic sulfonates, sulfur oxides.

**Conditions to Avoid:** Resin can decompose at temperatures greater than 90°C (194°F). Do not pack column with dry ion exchange resins. Dry beads expand when wet. This expansion can cause a glass column to shatter.

# SECTION 11 - TOXICOLOGICAL INFORMATION

Inhalation – Acute: Vapors are unlikely due to physical properties. Inhalation – Chronic: There are no known chronic inhalation effects. Skin Contact – Acute: Prolonged or repeated exposure is not likely to cause significant skin irritation. May cause more severe response if skin is scratched or cut. Skin absorption is unlikely due to physical properties.

Skin Contact - Chronic: There are no known chronic dermal effects.

Eye Contact – Acute: May cause severe eye irritation. May cause moderate corneal injury. Effects are likely to heal.

Ingestion – Acute: Single dose oral toxicity is considered to be low. No hazards anticipated from swallowing small amounts incidental to normal handling operation. Ingestion – Chronic: There are no known chronic ingestion effects.

Carcinogenicity/Mutagenicity: There are no known carcinogenic/mutagenic effects. Reproductive Effects: There are no known reproductive effects.

Neurotoxicity: There are no known neurotoxic effects.

Other Effects: There are no other known toxic effects.

Target Organs: This product will affect the eyes.

# SECTION 12 - ECOLOGICAL INFORMATION

The environmental fate and ecological toxicity are not known.

# SECTION 13 - DISPOSAL CONSIDERATIONS

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Spill/Leak Procedures: Isolate spill area to prevent falls as material can be a slipping hazard. Avoid contact with eyes and skin. Material is heavier than water and has limited water solubility. It will collect on the lowest surface.

# Cleanup: Clean up floor area. Sweep up,

Regulatory Requirements: Follow all applicable Federal, State, Local, or Provincial regulations.

Disposal: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State Local and Provincial laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

# SECTION 14 - TRANSPORTATION INFORMATION

**DOT Shipping Description**: This product is not regulated by DOT when shipped domestically by land.

Canadian TDG Information: For TDG regulatory information, if required, consult transportation regulations, or product shipping.

# SECTION 15 - REGULATORY INFORMATION

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#### US Regulations:

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SRA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard

TSCA Considerations: Every different salt or ionic form of an ion exchange resin is a separate chemical. If you use an ion exchange resin for ion exchange purposes and then remove the by-product resin from its vessel or container prior to recovery of the original or another form of the resin or of another chemical, the by-product resin must be listed on the TSCA Inventory (Unless an exemption is applicable). It is the responsibility of the customer to ensure that such isolated, recycled by-product resins are in compliance with TSCA. Failure to comply could result in substantial civil or criminal penalties being assessed by the EPA.

State Regulations: Consult individual state agency for further information.

#### **Canadian** Regulations:

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

\$1 · ·

#### D2B - eye or skin irritant

Refer elsewhere in the MSDS for specific warnings and safe handling information.

CPR Statement: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

#### SECTION 16 - OTHER INFORMATION

**Disclaimer:** The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the user thereof. It is the buyer's responsibility to ensure that its activities comply with federal, state, provincial and local laws.

Created by: MSDS Coordinator

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| ROHM AND HAAS                                                                    |                       |                                 |                                          |                | HAZARD RATING                                                                          |
|----------------------------------------------------------------------------------|-----------------------|---------------------------------|------------------------------------------|----------------|----------------------------------------------------------------------------------------|
| CORPORATE PRODUCT INTEGRITY :<br>NDEPENDENCE MALL WEST<br>PHILADELPHIA, PA 19105 | 215-                  |                                 | ELEPHONE<br>ROHM AND HAASI<br>(CHEMTREC) |                | 2-MODERATE <u>IDXICITY</u><br>1-SLIGHT<br>0-INSIGNIFICANT<br>SEE SECTION IV<br>SPECIAL |
| B5273<br>LIST 7                                                                  | MATERIAL              | SAF                             | ETY DAT                                  | A SHEET        | NOT OSHA HAZARDOUS<br>NOT WHMIS CONTROLLED                                             |
| MATERIAL<br>AMBERLITE® 200C Resin                                                |                       |                                 |                                          | 906226-6       | DOT HAZARD CLASS<br>NONREGULATED                                                       |
|                                                                                  |                       |                                 | 01/03/                                   | 89             |                                                                                        |
| FORMULA<br>Not applicable                                                        | CHEMICAL NAME OR S    | · · · · · · · · · · · · · · · - | waberge rea                              | in (codium     | for-1                                                                                  |
|                                                                                  |                       |                                 | ONAL INFORM                              |                | lorm)                                                                                  |
| ſ <u></u>                                                                        | 1 - 00                | W COLL                          |                                          | AFPROX WT      | * TWATLY                                                                               |
| Styrene/divinylbenzene<br>Water                                                  | cation exchange       |                                 | AS REG. NO.<br>NONHAZ<br>NONHAZ          | 47~61<br>39-53 | R&H OSHA ACGIH<br>NE NE NE<br>NE NE NE<br>NE = None established                        |
|                                                                                  | III - PHYS            |                                 | ROPERTY INF                              | ORMATION       |                                                                                        |
| APPEARANCE - ODOR - pH.<br>Beads; pH (aqueous slu                                |                       |                                 |                                          |                | VISCOSITY XA                                                                           |
| MELTING OR FREEZING POINT                                                        | BOILING POINT         |                                 | VAPOR PRESSUR                            | -              | VAPOR DENSITY (AIR-1)                                                                  |
| OC/32F (water)                                                                   | 100C/212F (Wate       |                                 | 17 @ 20C/6                               |                | Less than 1                                                                            |
| Negligible                                                                       | 39-53 (water)         | WEIGHT                          | 1 .                                      | TY WATER 1     | EVAPORATION RATE BUTYL ACETATE-I                                                       |
|                                                                                  |                       | EVDI /                          | 1.1-1.4<br>DSION HAZAR                   | D INCODAL      | Less than 1                                                                            |
| FLASH POINT                                                                      | AUTO IGNITION TEMPER  | RATURE                          | LOWER EXPLOSI                            |                | UPPER EXPLOSION LIMIT (%)                                                              |
| EXTINCUISHING MEDIA<br>FOAM ALCOHOL-<br>EDAM<br>SPECIAL FIRE FIGHTING PROCEDURE  | CO2 X DRY<br>CHEMICA  |                                 |                                          | ĒR             |                                                                                        |
|                                                                                  | athing apparatu       | is (pre                         | ssure-deman                              | d, MSHA/NIG    | OSH-approved or equivalent)                                                            |
| UNUSUAL FIRE AND EXPLOSION HAZ<br>TOXIC CORDUSTION Produc                        |                       | oxides                          | of sulfur.                               | <u></u>        |                                                                                        |
|                                                                                  | IV — HE/              | ALTH H                          | AZARD INFOR                              | MATION         |                                                                                        |
| ROHM AND HAAS RECOMMENDED W<br>STEL = None established                           | DRK PLACE EXPOSURE LI | MITS                            |                                          |                |                                                                                        |
| EFFECTS OF OVEREXPOSURE<br>Eye Contact: Product,                                 | as supplied, ca       | n caus                          | e eye irrita                             | ation.         |                                                                                        |
|                                                                                  |                       |                                 |                                          |                |                                                                                        |
|                                                                                  |                       |                                 |                                          |                |                                                                                        |
| EMERGENCY AND FIRST AID PROCED                                                   | URES                  |                                 | *                                        | •              |                                                                                        |

Eye Contact: Flush eyes with large amounts of water for at least 15 minutes. See a physicia if irritation persists.

| , *MAY 8 '91                             | 12:56 FROM RHEOX INC-                                                                                           | -MANCHESTER                            | O CHARLESTON                          | PAGE.003                                                                                                        |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| r. r <sup>i</sup> <b>r</b>               | IV - REACTIVITY                                                                                                 |                                        |                                       | 111461000                                                                                                       |
| STABILITY                                | CONDITIONS TO AVOID                                                                                             |                                        |                                       |                                                                                                                 |
| HAZARDOUS DECOMPOSITION I                | i vombergrares ovet to                                                                                          | OC/392F.                               |                                       |                                                                                                                 |
| afur oxides.                             | HOLOCIS INSTINI decompos                                                                                        | ition may yield s                      | tyrene monomer,                       | divinylbenzene,                                                                                                 |
| HAL JOUS POLYMERIZATION                  | CONDITIONS TO AVOID                                                                                             |                                        |                                       | <del></del>                                                                                                     |
| DOCCUR WILL NOT                          | None known                                                                                                      |                                        |                                       |                                                                                                                 |
| INCOMPATIBILITY IMATERIALS               | TO AVOIDAVOID contact with c                                                                                    | oncentrated nitri                      | c acid or any of                      | her strong                                                                                                      |
|                                          | oxidizing agents at<br>VI - SPILL OR LEAK P                                                                     |                                        | 4                                     |                                                                                                                 |
| STEPS TO BE TAKEN IN CASE N              | MATERIAL IS RELEASED ON SPILLED                                                                                 | NUCEDURE INFURM                        | ATION                                 | · · · · · · · · · · · · · · · · · · ·                                                                           |
| Floor may be slipped                     | y. Use care to avoid fall:                                                                                      | s. Sweep up and                        | transfer to cont                      | ainers for                                                                                                      |
| recovery or disposal                     | · ·                                                                                                             |                                        |                                       |                                                                                                                 |
|                                          |                                                                                                                 |                                        |                                       | · .                                                                                                             |
|                                          |                                                                                                                 | •                                      |                                       |                                                                                                                 |
|                                          |                                                                                                                 |                                        |                                       |                                                                                                                 |
|                                          |                                                                                                                 |                                        | • •                                   |                                                                                                                 |
|                                          |                                                                                                                 |                                        |                                       | 1                                                                                                               |
| WASTE DISPOSAL METHODS                   | Unused resin may be incines                                                                                     | cated on lands                         |                                       |                                                                                                                 |
| state and federal re                     | gulations. For contaminate                                                                                      | d resin, the use                       | ed in lacilities<br>r must determine  | meeting local,                                                                                                  |
| use an appropriate d                     | isposal method.                                                                                                 |                                        |                                       | CHA MATATO GINT                                                                                                 |
| · · · · · · · · · · · · · · · · · · ·    |                                                                                                                 |                                        |                                       |                                                                                                                 |
| VENTILATION TYPE                         | VII - SPECIAL PROTI                                                                                             | ECTION INFORMATIC                      |                                       |                                                                                                                 |
| Normal room ventilat                     | ion.                                                                                                            |                                        |                                       |                                                                                                                 |
| RESPIRATORY PROTECTION                   |                                                                                                                 |                                        |                                       |                                                                                                                 |
| None required for no                     | rmal operations.                                                                                                |                                        |                                       |                                                                                                                 |
|                                          | -                                                                                                               |                                        | · · · · · · · · · · · · · · · · · · · | I,                                                                                                              |
| MC IVE GLOVES                            | EVE PROTECTION                                                                                                  | (ANSI 287.1 OF                         |                                       |                                                                                                                 |
| OTHER PROTECTIVE EQUIPMENT               |                                                                                                                 | (MAJI 207.1 UL 0                       | TatAsten()                            | /\/\                                                                                                            |
| Eyewash facility                         |                                                                                                                 |                                        |                                       |                                                                                                                 |
|                                          | VIII - STORAGE AND                                                                                              | HANDLING INFORMA                       | TION                                  |                                                                                                                 |
| STORAGE TEMPERATURE MAX. 49C/120F MIN. 0 | C/32F INDOOR YES                                                                                                | MEATED                                 |                                       | OUTDOOR                                                                                                         |
| Store at ambient con                     |                                                                                                                 |                                        | NO                                    | <u> </u>                                                                                                        |
|                                          |                                                                                                                 |                                        | •                                     |                                                                                                                 |
| MOTE: The maximum of                     | perating temperature recomm                                                                                     | ended for this p                       | oduct is 150C/3                       | OOF: Above                                                                                                      |
| this temperature fun                     | ctional group destruction a                                                                                     | nd loss of capaci                      | ty will occur.                        |                                                                                                                 |
|                                          |                                                                                                                 |                                        |                                       |                                                                                                                 |
|                                          | IX - TOXICITY                                                                                                   | INFORMATION                            |                                       |                                                                                                                 |
|                                          |                                                                                                                 |                                        |                                       |                                                                                                                 |
| to toxicity data avai                    | ilable for this product.                                                                                        |                                        |                                       |                                                                                                                 |
|                                          |                                                                                                                 |                                        |                                       |                                                                                                                 |
|                                          |                                                                                                                 |                                        |                                       |                                                                                                                 |
|                                          | X - MISCELLANEO                                                                                                 |                                        |                                       |                                                                                                                 |
|                                          | and the second secon |                                        |                                       |                                                                                                                 |
| aution: Do not pack                      | column with dry ion exchange                                                                                    | nge resins. Dry                        | beads expand whe                      | in wetted; this                                                                                                 |
|                                          | a glass column to shatter.<br>I and other strong oxidizing                                                      |                                        |                                       |                                                                                                                 |
| men mixed with ion (                     | Exchange resins. Proper de                                                                                      | y ayanta can caus<br>Sign of equipment | to prevent rap                        | d build-up of                                                                                                   |
| r( ire is necessary                      | f if use of an oxidizing ag                                                                                     | ent such as nitri                      | c acid is conter                      | plated. 🧹 🔪                                                                                                     |
| whice using strong of                    | oxidizing agents in contact                                                                                     | with ion exchange                      | e beads, consult                      | : sources                                                                                                       |
| nowledgeable in hand                     | lling these materials.                                                                                          |                                        |                                       |                                                                                                                 |
|                                          | MARK OF ROHM AND HAAS COMP                                                                                      |                                        |                                       | and the second secon |
| A + NOT APPLICABLE<br>C = CEILING VALUE  | 906226 <del>-6</del>                                                                                            | DATE OF ISSUE                          | SUPERSED                              | es<br>08/05/87                                                                                                  |
| THE REORNATION CONTAINED NEW             | EIN IS BASED ON DATA CONSIDERED<br>TY IS EXPRESSED OR IMPLIED REGARDING                                         | ROHM AND HAAS COM                      | ANT ASSUMES NO RESPONSIVE             | ITY FOR PERSONAL                                                                                                |
| THE ACCURACY OF THESE DATA (             | A THE RESULTS TO BE OBTAINED FROM THE                                                                           | CAREED BY THE MATE                     | DAMAGE TO VENDEES, LIBERS (           | ACTINE ALL                                                                                                      |

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TUNE 9 ID028301391 → MB&D UHEMIUAL UU.

From: P.B. & S. Safety

Order #: 64103506

23 2

MATERIAL SAFETY DATA

**FMC** 

SODIUM CARBONATE

| 497 | -17 -8 |  |
|-----|--------|--|
|     |        |  |

|                                                           | 497 -19 -8                                                                                      |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| U.S./CANADA VERSION                                       | EFFECTIVE: 02/13/97 PRINTED: 03/12/97                                                           |
| PRINTED FOR                                               | PB48 CHEMICAL                                                                                   |
|                                                           | 2312 CENTERLINE IND. DRIVE                                                                      |
|                                                           | ATTN; SAFETY DIRECTOR<br>St Louis MD 63146                                                      |
|                                                           |                                                                                                 |
|                                                           | 1. CHENICAL PRODUCT/COMPANY IDENTIFICATION ####                                                 |
| PRODUCT NAME                                              | SODIUM CARBONATE, ANHYDROUS                                                                     |
| INFORMATION PROVIDED BY                                   | SODA ASH, SODIUM CARBONATE ANHYDROUS                                                            |
|                                                           | 1735 MARKET BTREET                                                                              |
|                                                           | PHILADELPHIA, PA 19103                                                                          |
| EMERGENCY PHONE NUMBERS                                   | (800) 253-7632                                                                                  |
| CHENTREC                                                  | (800) 424-9300                                                                                  |
| MEDICAL                                                   | (303) 595-9048 CALL COLLECT                                                                     |
| FLARI/UIRER,                                              | (307) 875-2580 CALL COLLECT                                                                     |
|                                                           | 2. COMPOSITION/INFORMATION ON INGREDIENTS =====                                                 |
| CAS # AND COMPONENTS:                                     | 497-19-8 BODIUM CARBONATE 99.8%                                                                 |
| 두 두 부 등 다 할 수 있다. 또 한 다 한 다 한 다 한 다 한 다 한 다 한 다 한 다 한 다 한 | 3. HAZARD IDENTIFICATION                                                                        |
| EMERGENCY DVERVIEW                                        | WHITE GRANULAR SOLID. PRODUCT IS                                                                |
|                                                           | NON-CONBUSTIBLE. REACTS WITH ACIDS TO RELEASE                                                   |
|                                                           | CARBON DIDXIDE AND HEAT. IRRITATING TO THE<br>EYES. CONTINUOUS CONTACT MAY IRRITATE SKIN.       |
| HEALTH EFFECTS                                            | DIRECT CONTACT WITH THE PRODUCT CAUSES                                                          |
|                                                           | IRRITATION OF THE EYES AND CONTINUOUS CONTACT                                                   |
|                                                           | MAY CAUSE SKIN IRRITATION (RED, DRY, CRACKED SKIN).                                             |
|                                                           | EXCESSIVE LEVELS OF AIRBORNE DUST MAY IRRITATE                                                  |
|                                                           | THE MUCOUS MEMBRANES AND UPPER RESPIRATORY                                                      |
|                                                           | TRACT.                                                                                          |
| ≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈≈                     | 4. FIRST AID MEASURES ********************                                                      |
| EYES                                                      | IMMEDIATELY FLUSH WITH WATER FOR AT LEAST                                                       |
|                                                           | 15 MINUTES, LIFTING THE UPPER AND LOWER LIDS                                                    |
| SKIN                                                      | OCCASIONALLY. SEE A MEDICAL DOCTOR IMMEDIATELY.<br>WASH WITH PLENTY OF WATER FOR 15 MINUTES. IF |
|                                                           | INNITATION OCCURS AND PERSISTS, OBTAIN                                                          |
|                                                           | MEDICAL ATTENTION.                                                                              |
| * 151171 LATI & UIV                                       | REMOVE FROM EXPOSURE. IF DISCOMFORT OCCURS<br>AND PERSISTS, OBTAIN MEDICAL ATTENTION.           |
| INGESTION                                                 | RINSE MOUTH WITH WATER. DILUTE BY GIVING 1 OR 2                                                 |
|                                                           | GLASSES OF WATER. DO NOT INDUCE VOMITING. NEVER                                                 |
|                                                           | GIVE ANYTHING BY MOUTH TO AN UNCONSCIDUS PERSON.                                                |
| NOTES TO PHYSICIAN                                        | SEE A MEDICAL DOCTOR IMMEDIATELY.<br>WHILE INTERNAL TOXICITY IS LOW, IRRITANT                   |
|                                                           | EFFECTS OF HIGH CONCENTRATIONS MAY PRODUCE                                                      |
|                                                           | (CONTANIES) STORE                                                                               |
| <u></u>                                                   | (CONTINUED) PAGE 01                                                                             |

To: C. E. NATCO CO.

110m 3 10020001391 → FDAS CHEMICAL CU.

From: P.B. & S. Safety

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| ERIAL SAFETY DATA                                    | SODIUM CARBONATE FMC                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ······                                               | 497 -19 -8                                                                                                                                                                                                                                                                                                                                                  |
| U.S./CANADA VERSION                                  | EFFECTIVE: 02/13/97 PRINTED: 03/12/97                                                                                                                                                                                                                                                                                                                       |
| ****************                                     | 4. FIRST AID MEASURES ***********************                                                                                                                                                                                                                                                                                                               |
|                                                      | CORNEAL DPACITIES AND VESICULAR SKIN<br>Reactions in Humans with Abraded Skin Only.<br>Treatment is symptomatic and supportive.                                                                                                                                                                                                                             |
| ₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₽₩₩₩₩₽₩₩₩₩                          | 5. FIRE FIGHTING MEASURES                                                                                                                                                                                                                                                                                                                                   |
|                                                      | WATER, WATER FOG, CARBON DIOXIDE (CO2),<br>DRY CHEMICAL.<br>WEAR FULL PROTECTIVE CLOTHING AND SELF                                                                                                                                                                                                                                                          |
| PROCEDURES<br>Degree of fire and<br>Explosion Hazard | CONTAINED BREATHING APPARATUS                                                                                                                                                                                                                                                                                                                               |
|                                                      | HEATED TO DECOMPOSITION, IT EMITS FUMES OF SODIUM OXIDE.                                                                                                                                                                                                                                                                                                    |
| ㅋ 봐도 ㅋ ㅎ 늘 후 유 날 는 후 은 날 은 후 은 날 한 후 은 날 두 유 도 두     | 6. ACCIDENTAL RELEASE MEASURES                                                                                                                                                                                                                                                                                                                              |
| PRDCEDURE FOR RELEASE;<br>OR BPILL                   | SWEEP UP AND RECYCLE INTO PROCESS IF<br>CONTAMINATION DOES NOT PRESENT A PROBLEM. USE<br>APPROPRIATE PROTECTIVE EQUIPMENT IF DUST IS<br>GENERATED OR CONTACT WITH EYES OR SKIN IS<br>EXPECTED. FLUSH RESIDUES AND LIQUID TO HOLDING<br>AREA FOR NEUTRALIZATION BEFORE DISCHARGE.                                                                            |
|                                                      | 7. HANDLING AND STORAGE                                                                                                                                                                                                                                                                                                                                     |
| HANDLING                                             | USE AIR CONVEYING/MECHANICAL SYSTEMS FOR BULK<br>TRANSFER TO STORAGE. FOR MANUAL HANDLING OF BULK<br>TRANSFER USE MECHANICAL VENTILATION TO REMOVE<br>AIRBORNE DUST FROM RAILCAR, SHIP OR TRUCK. USE<br>APPROVED RESPIRATORY PROTECTION WHEN VENTILATION<br>SYSTEMS ARE NOT AVAILABLE. SELECTION OF<br>RESPIRATORS IS BASED ON THE DUST CLOUD<br>GENERATED. |
| TORAGE                                               | PROVIDE GENERAL MECHANICAL AND/OR LOCAL EXHAUST<br>VENTILATION TO PREVENT RELEASE OF AIRBORNE DUST<br>INTO THE WORK ENVIRONMENT. APPROVED RESPIRATORY<br>PROTECTION SHOULD BE UBED WHEN AIRBORNE DUST<br>IS EXPECTED TO BE RELEASED.                                                                                                                        |
|                                                      | STORE IN A COOL DRY AREA, AWAY FROM ACIDS.                                                                                                                                                                                                                                                                                                                  |
|                                                      | 8. EXPOSURE CONTROLS/PERSONAL PROTECTION ======                                                                                                                                                                                                                                                                                                             |
|                                                      | MINIMIZE EYE AND SKIN CONTACT BY UBING<br>APPROPRIATE PROTECTIVE EQUIPMENT. USE LOCAL OR<br>GENERAL ROOM VENTILATION TO CONTROL AIRBORNE<br>DUST THAT MAY BE GENERATED INTO THE WORK<br>ENVIRONMENT.                                                                                                                                                        |
| ECOMMENDED PERSONAL                                  |                                                                                                                                                                                                                                                                                                                                                             |
|                                                      | (CONTINUED) PAGE 02                                                                                                                                                                                                                                                                                                                                         |

r~00 0 3-15-99 9:55am p.3 of 7

|            | E≪E. NATCO CO.                                         | From: P.8. & S. Safety 3-15-99 9:55am                                                                                      |
|------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| MATE       | RIAL SAFETY DATA                                       |                                                                                                                            |
|            |                                                        |                                                                                                                            |
| ι          | .8./CANADA VERSION                                     |                                                                                                                            |
|            |                                                        | PRINTED: 02/13/97 PRINTED: 03/12/9                                                                                         |
|            | : # # # # # # # # # # # # # # # # # # #                | 8. EXPOSURE CONTROLS/PERSONAL PROTECTION ######                                                                            |
|            | PROTECTIVE EQUIPMENT                                   |                                                                                                                            |
|            | REBPIRATORY                                            | USE APPROVED DUST RESPIRATORS FOR LOW LEVELS OF<br>AIRBORNE DUST. HIGH CONCENTRATIONS MAY REQUIRE<br>AIR SUPPLIED SYSTEMS. |
|            | EYE8                                                   | USE CUP TYPE CHENICAL COCCUSO                                                                                              |
|            | BPECIAL CLOTHING                                       | USE IMPERVIOUS GLOVES TO PREVENT SKIN CONTACT.<br>ARM PROTECTORS AND APRONS. IF CLOTHING BECOMES                           |
|            | HIN EVVILIENT                                          | I CUNIAMINATED REMAVE AND LANDER REFORE DEVOR                                                                              |
|            |                                                        | INDUSTRIAL SAFETY SHOES.                                                                                                   |
|            |                                                        | 9. PHYSICAL AND CHEMICAL PROPERTIES PEPEEREE                                                                               |
| 1 84       | 0161NG MOINESSSSSSSSSSS                                | 851 DEGREES C (1564 DEGREES F)<br>Decomposes                                                                               |
| 0/         | APOR PRESSURE                                          | NOT APPLICABLE                                                                                                             |
| R          | APOR DENSITY (AIR=1)                                   | NOT APPLICABLE                                                                                                             |
|            | APPEARANCE AND STATE                                   | WHITE, SULID GRANULAR                                                                                                      |
|            | DOR                                                    | ODORLESS                                                                                                                   |
| 91         | PECIFIC GRAVITY (H2O=1).;<br>DLUBILITY IN H2O % BY HT; | 2.509                                                                                                                      |
| x          | VOLATILES                                              | NGT APPLICADE                                                                                                              |
| E          | APORATION RATE                                         | NOT APPLICABLE                                                                                                             |
| PH         | (AS IS)                                                | NOT APPLICADIS                                                                                                             |
| P⊦         | 4 (1% SOLUTION)                                        | 11.4                                                                                                                       |
|            | OR THRESHOLD                                           | NOT APPLICABLE                                                                                                             |
|            | ARTITION COEFFICIENT                                   | DENSE GRADES.0.86-1.121 LIGHT GRADES.0.70-0.90                                                                             |
| 1          | N-OCTANOL/WATER                                        |                                                                                                                            |
| FL         | ASH POINT                                              | NONCOMBUSTIBLE                                                                                                             |
| FL         | TOIGNITION TEMPERATURE.:<br>Ammable limits upper:      | NOT APPLICABLE                                                                                                             |
|            | (AIR) LOWER                                            | NOT APPLICABLE                                                                                                             |
| EX         | PLOSIVE PROPERTIES                                     | NOT APPLICABLE                                                                                                             |
| 0X<br>80   | IDIZING PROPERTIES:                                    | NOT APPLICABLE                                                                                                             |
|            | - FAT SOLUBILITY<br>(SOLVENT - DIL)                    | NUT AVAILABLE                                                                                                              |
| **         |                                                        | 10. STABILITY AND REACTIVITY SERVER REACTIVITY                                                                             |
| <b>S</b> T | ABILITY                                                | STABLE                                                                                                                     |
| HA         | ZARDOUS POLYMERIZATION.                                | WILL NOT OCCUR                                                                                                             |
|            |                                                        | CONTACT WITH ACIDS EXCEPT UNDER CONTROLLED<br>CONDITIONS.                                                                  |
| MA         | TERIALS TO AVOID                                       | ALUMINUM POWDER, ACIDS, FLUORINE, MOLTEN                                                                                   |
| MA         | JOR CONTAMINANTS THAT                                  |                                                                                                                            |
|            |                                                        | (CONTINUED) PAGE 03                                                                                                        |

| ERIAL SAFETY DATA                                                                                       | SODIUM CARBONATE FMC                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                         | 497 -19 -8                                                                                                                                                                                                |
| U.S./CANADA VERSION                                                                                     | EFFECTIVE: 02/13/97 PRINTED: 03/12/97                                                                                                                                                                     |
| *********                                                                                               | - 10. STABILITY AND REACTIVITY                                                                                                                                                                            |
| CONTRIBUTE TO INSTABILITY<br>INCOMPATIBILITY                                                            | NONE<br>REACTS WITH ACIDS WITH RELEASE OF LARGE VOLUMES                                                                                                                                                   |
| HAZARDOUS DECOMPOSITION<br>PRODUCTS<br>SENSITIVITY TO MECH                                              |                                                                                                                                                                                                           |
| IMPACT<br>SENBITIVITY TO STATIC<br>DISCHARGE                                                            | NONE                                                                                                                                                                                                      |
| ᆕᆕᅶᆧᅶᄟᅶᅸᆂᆍᆕᆕᇼᆂᆍᆤᅷᅸᆍᅶᅷᅷᆄᆂᅶᅷ                                                                              | S 11. TOXICOLOGICAL INFORMATION PROFESSESSES                                                                                                                                                              |
| EYE CONTACT                                                                                             | SEVERE IRRITANT (RABBIT)                                                                                                                                                                                  |
| SKIN CONTACT                                                                                            | TOXICOLOGY 231281-291 (1982)<br>NON-IRRITATING TO INTACT SKIN. MINOR IRRITATION<br>MAY OCCUR DN ABRADED SKIN.<br>NON-SENSITIZING (HUMANS, 0.25% SODIUM CARBONATE)                                         |
| SKIN ABSORPTION                                                                                         | TOXICOL, APPL. PHARMACOL, 31:481-490 (1975)<br>ND DATA AVAILABLE.<br>LC50 = 2.3 Mg/L (RAT,2 HR.) ENVIRON                                                                                                  |
| INGESTION                                                                                               | RES 31:138 (1983).<br>LD50 = 4090 MG/KG (RAT) (RTECS 1985-6).<br>May cause severe irritation of the eyes,<br>including corneal opacities. Dusts and mists<br>are irritating to the skin, mucdus membranes |
| CHRONIC EFFECTS FROM<br>DVEREXPOSURE<br>(EFFECTS CONSIDERED<br>INCLUDE:                                 | AND UPPER RESPIRATORY TRACT.<br>May cause inflammation of the mucous membranes<br>in the respiratory tract and of the skin.                                                                               |
| SENSITIVITIES,<br>CARCINDGENICITY,<br>TERATOGENICITY,<br>MUTAGENICITY,<br>Synergistic                   |                                                                                                                                                                                                           |
| PRODUCTS, AND ANY<br>Medical conditions<br>Generally recognized<br>AS being aggravated<br>By exposure.) |                                                                                                                                                                                                           |
|                                                                                                         | 12. ECOLOGICAL INFORMATION ====================================                                                                                                                                           |
|                                                                                                         | BIODEGRADABILITY DOES NOT APPLY TO INURGANIC<br>Substances. No other data available.                                                                                                                      |
|                                                                                                         | YO HE LUDU (BLUEGILL SUNFISH) = SUU-SEU MUTL                                                                                                                                                              |

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To: C. E. NATCO CO.

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From: P.B. & S. Safety

3-15-99 9:56am p.5 of 7

| 477     -19 -6       U.S./CANADA VERSION     EFFECTIVE: 02/13/97     PRINTED: 03/12/97       WASTE DISPOSAL METHOD:     13. DISPOSAL CONSIDERATIONS       WASTE DISPOSAL METHOD:     SALVACE AS MUCH MATERIAL AS POSSIBLE AND RETURN<br>TO PRODEES IN CONFIDENTIAL IN PROBLEM. DISPOSE IN AN APPROVED LANDFILL IN<br>ACCOMPANCE WITH ACCEPTED COVERNMENTAL<br>REGULATIONS.       DOT PROPER SHIPPING NAME. I<br>SODIUM CARBONATE<br>IATA                                                                                                                                                                                                                                                                                                                                                                                                                                             | MATERIAL SAFETY DATA                                                                                                                                                                                                     | SODIUM CARBONATE FMC                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IS. DISPOSAL CONSIDERATIONS         NASTE DISPOSAL METHOD         SALVAGE AS NUCH MATERIAL AS POSSIBLE AND RETURN<br>TO PROCESS IF CONTAMINATION DOES NOT PRESENT A<br>PROBLEM. DISPOSE IN A APPROVED LANDFILL IN<br>ACCORDANCE WITH ACCEPTED GOVERNMENTAL<br>REGULATIONS.         DOT PROPER SHIPPING NAME.         SODIUM CARBONATE<br>INDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                         |
| WASTE DISPOSAL METHOD:       SALVAGE AS MUCH MATERIAL AS POSSIBLE AND RETURN<br>TO PROCESS IF CONTAMINATION DOES MOT PRESENT A<br>PROBLEM. DISPOSE IN AN APPROVED LANDFILL IN<br>ACCORDANCE WITH ACCEPTED GOVERNMENTAL         DOT PROPER SHIPPING NAME.       SUDIUM CARBONATE         DATA       SUDIUM CARBONATE         NOT APPLICABLE       NOT APPLICABLE         DOT LABELS       NOT APPLICABLE         NOT APPLICABLE       NOT APPLICABLE         SUBSTANCE/RG | U.S./CANADA VERSION                                                                                                                                                                                                      | EFFECTIVE: 02/13/97 PRINTED: 03/12/97                                                                                                                                                                                                                                                                   |
| WASTE DISPOSAL METHOD:       SALVAGE AS MUCH MATERIAL AS POSSIBLE AND RETURN<br>TO PROCESS IF CONTAMINATION DOES MOT PRESENT A<br>PROBLEM. DISPOSE IN AN APPROVED LANDFILL IN<br>ACCORDANCE WITH ACCEPTED GOVERNMENTAL         DOT PROPER SHIPPING NAME.       SUDIUM CARBONATE         DATA       SUDIUM CARBONATE         NOT APPLICABLE       NOT APPLICABLE         DOT LABELS       NOT APPLICABLE         NOT APPLICABLE       NOT APPLICABLE         SUBSTANCE/RG |                                                                                                                                                                                                                          | 13. DIBPOSAL CONSIDERATIONS ####################################                                                                                                                                                                                                                                        |
| DUT PROPER SHIPPING NAME.<br>IATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                          | SALVAGE AS MUCH MATERIAL AS POSSIBLE AND RETURN<br>TO PROCESS IF CONTAMINATION DOES NOT PRESENT A<br>PROBLEM. DISPOSE IN AN APPROVED LANDFILL IN<br>ACCORDANCE WITH ACCEPTED GOVERNMENTAL                                                                                                               |
| INTAPLICABLE<br>INDG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 별 및 및 및 및 및 및 및 및 및 및 및 및 및 및 및 및 및 및 및                                                                                                                                                                                  | 14. TRANSPORT INFORMATION ********************                                                                                                                                                                                                                                                          |
| OSHA         EXPOSURE LIMITE         SUBSTANCE(S)         OSHA         PEL-TWA         NOT APPLICABLE         NOT APPLICABLE         STEL         NOT APPLICABLE         SKIN DESIGNATION.:         NOT APPLICABLE         STEL         NOT APPLICABLE         STEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | IATA<br>IMDG<br>DOT CLASSIFICATION<br>DOT LABELS<br>DOT MARKING<br>DOT PLACARD<br>UN NUMBER<br>HAZARDOUS SUBSTANCE/RQ<br>49 STCC NUMBER<br>PRECAUTIONS TO BE TAKEN<br>IN TRANSPORTATION<br>OTHER SHIPPING<br>INFORMATION | NOT APPLICABLE<br>NOT APPLICABLE<br>NON HAZARDOUS<br>NOT APPLICABLE<br>NOT APPLICABLE<br>NOT APPLICABLE<br>NOT APPLICABLE<br>NOT APPLICABLE<br>SWEEP UP, RETURN TO CONTAINER AND MARK AS WASTE<br>FOR DISPOSAL.<br>SODIUM CARBONATE IS GENERALY REGARDED AS SAFE,<br>(GRAS) WHEN USED WITH CURRENT GODD |
| EXPOSURE LIMITS         SUBSTANCE(S)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ***********                                                                                                                                                                                                              | 15. REGULATORY INFORMATION EDGESESSESSESSESSESSES                                                                                                                                                                                                                                                       |
| (CONTINUED) PAGE 05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | EXPOSURE LINITS<br>SUBSTANCE(S)                                                                                                                                                                                          | NOT APPLICABLE<br>NOT APPLICABLE<br>NOT APPLICABLE<br>NOT APPLICABLE<br>NOT APPLICABLE<br>NOT APPLICABLE<br>EYE<br>NO<br>NO<br>NO<br>NO<br>NO<br>NO<br>NO<br>NO<br>NO<br>APPLICABLE<br>NOT APPLICABLE<br>NOT APPLICABLE                                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                          | (CONTINUED) PAGE 05                                                                                                                                                                                                                                                                                     |

| To: C. E. NATCO CO.                                    | From: P.B. & S. Safety 3-15-99 9:57am p. 6 of 7                                                | )      |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------|--------|
| MATERIAL SAFETY DATA                                   | SODIUM CARBONATE FMC                                                                           | م      |
|                                                        | 497 -19 -8                                                                                     | Sec. 1 |
| U.S./CANADA VERSION                                    | EFFECTIVE: 02/13/97 PRINTED: 03/13/87                                                          |        |
|                                                        | PRINTED: 02/13/97 PRINTED: 03/12/97                                                            |        |
|                                                        | 15. REGULATORY INFORMATION ====================================                                |        |
| UNLISTED SUBSTANCE(S)                                  | NOT APPLICABLE                                                                                 |        |
|                                                        | NOT APPLICABLE                                                                                 |        |
| CHARACTERISTIC:<br>RCRA WASTE NO                       | NUT APPLICABLE                                                                                 |        |
| SARA TITLE III SEC 313                                 |                                                                                                |        |
| (40 CFR 372)                                           |                                                                                                |        |
| LISTED TOXIC CHEMICAL:<br>INVENTORY REPORTING          | NOT LISTED                                                                                     |        |
| SABA, IITLE III. SEC 311/312                           |                                                                                                |        |
| i oncento criccorragana i                              | INTEDIALE (ACUTE) WEATTH WATARD (TRANSPORT                                                     |        |
| PLANNING THRESHOLD                                     | 10,000 POUNDS                                                                                  |        |
| SARA TITLE III SEC 302-303                             |                                                                                                |        |
| (40 CFR 355)                                           |                                                                                                |        |
| LISTED SUBSTANCE(S);<br>RQ;                            | NOT APPLICABLE                                                                                 |        |
| PLANNING THRESHOLD                                     | NOT APPLICABLE                                                                                 |        |
| U.S. TSCA STATUS                                       | LISTED                                                                                         |        |
| CANADA                                                 |                                                                                                |        |
| INGREDIENT DISCLOSURE LIST                             |                                                                                                | ÷      |
| SUBSTANCE(S)                                           | YER                                                                                            | `      |
| HAZARD SYMBOLS                                         | TOXIC                                                                                          |        |
| CLASS & DIVISION                                       | CLASE D, DIVISION 2, SUBDIVISION B.                                                            |        |
| PRODUCT IDENTIFICATION NO:<br>DOMESTIC SUBSTANCE LIST: | NUT APPLICABLE                                                                                 | •      |
| CEPA PRIORITY LIST                                     | NOT LISTED                                                                                     |        |
| CARCINDGENICITY                                        |                                                                                                | •      |
| ACGIH APPENDIX A                                       | NOT LISTED                                                                                     |        |
| A1 - SUSPECTED HUMAN                                   | NOT LISTED                                                                                     |        |
| LARC GROUP 1 OR 2                                      | NO                                                                                             |        |
| LABEL LANGUAGE (US/CANADA)                             |                                                                                                |        |
|                                                        | DUST MAY CAUSE BEVERE IRRITATION OF EYES AND<br>SLIGHT IRRITATION OF NOSE AND THROAT, REPEATED |        |
|                                                        | CONTACT MAY CAUSE REDNERR AND DRY, CRACKED OFTAL                                               |        |
| CHIGIGHGESSESSESSESSESSESSESSESSESSESSESSESSESS        | NUT APPLICABLE                                                                                 |        |
| HANDLING AND STORAGE                                   | DO NOT STORE CLOSE TO ACIDS. WEAR EYE                                                          |        |
| I                                                      | PROTECTION AND APPROVED DUST RESPIRATOR WHEN<br>Excessive dust is present,                     |        |
| FIRST AID                                              | IN CASE OF CONTACT, IMMEDIATELY FLUSH EVER WITH                                                |        |
| 1 1                                                    | WATER FOR AT LEAST 15 MINUTES. IF IRRITATION                                                   |        |
|                                                        | PERSISTS, OBTAIN MEDICAL ATTENTION, FLUSH SKIN<br>WITH WATER,                                  |        |
| STATE REGULATIONS                                      | CALIFORNIA PROPOSITION 65; SAFE WATER AND TOXIC                                                |        |
|                                                        | ENFORCEMENT ACT OF 1986, THE FOLLOWING CHEMICALS                                               |        |
|                                                        | HAVE BEEN DETECTED.                                                                            | No.    |
|                                                        | (CONTINUED) PAGE 06                                                                            |        |
|                                                        |                                                                                                |        |

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To: C. E. NATCO CO.

From: P.B. & S. Safety

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-FMC MATERIAL SAFETY DATA SODIUM CARBONATE 497 -19 -8 U.S./CANADA VERSION EFFECTIVE: 02/13/97 PRINTED: 03/12/97 NEWARRANSER WEREARCHARDED 13. REGULATORY INFORMATION AND ADDRESS AND AD ARBENIC, PPM AS AS203 = 0.03 TOTAL CHROMIUM, PPH CR = 0.03 LEAD, PPM PB.... = <1 CADMIUM, PPM CD..... = <0.1 ALL OTHER LISTED CHEMICALS ARE NOT DETECTED OR NOT SUSPECTED TO BE PRESENT. AREALEREDAREEREDAREERED 16. OTHER INFORMATION PREMERREDAREERED PRESERVATE CHEMICALS AND CARBONATE CHEMICALS MANUFACTURE, PULP AND PAPER, BRINE TREATMENT, WATER HARDNESS REMOVAL, PH ADJUSTMENT IN WATER OR WASTE WATER, FLUE GAS DESULFURIZATION, COAL TREATMENT, ION EXCHANGE RESIN REGENERATION. NFPA 704 FLAMMABILITY ...... 0 SPECIAL HAZARD ..... 1 0 (DEGREE OF HAZARD 0 = NO HAZARD 4 = SEVERE HAZARD) HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS) REACTIVITY:..... 0 PERSONAL PROTECTION (SAFETY GOGGLES, GLOVES, APRON AND VAPOR RESPIRATOR) THIS CHEMICAL IS CERTIFIED TO ANSI/NSF STANDARD 50, DRINKING WATER TREATMENT CHEMICALS-HEALTH EFFECTS. THE MAXIMUM DOSAGE LEVEL FOR THIS CHENICAL 19 150 MG/L. \*\*\*\*\*\*\* THE CONTENTS AND FORMAT OF THIS MODS ARE IN ACCORDANCE WITH OSHA HAZARD COMMUNICATION AND CANADA'S WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS). PAGE 07

# Safety data for behenic acid

# General

Synonyms: docosanoic acid Molecular formula:  $C_{22} H_{44} O_2$ CAS No: 112-85-6 EINECS No: 204-010-8

# **Physical data**

Appearance: white to cream crystals or powder Melting point: 74-78 C Boiling point: Vapour density: Vapour pressure: Density (g cm<sup>-3</sup>): Flash point: Explosion limits: Autoignition temperature: Water solubility: insoluble

# Stability

Stable. Combustible. Incompatible with bases, oxidizing agents, reducing agents.

# Toxicology

Avoid breathing dust. Eye, skin and respiratory irritant. Toxicology not fully investigated.

Risk phrases R36 R37 R38.

# **Transport information**

Non-hazardous for road, sea and air freight.

# Personal protection

Minimize contact.

Safety phrases S22 S24 S25 S26 S36. ....

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[Return to Physical & Theoretical Chemistry Lab. Safety home page.]

This information was last updated on August 3, 2000. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.





# American International Chemical, Inc.

17 Strathmore Road, Natick, MA 01760 (800) 238-0001 (508) 655-5805 FAX (508) 655-0927 Web Site: www.aicma.com Email: <u>info@aicma.com</u>

# MATERIAL SAFETY DATA SHEET

# SULFAMIC ACID

# SECTION 1 - CHEMICAL PRODUCT AND COMPANY INFORMATION

| American International Chemical, Inc.<br>17 Strathmore Read | Emergency Number: Chemtrec       | 800-424-9300 |
|-------------------------------------------------------------|----------------------------------|--------------|
| Madel Back comes                                            | Information Number: 800-238-0001 | 703-527-3887 |

Date: October 1, 2001

Synonyms: Amidosulfonic Acid

CAS # 5329-14-6

DOT Hazard Class: Corrosive UN 2967

# SECTION 2 - COMPOSITION AND INFORMATION ON INGREDIENTS

Sulfamic Acid 99,5% min.

# SECTION 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Odorless, white granules that are corrosive. Can cause burns and harmful if swallowed or inhaled.

POTENTIAL HEALTH EFFECTS Eye & Skin: Can cause severe irritation. Inhalation: Will cause severe irritation to the upper respiratory tract. Ingestion: Can cause severe burns to the mouth, throat and stomach.

CARCINOGENICITY: Not listed under OSHA, IARC, or NTP.

# SECTION 4 - FIRST AID MEASURES

Eye: Flush with plenty of water for at least 15 minutes. Skia: Wash off with plenty of water. Remove any contaminated clothing. Inhalation: Remove to the fresh air. Give artificial respiration if necessary. Ingestion: Dilute with water, milk or Milk of Magnesia. Call a physician. Sulfamic Acid

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# In All Of The Above: Consult a physician if symptoms persist.

# SECTION 5 - FIRE FIGHTING MEASURES

Flash Point: Non Flammable

Flammable Limits: Not Applicable

Extinguishing Media: Foam

Special Fire Fighting Procedures:

Do not use water since it forms solutions which are strongly acidic. Use self contained breathing apparatus. Decomposes above 209°C forming toxic fumes.

Unusual Fire Explosion Hazard: None Known

Auto Ignition Temperature: Not Applicable

### SECTION 6 - ACCIDENTAL RELEASE MEASURES

Isolate hazard area and deny entry to unnecessary or unprotected personnel. Contain spill, sweep up, collect and place in a disposal container. Avoid runoff into sewers and ditches which lead to waterways. Do not use water since it will make strong acidic solutions.

#### SECTION 7 - HANDLING AND STORAGE

Avoid contact with skin, eyes and clothing. Avoid breathing dust. Use normal personal hygiene and housekeeping. Store in cool dry area away from other incompatible materials. Product is slightly hydroscopic and should be stored in a dry area to prevent moisture pick up and caking.

#### SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

RESPIRATORY PROTECTION: Use NIOSH/MSHA approved respiratore.

VENTILATION REQUIREMENTS: Ventilate as necessary to eliminate dust from the work area.

#### SKIN AND EYE PROTECTION:

Use rubber or neoprene gloves, chemical goggles and clothing sufficient to protect skin from dust.

#### WORK, HYGIENIC PRACTICES:

As required to protect skin and eyes from dust, safety showers and/or eye wash should be available. Do not leave food or smoke in work area. Wash thoroughly and remove or clean any contaminated clothing.

EXPOSURE LIMITS: None Established

Sulfamic Acid

Page 2 of 4

F.OF Wednesday, February 16. 2005

#### SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: 209°C or 408°F

Vapor Pressure (MM Hg): Not Applicable

Vapor Density (AIR=1): Not Applicable

Specific Gravity (H20=1): 2.11

Bulk Density: 1.2 - 1.5 g/cc

Percent Volatile by Volume (%): Not Applicable

Melting Point: 205°C or 401°F

Evaporation Rate (Butyl Acetate=1): Not Applicable

Solubility in Water: Appreciable 18% WT @ 20°C and 43% by WT @ 70°C

pH: 1.2 (1% solution)

#### SECTION 10 - STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable under normal temperatures and pressures.

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

HAZARDOUS DECOMPOSITION PRODUCTS: Sulfur trioxide, sulfur dioxide, nitrogen and ammonia.

KEEP AWAY FROM: Oxidizers, strong bases, alkalis, nitrates, nitrites, carbonates, sulfides and cyanides.

#### SECTION 11 - TOXICOLOGICAL INFORMATION

ORAL RAT LDss 3160mg/kg

#### SECTION 12 - ECOLOGICAL INFORMATION

Not available

#### SECTION 13 - DISPOSAL CONSIDERATIONS

Sulfamic Acid

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Dispose of in accordance with all federal, state and local regulations.

RCRA WASTE #: Not Listed

### SECTION 14 - TRANSPORTATION INFORMATION

| TECHNICAL SHIPPING NAME: |                                            |
|--------------------------|--------------------------------------------|
| D.O.T. HAZARD CLASS:     | Corrosive                                  |
| U.N.N.A. NUMBER          | 2967                                       |
| PRODUCT RQ (lbs.)        | None                                       |
| D.O.T. LABEL             |                                            |
| D.O.T. FLACARD           | Companie Acta, UN 2907, Class 8, UNDUP III |
| PRODUCT LABEL            |                                            |

### SECTION 15 - REGULATORY INFORMATION

TSCA (TOXIC SUBSTANCE CONTROL ACT): This product is listed on the TSCA Inventory.

#### SARA TITLE III INFORMATION:

Section 302 Extremely hazardous Substance: Unlisted

Section 313 Toxic Chemicals: Unlisted

Section 311/312 Hazard Category: Immediate (acute) Health Hazard.

### SECTION 16 - OTHER INFORMATION

Reason for Issue. Updated date

This information is given without any warranty or representation. It is believed to be correct but does not claim to be all inclusive and shall be used only as a guide. American International Chemical, Inc., shall not be held liable for any damage resulting from handling or contact with the above product. It is offered solely for your consideration, investigation sud verification.

Sulfamic Acid

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#### MATERIAL SAFETY DATA SHEET INDEX WASTE WATER TREATMENT PLANT

Calsoft LAS-99 **ChemTreat FO-620 ChemTreat P-835E ChemTreat P-845E ChemTreat P-890L** ChemTreat CT-9004 Citranox . **Citric Acid Solution Dry Alum Ferric Chloride Solution Sodium Hypochlorite Solution Prestochlor Calcium Hypochlorite Granules** Liquid Caustic Soda, 50% Nalco 8103 Plus Phosphoric Acid 75-80% By Weight **Polarographic D.O. Probe Electrolyte Solution** Sodium Carbonate, Anhydrous **Sodium Metabisulfite** Sodium Tripolyphosphate Anhydrous **Urea Prill XLT IND** 

\*

Scan in +lakel "MSTJS: - WWI?"

#### Effective Date: 03/15/94

#### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION Product Name: CALSOFT<sup>®</sup> LAS-99

Chemical or Common Name:

Benzenesulfonic acid, C10-16-alkyl derivs.; Dodecylbenzene sulfonic acid.

Pilot Chemical Company 11756 Burke Street Santa Fe Springs, CA U.S.A. Emergency Phone No. 1-562-945-1867 (8 - 4 Pacific Time) CHEMTREC: 1-800-424-9300

#### 2. COMPOSITION/INFORMATION ON INGREDIENTS

| Component:                        | CAS#:      | Exposure Limits:              | Wt.%: |
|-----------------------------------|------------|-------------------------------|-------|
| C10-16-alkylbenzene sulfonic acid | 68584-22-5 | Unknown                       | 97    |
| Benzene, C10-16-Alkyl derivs.     | 68648-87-3 | Unknown                       | 1     |
| Sulfuric Acid                     | 7664-93-9  | 1mg/m <sup>3</sup> TWA (OSHA) | 1     |
| Sulfur Dioxide                    | 7446-09-5  | 2ppm TWA (ACGIH)              | 0.1   |

#### 3. HAZARDS INFORMATION:

EMERGENCY OVERVIEW: LAS-99 is a strong and irritating organic acid. Avoid contact with skin or eyes, may cause burns. Do not swallow. Breathing of vapors may cause sickness, sneezing, or irritation to the nose, throat, and lungs. Persons with skin allergies or respiratory problems should avoid contact.

#### Potential Health Effects:

EYE: Contact with the eyes will cause irritation, reddening, and possible chemical burns. If not removed immediately may result in injury to eyes.

SKIN: Contact with the skin will cause a gradual burning feeling resulting in irritation, reddening and possible chemical burns.

INGESTION: Swallowing material may cause burning feeling resulting in irritation, redding and possible chemical burns to the mouth, throat, and mucous membrane. Material may cause sickness and upset stomach.

INHALATION: Breathing of SO<sub>2</sub> vapors may cause sneezing, or irritation to the nose, throat, and lungs.

CHRONIC INFORMATION: Non-Carcinogenic, otherwise unknown Hazard Type: Corrosive Liquid

#### 4. FIRST AID MEASURES:

Eye Contact: Wash eyes immediately with running water, including under the eyelids for 15 minutes. Get immediate medical attention.

Skin Contact: Wash area with running water for 5 to 10 minutes. Contaminated clothing should be washed before reuse.

Ingestion (Swallowing): Give 2 to 3 cups of dilute sodium carbonate or bicarbonate solution to drink, do not induce vomiting. Seek medical assistance.

Inhalation (Breathing): Move away from vapors to fresh air source. Rest until normal breathing is restored. If breathing has stopped, administer artificial respiration and oxygen. Seek medical assistance.

Code Nos.: 4000

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Effective Date: 03/15/94

Revision Date: 05/25/04 Page 2 of 4

Product Name:

### CALSOFT<sup>®</sup> LAS-99

#### 5. FIRE FIGHTING MEASURES:

FLAMMABLE PROPERTIES: FlashPoint: > 300°C. T.O.C.

HAZARDOUS COMBUSTION PRODUCTS: Product burns to form oxides of carbon (CO, CO<sub>2</sub>), sulfur containing hydrocarbons, hydrocarbons and soot.

FIRE FIGHTING INSTRUCTIONS:

Extinguishing Media: Water, foam, CO<sub>2</sub>, or dry chemical.

Fire Fighting Procedures: Cool the material with water. It burns only when hot. Fire & Explosion Hazards: None

### USE SELF-CONTAINED BREATHING APPARATUS!

#### 6. ACCIDENTAL RELEASE MEASURES:

#### **CAUTION - MATERIAL IS SLIPPERY ON WET & HARD SURFACES**

SMALL SPILL: <u>Steps to be taken in case material is leaked or spilled</u>; Recover all usable material. Soak up balance with sand or dirt. May be neutralized with soda ash, TSP, or bicarbonate of soda.

LARGE SPILL: In case of large spill by truck or rail car, call CHEMTREC 1-800-424-9300.

#### 7. HANDLING AND STORAGE:

HANDLING: Spilled material is slippery on walkways and highways. Foams profusely when hit with a stream of water. See section #8 for personal protection equipment. STORAGE: Store in iron, stainless steel, or acid resistant Fiberglas tanks.

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

ENGINEERING CONTROLS: Mechanical ventilation recommended if personnel would be working in a confined space with open containers or in direct exposure to the material. RESPIRATORY PROTECTION: Avoid breathing vapors as they are irritating (sulfur dioxide). A NIOSH approved acid gas respirator should be used if vapors are unavoidable. SKIN PROTECTION: Chemical resistant gloves, long sleeved shirt, long trousers, chemical resistant boots.

EYE PROTECTION: Safety glasses or goggles and full face-shield.

#### 9. PHYSICAL AND CHEMICAL PROPERTIES:

Boiling Point: Vapor Pressure: Vapor Density (Air=1) % Volatile by Volume: Evaporation Rate: pH of Liquid, Typical: Solubility in Water: Specific Gravity: Liquid Density: Appearance: Odor: >572°F (300°C)
15 mm Hg @ 25°C; 39 mm Hg @ 90°C.
Not applicable.
<0.5
Unknown
<2.0
Soluble in all proportions, may gel.
1.06
8.8 Lbs/Gal.
Clear to slightly hazy brown liquid.
Sharp sulfur dioxide odor.</pre>

Code Nos.: 4000

Effective Date: 03/15/94

Product Name:

#### CALSOFT<sup>®</sup> LAS-99

### 10. STABILITY AND REACTIVITY:

Stability: Stable at normal temperatures and pressures.

Conditions to Avoid: Product is a corrosive acid if mixed with water. Product generates heat with alkaline materials.

Incompatibility: Alkalis

Hazardous Decomposition: None

Hazardous Polymerization: Will not occur.

#### 11. TOXICOLOGICAL INFORMATION:

SKIN: Non sensitizing

INGESTION: Oral Mus LD<sub>50</sub>: 1407 mg/Kg

INHALATION: Unknown for product.

Sulfuric Acid 1mg/m<sup>3</sup> TWA (OSHA)

Sulfur Dioxide 2ppm TWA (ACGIH)

#### SUBCHRONIC: Unknown

CHRONIC/CARCINOGENICITY: Calsoft<sup>®</sup> LAS-99 is non-carcinogenic. Prolonged and repeated contact will cause deoiling of the skin resulting in inflammation, rashes or dermatitis.

TERATOLOGY, REPRODUCTION, MUTAGENICITY: Negative

#### 12. ECOLOGICAL INFORMATION:

ECOTOXICOLOGICAL INFORMATION: Unknown

CHEMICAL FATE INFORMATION: Material totally biodegrades under aerobic conditions of secondary wastewater treatment systems. The rate of biodegradation is comparable to the rate of many naturally occurring materials such as glucose sugar, amino acids and plant fiber (cellulose).

#### 13. DISPOSAL CONSIDERATIONS:

<u>Waste Disposal Method:</u> Product is biodegradable. Haul to approved sanitary landfill or dump in compliance with federal, state or providential, and local regulations. Wash away residue with lots of water to plant or municipal wastewater treatment systems. If neutralized, may be disposed of as non-hazardous.

#### 14. TRANSPORTATION INFORMATION:

Proper Shipping Name: Aryl sulphonic acid, liquid. DOT Hazard Class: Corrosive Liquid UN 2586; 8 EPA Reportable Quantity: 1000 Lbs; Packaging Group: PG III Marine Pollutant if shipped in totes, bulk, or on vessels. (Dodecylbenzene Sulfonic Acid).

#### 15. REGULATORY INFORMATION:

#### FEDERAL EPA

#### TSCA STATUS:

All chemicals contained in this product are on the TSCA Chemical Substance Inventory.

Code Nos.: 4000

Revision Date: 05/25/04 Page 4 of 4

Product Name:

CALSOFT<sup>®</sup> LAS-99

### 15. REGULATORY INFORMATION (Continued): FEDERAL EPA (Continued)

#### **CERCLA:**

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center of release of quantities of Hazardous Substances equal to or greater than the reportable quantities (RQs) in 40 CFR 302.4.

Components present in this product at a level which could require reporting under the statute are:

| Chemical:                    | CAS#:      | Concentration %: | RQ (lbs): |
|------------------------------|------------|------------------|-----------|
| Dodecylbenzene sulfonic acid | 27176-87-0 | 31               | 1000      |
| Sulfuric Acid                | 7664-93-9  | 1.50             | 1000      |
| Sulfur Dioxide               | 7446-09-5  | 0.10             | 500       |

Sulfuric acid and sulfur dioxide are identified as EXTREMELY HAZARDOUS SUBSTANCES under SARA Title III, Section 302.

#### SARA Title III - Sections 313

Sulfuric acid is identified as a TOXIC CHEMICAL, but is not subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372, because it is in a non-acrosol form.

#### **INTERNATIONAL REGULATIONS**

Global Status: Canada - DSL; EEC - EINECS; Japan- HNCS; Korean - ECL; Australia - AICS; China- IECSC, listed on all inventories.

#### \*\*\*\*\*\*

#### STATE RIGHT-TO-KNOW

CALIFORNIA Proposition 65: No substance present. MASSACHUSETTS Right-To-Know, Substance List (MSL): See CERCLA Information. NEW JERSEY Right-to-Know: See Section 2. PENNSYLVANIA Right-To-Know: See CERCLA information.

#### 16. OTHER INFORMATION:

NFPA Ratings: Health (2) = Hazardous, Use breathing apparatus;

Flammability (1) = Must be preheated to burn; Reactivity (0) = Normally stable. HIMS: H2-F1-R0-PH

This data sheet is for information purposes only and is accurate to best of Pilot Chemical Company's knowledge. The manufacture makes no warranties, expressed or implied, as to the accuracy, completeness, or adequacy of the information contained therein.

Prepared By, B.F. Cruickshank

Revised By: B.F. Cnuickshank

Code Nos.: 4000





**ChemTreat FO-620** 

## Section 1. Chemical Product and Company Identification

Product Name: Manufacturer's Name: Emergency Telephone Number: Address (Corporate Headquarters) Telephone Number for Information: Date of MSDS:

ChemTreat, Inc. (800) 424-9300 4461 Cox Road, Gien Allen, VA 23060 (800) 648-4579 April 8, 2004

### Section 2. Composition/Hazardous Ingredients

| Component      | CAS Registry # | Wt. % |
|----------------|----------------|-------|
| Naphthenic oil | 67254-74-5     | < 92  |

### Section 3. Hazards Identification

Emergency Overview: Milky straw colored liquid; mild hydrocarbon odor; may cause skin and eye irritation.

**Potential Health Effects:** 

Eyes -Temporary irritation will occur.

Skin - Prolonged or repeated contact may cause dermatitis or irritation.

Inhalation - Irritation may occur in traches and lungs.

Ingestion: May cause diarrhea and/or irritation of exophagus.

Chronic Effects/Carcinogenicity: No information available.

### Section 4. First Aid Measures

**Inhalation:** If symptoms develop, remove victim to fresh air and get medical attention. If breathing has stopped, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

**Eyes:** Flush eyes with large amounts of water for until irritation subsides. If irritation persists, get medical attention.

Skin: Wash with large amounts of water. Use soap if available. If irritation persists, seek medical attention.

**Ingestion:** Do NOT induce vomiting. Get prompt medical attention. Never give anything by mouth to an unconscious person.

ChemTreat, Inc. FO-620 Page 1

## Section 5. Fire Fighting Measures

Flammable Properties: Flash point = > 250 F

Suitable Extinguishing Media: Use carbon dioxide, dry chemicals, water fog, or foam.

Fire & Explosion Hazards: None known.

**Protective Equipment:** If product is involved in a fire, wear full protective clothing including a positivepressure, NIOSH-approved, self-contained breathing apparatus.

### Section 6. Accidental Release Measures

Small Spill: Construct temporary dikes of dirt, sand, or any readily available inert material to prevent spreading of the material. Wearing appropriate personal protective equipment, move the leaking container to a containment area of plug the leak. Absorb on inert material, then shovel up and dispose of according to local, state, federal regulations.

Large Spill: Construct temporary dikes of dirt, sand, or any readily available inert material to prevent spreading of the product. Wearing appropriate personal protective equipment, close or cap valves and/or block or plug hold in leaking container and transfer to another container for proper disposal.

### Section 7. Handling and Storage

Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Avoid breathing mists. Do not ingest. Keep away from heat and open flame. Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations.

## Section 8. Exposure Controls/Personal Protection

Use protective equipment in accordance with 29 CFR 1910 Subpart I. Good general ventilation should be sufficient to control airborne jevels. Wear chemical splash goggles or safety glasses with full-face shield. Wear rubber gloves. Wasii them after each use and replace as necessary. If conditions warrant, wear impervious protective dolling such as boots, sprons, and coveralls to prevent skin contact. Maintain eyewash fountain and quick-drench facilities in work area.

### Section 9. Physical and Chemical Properties

Appearance: Milky straw colored, opaque Boiling Point > 212 F Evaporation Rate: N/D Freezing Point: 32 F Melting Point: N/D Molecular Weight: N/A Odor: Mild hydrocarbon pH: N/A

Physical state: Liquid dispersion Solubility in Water: Insoluble Specific Gravity: ~ 0.908 Vapor Density: N/D Vapor Pressure: N/D Viscosity: N/A % Volatile: 0

### Section 10. Stability and Reactivity

Chemical Stability: Stable at normal temperature and pressure.

ChemTreat, Inc. FO-620 Page 2 Incompatibility: Strong oxidizers Hazardous Decomposition Products: Carbon monoxide and asphyxiants Hazardous Polymerization: Will not occur

## Section 11. Toxicological Information

No information available

## Section 12. Ecological Information

Ceriodaphnia Dubia: Survival NOEC = 12.5 mg/L, LOEC = 25 mg/l; Reproduction NOEC = 6.25 mg/L, LOEC = 12.5 mg/L; Acute LC50 = 15.7 mg/L Fathead minnow: Acute LC50 = 1556.9 mg/L

### Section 13. Disposal Considerations

Incineration in accordance with applicable local, state, and federal regulations is the recommended disposal method. Supplemental fuel may be required. When the drum is empty, rinse with plenty of water before discarding.

## Section 14. Transport Information (not meant to be all inclusive)

D.O.T. Shipping Name: Not D.O.T. Regulated

## Section 15. Regulatory Information (Not meant to be all inclusive - selected regulation represented)

TSCA Status: All ingredients listed CERCLA Reportable Quantity: None SARA Title III: Section 302 Extremely Hazardous Substances: None Section 313 Toxic Chemicals: None

**CALIFORNIA PROPOSITION 65: None** 

## Section 16. Other Information

Hazard (NFPA) Rating: Health 1 Flammability 0 Reactivity 0

SARA Hazard Categories - Section 311/312 Acute - No Chronic - No Fire - No

Reactive - No

Sudden Release - No

Although the information and recommendations set forth herein (hereingher "Information") are presented in good faith and believed to be correct as of the date hereaf. ChemTreat, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ChemTreat, Inc. be responsible for dampes of any makine whatsoreer resulting from the use or reliance upon information. Inc. be responsible for dampes of any makine whatsoreer resulting from the use or reliance upon information. NO REPRESENTATION OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

Timoth H. Reid

**Director, Regulatory Affairs** 

ChemTreat, Inc. FO-620 Page 3





### Section 1. Chemical Product and Company Identification

Product Name: Manufacturer's Name: Emergency Telephone Number: Address (Corporate Headquarters) Telephone Number for Information: Date of MSDS: ChemTreat P-835E ChemTreat, Inc. (800) 424-9300 4461 Cox Road, Glen Allen, VA 23060 (800) 648-4579 April 21, 2003

## Section 2. Composition/Hazardous Ingredients

| Component                               | CAS Registry # | Wt. % |
|-----------------------------------------|----------------|-------|
| Petroleum distillate hydrotreated light | 64742-47-8     | 24    |
| Cationic polyacrylamide                 | Proprietary    | 40.7  |

### Section 3. Hazards Identification

Emergency Overview: White, viscous, opaque liquid; slight hydrocarbon odor. Potential Health Effects: Eyes – Causes minimal eye irritation. Skin – May be irritating to skin. Inhalation –May cause irritation of respiratory tract. Ingestion: May cause nausea.

**Chronic Effects/Carcinogenicity**: No applicable information was found on the long-term health effects of this product. Persons with pre-existing skin conditions may be more susceptible to the effects of this product. Overexposure to this product may cause irritation and/or burns to the skin.

## Section 4. First Aid Measures

**Inhalation:** Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-tomouth. If breathing is difficult, give oxygen.

**Eyes:** Immediately flush eyes with plenty of water. Get medical attention if irritation persists. **Skin:** Wash with soap and water. Get medical attention if irritation develops or persists. **Ingestion:** Get medical attention immediately.

## Section 5. Fire Fighting Measures

Flammable Properties: Flashpoint = > 200 F Suitable Extinguishing Media: Use water spray, carbon dioxide, or dry chemical.

> ChemTreat, Inc. P-835E Page 1

Fire & Explosion Hazards: Use water to keep container cool.

Protective Equipment: If product is involved in a fire, wear full protective clothing including a positive pressure, NIOSH-approved, self-contained breathing apparatus.

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## Section 6. Accidental Release Measures

**Small Spill:** Remove sources of ignition. Construct temporary dikes of dirt, sand, or any readily available inert material to prevent spreading of the material. Wearing appropriate personal protective equipment, move the leaking container to a containment area or plug the leak. Absorb on inert material, then shovel up and dispose of according to local, state, federal regulations. Spills of this material are very slippery.

Large Spill: Remove sources of ignition. Construct temporary dikes of dirt, sand, or any readily available inert material to prevent spreading of the product. Wearing appropriate personal protective equipment, close or cap valves and/or block or plug hold in leaking container and transfer to another container for proper disposal. Spills of this material are very slippery.

## Section 7. Handling and Storage

Keep away from oxidizers. Use with adequate ventilation. Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Avoid breathing mists. Do not ingest. Keep away from heat and open flame. Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations.

## Section 8. Exposure Controls/Personal Protection

Use protective equipment in accordance with 29 CFR 1910 Subpart I. Local exhaust ventilation should be sufficient to control airborne levels. Wear chemical splash goggles or safety glasses with full-face shield. Wear rubber gloves. Wash them after each use and replace as necessary. If conditions warrant, wear impervious protective clothing such as boots, aprons, and coveralls to prevent skin contact. Maintain eyewash fountain and quick-drench facilities in work area.

## Section 9. Physical and Chemical Properties

Appearance: White, viscous, opaque Boiling Point: N/A Evaporation Rate: N/A Freezing Point: 0 F Melting Point: N/A Molecular Weight: N/A Odor: Slight hydrocarbon pH: 4-6 Physical state: Liquid Solubility in Water: Appreciable Specific Gravity: ~ 1.044 Vapor Density: Similar to water Vapor Pressure: N/A Viscosity: N/A % Volatile: 60

## Section 10. Stability and Reactivity

Chemical Stability: Stable at normal temperatures and pressures Incompatibility: Strong oxidizing agents will react with metals, causing degradation.

> ChemTreat, Inc. P-835E Page 2

Hazardous Decomposition Products: Carbon oxides, nitrogen oxides, and ammonia hydrogen chloride vapor

Hazardous Polymerization: Will not occur

### Section 11. Toxicological Information

Petroleum distillate hydrotreated light: Oral LD50 (rat) = > 10 ml/kg; Dermal LD50 (rabbits) = > 10 ml/kg; TLV = 400 ppm OSHA TWA/Ceiling

## Section 12. Ecological Information

Fathead Minnow 96h LC50 = 5.815 mg/l; Ceriodaphnia Dubia 48h LC50 = 1.233 mg/l Sheepshead Minnow 96h LC50 = 117.5 mg/l; Mysid Shrimp 48h LC50 = 33.2 mg/l

## Section 13. Disposal Considerations

Dispose of in accordance with federal, state, and local regulations. Does not meet the criteria of a hazardous waste as described in 40 CFR 261.

### Section 14. Transport Information (not meant to be all inclusive)

D.O.T. Shipping Name: Not D.O.T. Regulated

### Section 15. Regulatory Information (Not meant to be all inclusive - selected regulation represented)

TSCA Status: All ingredients listed CERCLA Reportable Quantity: None SARA Title III:

Section 302 Extremely Hazardous Substances: None

Section 313 Toxic Chemicals: None

CALIFORNIA PROPOSITION 65: No

KOSHER – This product is certified by the Orthodox Union as kosher pareve. (IA) NSF – Certified to ANSI/NSF 60. Maximum use rate for potable water – 2 mg/L.

## Section 16. Other Information

Hazard (NFPA) Rating: Health 2 Flammability 0 Reactivity 0

SARA Hazard Categories - Section 311/312

Acute - Yes Chronic - No Fire - No Reactive - No Sudden Release - No

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, ChemTreat, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ChemTreat, Inc. be responsible for damages of any nature whatsoever resulting from the use or reliance upon information. NO REPRESENTATION OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OF ANY OTHER NATURE ARE MADE

NO REPRESENTATION OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

Timothy H. Reid

**Director**, Regulatory Affairs

ChemTreat, Inc. P-835E Page 3





## Section 1. Chemical Product and Company Identification

Product Name: Manufacturer's Name: Emergency Telephone Number: Address (Corporate Headquarters) Telephone Number for Information: Date of MSDS:

ChemTreat P-845E ChemTreat, Inc. (800) 424-9300 4461 Cox Road, Glen Allen, VA 23060 (800) 648-4579 April 21, 2003

## Section 2. Composition/Hazardous Ingredients

| Component                               | - | CAS Registry # | Wt. % |
|-----------------------------------------|---|----------------|-------|
| Petroleum distillate hydrotreated light |   | 064742-47-8    | 15-30 |

## Section 3. Hazards Identification

Emergency Overview: Grayish, milky, opaque liquid; amine odor. WARNING! Causes skin irritation and may cause eye irritation. Potential Health Effects: Eyes – Direct contact may cause mild eye irritation. Skin – Direct contact may cause skin irritation. Inhalation –No expected inhalation hazard. Ingestion: May irritate gastrointestinal tract. Chronic Effects/Carcinogenicity: None known.

### Section 4. First Aid Measures

Inhalation: Move to fresh air. Material is not expected to be harmful if inhaled. Eyes: Immediately flush eyes for 15 minutes with plenty of water. Call a physician. Skin: Flush skin with water. Remove contaminated clothing; wash before reuse. Ingestion: No information available.

## Section 5. Fire Fighting Measures

Flammable Properties: Flashpoint = > 213 F (PMCC) Suitable Extinguishing Media: Use water spray, carbon dioxide, or dry chemical. Fire & Explosion Hazards: Use water to keep containers cool.

> ChemTreat, Inc. P-845E Page 1

Protective Equipment: If product is involved in a fire, wear full protective clothing including a posit pressure, NIOSH-approved, self-contained breathing apparatus.

### Section 6. Accidental Release Measures

**Small Spill:** Construct temporary dikes of dirt, sand, or any readily available inert material to prevent spreading of the material. Wearing appropriate personal protective equipment, move the leaking container to a containment area or plug the leak. Absorb on inert material, then shovel up and dispose of according to local, state, federal regulations. Spills of this product are very slippery. Large Spill: Construct temporary dikes of dirt, sand, or any readily available inert material to prevent spreading of the product. Wearing appropriate personal protective equipment, close or cap valves and/or block or plug hold in leaking container and transfer to another container for proper disposal. Spills of this product are very slippery.

### Section 7. Handling and Storage

To avoid product degradation and equipment corrosion, do not use iron, copper, or aluminum containers or equipment. OSHA regulations (29 CFR 106.a.14) require that the flashpoint of materials of this type be determined by the Pensky-Martens Closed Cup test method. The test for this product indicates it has a flashpoint greater than 200 F (93.3 C). Another method indicates a potential for flash at approximately 154 F (67.8 C); therefore, caution should be exercised in storage and handling. Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Avoid breathing mists. Do not ingest. Keep away from heat and open flame. Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations.

## Section 8. Exposure Controls/Personal Protection

Use protective equipment in accordance with 29 CFR 1910 Subpart I. Good enclosure and local exhaust ventilation should be sufficient to control airborne levels. Wear chemical splash goggles or safety glasses with full-face shield. Wear rubber gloves. Wash them after each use and replace as necessary. If conditions warrant, wear impervious protective clothing such as boots, aprons, and coveralls to prevent skin contact. Maintain eyewash fountain and quick-drench facilities in work area.

### Section 9. Physical and Chemical Properties

| Appearance: Grayish, milky, opaque | Physical state: Liquid                    |
|------------------------------------|-------------------------------------------|
| Boiling Point: 212 F               | Solubility in Water: Limited by viscosity |
| Evaporation Rate: N/A              | Specific Gravity: ~ 1.051                 |
| Freezing Point: 0 F                | Vapor Density: Similar to water           |
| Melting Point: N/A                 | Vapor Pressure: Similar to water          |
| Molecular Weight: N/D              | Viscosity: 2.3 min. (cps)                 |
| Odor: Amine                        | % Volatile: ~ 65-70                       |
| pH: N/A                            | Bulk Density: N/A                         |

## Section 10. Stability and Reactivity

Chemical Stability: Stable at normal temperatures and pressures

Incompatibility: The addition of lime or other alkaline substances may cause the release of amine compounds, which may have an objectionable odor. Avoid temperatures > 104 F (40 C) for long periods of time.

Hazardous Decomposition Products: May produce oxides of carbon, oxides of nitrogen, nitrogen, ammonia, and hydrochloric acid.

Hazardous Polymerization: Will not occur

### Section 11. Toxicological Information

Effects of Overexposure: This estimated acute oral (rat) LD50, acute dermal (rabbit) LD50, and 4 hour inhalation (rat) LC50 values for this material are > 5000 mg/kg, > 2000 mg/kg, and > 20 mg/l, respectively. Direct contact with the material can cause moderate skin and mild eye irritation. Acute overexposure to petroleum distillate vapors may cause eye and throat irritation. Certain petroleum distillate fractions may produce moderate to severe skin irritation with direct contact. Prolonged repeated exposure to petroleum distillate vapor may cause central nervous system damage as well as heart and blood disorders. The oral LD50 in the rat for various distillates ranges from 4.5 to > 25 ml/kg, and the inhalation LC50 in rats is about 15,000 ppm. Aspiration of petroleum distillate may cause chemical pneumonitis. Overexposure to vapor may cause dizziness, drowsiness, headache, and nausea.

### Section 12. Ecological Information

No aquatic LC50, BOD, or COD data available.

### Section 13. Disposal Considerations

Dispose of in accordance with local, state, and federal regulations.

## Section 14. Transport Information (not meant to be all inclusive)

D.O.T. Shipping Name: Not D.O.T. Regulated

### Section 15. Regulatory Information (Not meant to be all inclusive - selected regulation represented)

TSCA Status: All ingredients listed CERCLA Reportable Quantity: None SARA Title III: Section 302 Extremely Hazardous Substances: None Section 313 Toxic Chemicals: None CALIFORNIA PROPOSITION 65: None

### Section 16. Other Information

Hazard (NFPA) Rating: Health 2 Flammability 1 Reactivity 0

SARA Hazard Categories – Section 311/312 Acute – Yes Chronic – No Fire – No

Reactive - No

Sudden Release - No

ChemTreat, Inc. P-845E Page 3

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Timothy H. Reid

Director, Regulatory Affairs

ChemTreat, Inc. P-845E Page 4





### Section 1. Chemical Product and Company Identification

Product Name: Manufacturer's Name: Emergency Telephone Number: Address (Corporate Headquarters) Telephone Number for Information: Date of MSDS: ChemTreat P-890L ChemTreat, Inc. (800) 424-9300 4461 Cox Road, Glen Allen, VA 23060 (800) 648-4579 July 13, 2007

## Section 2. Composition/Hazardous Ingredients

| Component             | U | CAS Registry # | Wt. %   |
|-----------------------|---|----------------|---------|
| Polyaluminum chloride |   | 1327-41-9      | 15 - 40 |

## Section 3. Hazards Identification

Emergency Overview: Clear, colorless liquid; mild odor; not flammable.
Potential Health Effects:
Eyes – Irritating to eyes, possible severe.
Skin – May irritate skin.
Inhalation – Irritating to respiratory tract.
Ingestion – Harmful if ingested.
Chronic Effects/Carcinogenicity: No information available on significant long-term health effects.

### Section 4. First Aid Measures

**Inhalation:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

**Eyes:** Immediately flush eyes with plenty of water. Get medical attention if irritation persists. **Skin:** Flush skin with water for at least 15 minutes. Remove contaminated clothing; wash before reuse. If irritation develops or persists, call a physician.

**Ingestion:** If swallowed, do NOT induce vomiting. Give victim a glass of water or milk. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

## Section 5. Fire Fighting Measures

Flammable Properties: Not flammable.

Suitable Extinguishing Media: Use extinguishing media appropriate to surrounding fire. Fire & Explosion Hazards: None known.

ChemTreat, Inc. P-890L Page 1 **Protective Equipment:** If product is involved in a fire, wear full protective clothing including a positive-pressure, NIOSH-approved, self-contained breathing apparatus.

## Section 6. Accidental Release Measures

**Small Spill:** Construct temporary dikes of dirt, sand, or any readily available inert material to prevent spreading of the material. Wearing appropriate personal protective equipment, move the leaking container to a containment area or plug the leak. Absorb on inert material, then shovel up and dispose of according to local, state, federal regulations.

**Large Spill:** Construct temporary dikes of dirt, sand, or any readily available inert material to prevent spreading of the product. Wearing appropriate personal protective equipment, close or cap valves and/or block or plug hole in leaking container and transfer to another container for proper disposal.

## Section 7. Handling and Storage

Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Avoid breathing mists. Do not ingest. Keep away from heat and open flame. Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations.

## Section 8. Exposure Controls/Personal Protection

Use protective equipment in accordance with 29 CFR 1910 Subpart I. Good general ventilation should be sufficient to control airborne levels. Wear chemical splash goggles or safety glasses with full-face shield. Wear rubber gloves. Wash them after each use and replace as necessary. If conditions warrant, wear protective clothing such as boots, aprons, and coveralls to prevent skin contact. Maintain eyewash fountain and quick-drench facilities in work area.

## Section 9. Physical and Chemical Properties

Appearance: Clear, colorless Boiling Point: 220°F Evaporation Rate: N/A Freezing Point: 32°F Melting Point: N/A Molecular Weight: N/A Odor: Mild pH: ~ 2.7

Physical state: Liquid Solubility in Water: Miscible Specific Gravity: ~1.201 Vapor Density: N/A Vapor Pressure: N/A Viscosity: N/A % VOC:

## Section 10. Stability and Reactivity

Chemical Stability: Stable at normal temperatures and pressures Incompatibility: Bases, oxidizers Hazardous Decomposition Products: None known Hazardous Polymerization: Will not occur

## Section 11. Toxicological Information

Slightly toxic by ingestion. May be irritating to eyes and skin.

ChemTreat, Inc. P-890L Page 2

## Section 12. Ecological Information

This material is a water pollutant and should be prevented from contaminated soil or from entering sewage and drainage systems and bodies of water.

Sheepshead minnow 96h LC50 = > 1000 mg/l; Mysid Shrimp 48h LC50 = > 1000 mg/l; Fathead Minnow 96h LC50 = 230.4 mg/l

## Section 13. Disposal Considerations

This material is not considered to be a RCRA regulated waste. Dispose of in accordance with local, state, and federal regulations.

## Section 14. Transport Information (not meant to be all inclusive)

D.O.T. Shipping Name: Corrosive liquid, acidic, inorganic, n.o.s. D.O.T. Technical Name: Polyaluminum chloride D.O.T. Hazard Class: 8 (corrosive); UN/NA Number: UN3264; Packing Group: III

## Section 15. Regulatory Information (Not meant to be all inclusive - selected regulation represented)

TSCA Status: All ingredients listed CERCLA Reportable Quantity: None SARA Title III: Section 302 Extremely Hazardous Substances: None

Section 313 Toxic Chemicals: None CALIFORNIA PROPOSITION 65: None known.

NSF: Certified to NSF/ANSI 60 for use in potable water at a maximum use rate of 250 mg/L.

## Section 16. Other Information

| HMIS Hazard Rati | ng:             |                    |                   |
|------------------|-----------------|--------------------|-------------------|
| Health: 1        | Flammability: 0 | Physical Hazard: 0 | PPE: X (see note) |

Note: PPE rating depends on circumstances of use. See Section 8 for recommended PPE.

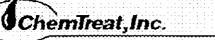
| SARA Hazard Cate | gories - Section 311, | /312 |               |                     |
|------------------|-----------------------|------|---------------|---------------------|
| Acute - Yes      |                       |      | Reactive – No | Sudden Release - No |

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ChemTreat, Inc. P-890L Page 3





## Section 1. Chemical Product and Company Identification

Product Name: Manufacturer's Name: Emergency Telephone Number: Address (Corporate Headquarters) Telephone Number for Information: Date of MSDS: **ChemTreat CT-9004** ChemTreat, Inc. (800) 424-9300 4461 Cox Road, Glen Allen, VA 23060 (800) 648-4579 March 9, 2004

## Section 2. Composition/Hazardous Ingredients

| Component                                 | CAS Registry # | Wt. %          |
|-------------------------------------------|----------------|----------------|
| 1-Hydroxyethylidene-1,1diphosphonic acid, |                |                |
| tetrapotassium salt                       | 14860-53-8     | 1 – 10         |
| Sodium polyacrylate                       | 9003-04-7      | 5 <b>- 2</b> 5 |
| Polyacrylate, copolymer                   | Proprietary    | 5 - 25         |

## Section 3. Hazards Identification

Emergency Overview: Straw colored liquid; mild odor. Not flammable.
Potential Health Effects:
Eyes - Irritating to eyes.
Skin - Irritating to skin.
Inhalation - Irritating to respiratory tract.
Ingestion: Low toxicity if ingested.
Chronic Effects/Carcinogenicity: No information available on significant long-term effects.

## Section 4. First Aid Measures

**Inhalation:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes, holding eyelids apart to ensure flushing of entire eye surface. Get medical attention if irritation persists. **Skin:** In case of contact, immediately wash with plenty of water while removing contaminated clothing. Wash and decontaminate clothing before reuse. Seek medical advice.

**Ingestion:** If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

ChemTreat, Inc. CT-9004 Page 1

## Section 5. Fire Fighting Measures

Flammable Properties: Not flammable

Suitable Extinguishing Media: Use extinguishing media appropriate to surrounding fire. Fire & Explosion Hazards: Keep containers cool with water spray to minimize the potential of decomposition.

Protective Equipment: If product is involved in a fire, wear full protective clothing including a positivepressure, NIOSH-approved, self-contained breathing apparatus.

## Section 6. Accidental Release Measures

**Small Spill:** Construct temporary dikes of dirt, sand, or any readily available inert material to prevent spreading of the material. Wearing appropriate personal protective equipment, move the leaking container to a containment area or plug the leak. Absorb on inert material, then shovel up and dispose of according to local, state, federal regulations.

Large Spill: Construct temporary dikes of dirt, sand, or any readily available inert material to prevent spreading of the product. Wearing appropriate personal protective equipment, close or cap valves and/or block or plug hold in leaking container and transfer to another container for proper disposal.

## Section 7. Handling and Storage

Keep away from food and drinking water. Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Use only in well ventilated area. Avoid breathing mists. Do not ingest. Store at ambient temperatures. Keep from freezing. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations. For industrial use only.

## Section 8. Exposure Controls/Personal Protection

Use protective equipment in accordance with 29 CFR 1910 Subpart I. Local exhaust ventilation should be sufficient to control airborne levels. Wear chemical splash goggles or safety glasses with full-face shield. Wear rubber gloves. Wash them after each use and replace as necessary. If conditions warrant, wear impervious protective clothing such as boots, aprons, and coveralls to prevent skin contact. Maintain eyewash fountain and quick-drench facilities in work area.

## Section 9. Physical and Chemical Properties

Appearance: Straw colored Boiling Point: 212°F Evaporation Rate: N/D Freezing Point: 32°F Melting Point: N/A Molecular Weight: N/A Odor: Mild pH: ~10.0

Physical state: Liquid Solubility in Water: Complete Specific Gravity: ~1.24 Vapor Density: Similar to water Vapor Pressure: Similar to water Viscosity: N/A % VOCs: ~64

> ChemTreat, Inc. CT-9004 Page 2

### Section 10. Stability and Reactivity

Chemical Stability: Stable at normal temperatures and pressures. Incompatibility: Strong acids. Hazardous Decomposition Products: Unknown. Hazardous Polymerization: Will not occur

### Section 11. Toxicological Information

Eyes, skin and inhalation - irritating; ingestion - low order of toxicity.

### Section 12. Ecological Information

Not tested.

### Section 13. Disposal Considerations

Dispose of in accordance with local, state, and federal regulations.

### Section 14. Transport Information (not meant to be all inclusive)

D.O.T. Shipping Name: Not D.O.T. Regulated

Section 15. Regulatory Information (Not meant to be all inclusive - selected regulation represented)

TSCA Status: All ingredients listed CERCLA Reportable Quantity: None

SARA Title III:

Section 302 Extremely Hazardous Substances: None

Section 313 Toxic Chemicals: None

CALIFORNIA PROPOSITION 65: None known.

### Section 16. Other Information

Hazard (NFPA) Rating: Health 1 Flammability 0 Reactivity 0

SARA Hazard Categories - Section 311/312 Acute - Yes Chronic - No Fire - No

Reactive - No

Sudden Release - No

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Timothy H. Reid

Director, Regulatory Affairs

ChemTreat, Inc. CT-9004 Page 3 msds\_citranox\_english\_osha

### CITRANOX MSDS

| Section 1 : MANUFACTURER INFORMATION    |                                                                       |  |
|-----------------------------------------|-----------------------------------------------------------------------|--|
| Supplier:                               | Same as manufacturer.                                                 |  |
| Manufacturer:                           | Alconox, Inc.<br>30 Glenn St.<br>Suite 309<br>White Plains, NY 10603. |  |
| Manufacturer emergency<br>phone number: | 800-255-3924.<br>813-248-0585 (outside of the United States).         |  |
| Manufacturer:                           | Alconox, Inc.<br>30 Glenn St.<br>Suite 309<br>White Plains, NY 10603. |  |
| Supplier MSDS date:                     | 2005/03/14                                                            |  |
| D.O.T. Classification:                  | Not regulated.                                                        |  |

| Section 2 : HAZARDOUS INGREDIENTS |                 |                 |        |                                                    |               |
|-----------------------------------|-----------------|-----------------|--------|----------------------------------------------------|---------------|
| C.A.S.                            | CONCENTRATION % | Ingredient Name | T.L.V. | LD/50                                              | LC/50         |
| 77-92-9                           | 10-30           | CITRIC ACID     |        | 3000 MG/KG<br>RAT ORAL<br>5040 MG/KG<br>MOUSE ORAL | NOT AVAILABLE |

| Section 3                                | : PHYSICAL / CHEMICAL CHARACTERISTICS |
|------------------------------------------|---------------------------------------|
| Physical state:                          | Liquid.                               |
| Appearance & odor:                       | Pale yellow.<br>Nearly odorless.      |
| Odor threshold (ppm):                    | Not available.                        |
| Vapour pressure<br>(mmHg):               |                                       |
| Vapour density (air=1):                  | >1                                    |
| <u>Volatiles (%)</u>                     |                                       |
| By volume:                               | Not available.                        |
| Evaporation rate<br>(butyl acetate = 1): | <1                                    |
| Boiling point (°C):                      | 103 (217F)                            |
| Freezing point (°C):                     | Not available.                        |
| pH:                                      | 2.5                                   |
| Specific gravity @ 20 °C:                | (water = 1).<br>1.12                  |
| Solubility in water (%):                 | Complete.                             |
| Coefficient of water\oil<br>dist.:       | Not available.                        |
| VOC:                                     | None                                  |

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| Section 4 : FIRE AND EXPLOSION HAZARD DATA |                                                                                                                                                         |  |  |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Flammability:                              | Not fiammable.                                                                                                                                          |  |  |
| Conditions of<br>flammability:             | Surrounding fire.                                                                                                                                       |  |  |
| Extinguishing media:                       | Carbon dioxide, dry chemical, foam.<br>Water<br>Water fog.                                                                                              |  |  |
| Special procedures:                        | Self-contained breathing apparatus required.<br>Firefighters should wear the usual protective gear.<br>Use water spray to cool fire exposed containers. |  |  |
| Auto-ignition<br>temperature:              | Not available.                                                                                                                                          |  |  |
| Flash point (°C),<br>method:               | None                                                                                                                                                    |  |  |
| Lower flammability<br>limit (% vol):       | Not applicable.                                                                                                                                         |  |  |
| Upper flammability<br>limit (% vol):       | Not applicable.                                                                                                                                         |  |  |
| Not available.                             |                                                                                                                                                         |  |  |
| Sensitivity to mechanical<br>impact:       | Not available.                                                                                                                                          |  |  |
| Hazardous combustion<br>products:          | Oxides of carbon (COx).<br>Hydrocarbons.<br>Oxygen.<br>Hydrogen.<br>Carbon.                                                                             |  |  |
| Rate of burning:                           | Not available.                                                                                                                                          |  |  |
| Evolosive nower                            | Containers may cupture if exposed to heat or fire.                                                                                                      |  |  |

Explosive power: Containers may rupture if exposed to heat or fire.

#### Section 5 : REACTIVITY DATA

Chemical stability: Product is stable under normal handling and storage conditions.

Conditions of instability: Extreme temperatures.

Hazardous polymerization: Will not occur.

Incompatible Strong alkalies. substances: Strong oxidizing agents.

-----

Hazardous See hazardous combustion products.

#### Section 6 : HEALTH HAZARD DATA

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of Acute <u>Exposure</u> Eye contact: Irritant. Skin contact: Slight irritation upon prolonged contact. Inhalation: May cause slight irritation. Ingestion: May cause vomiting and diarrhea. May cause gastric distress. Effects of chronic exposure: Contains an ingredient which may be corrosive.

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|                                               | > 5000 mg/kg rat orai.                                                                                                                                                  |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LC50 of product, species<br>& route:          | Not available.                                                                                                                                                          |
| Exposure limit of<br>material:                | Not available.                                                                                                                                                          |
| Sensitization to product:                     | Not available.                                                                                                                                                          |
| Carcinogenic effects:                         | Not listed as a carcinogen.                                                                                                                                             |
| Reproductive effects:                         | Not available.                                                                                                                                                          |
| Teratogenicity:                               | Not available.                                                                                                                                                          |
| Mutagenicity:                                 | Not available.                                                                                                                                                          |
| Synergistic materials:                        | Not available.                                                                                                                                                          |
| Medical conditions<br>aggravated by exposure: | Not available.                                                                                                                                                          |
| <u>First Aid</u>                              |                                                                                                                                                                         |
| Skin contact:                                 | Remove contaminated clothing.<br>Wash thoroughly with soap and water.<br>Seek medical attention if irritation persists.                                                 |
| Eye contact:                                  | Check for and remove contact lenses.<br>Flush eyes with clear, running water for 15 minutes while holding<br>eyelids open. If irritation persists, consult a physician. |
| Inhalation:                                   | Remove victim to fresh air.<br>If irritation persists, seek medical attention.                                                                                          |
| Ingestion:                                    | Do not induce vomiting, seek medical attention.<br>Dilute with two glasses of water.<br>Never give anything by mouth to an unconscious person.                          |
| Section 7 :                                   | PRECAUTIONS FOR SAFE HANDLING AND USE                                                                                                                                   |
| Leak/Spill:                                   | Contain the spill.                                                                                                                                                      |

| Leak/Spill:           | Contain the spill.<br>Prevent entry into drains, sewers, and other waterways.<br>Wear appropriate protective equipment.<br>Soak up with an absorbent material.<br>Place in appropriate container for disposal.<br>Flush residue or small spills to sanitary sewer.                                                               |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Waste disposal:       | In accordance with local and federal regulations.                                                                                                                                                                                                                                                                                |
|                       | Protect against physical damage.<br>Avoid breathing vapors/mists.<br>Wear personal protective equipment appropriate to task.<br>Wash thoroughly after handling.<br>Keep out of reach of children.<br>Avoid contact with skin, eyes and clothing.<br>Avoid extreme temperatures.<br>Launder contaminated clothing prior to reuse. |
| Storage requirements: | Store away from incompatible materials.<br>Keep containers closed when not in use.                                                                                                                                                                                                                                               |

#### Section 8 : CONTROL MEASURES

#### Precautionary Measures



Neoprene or rubber gloves.

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Respiratory/Type: None required under normal use. If exposed to misting. NIOSH approved respirator for vapours and mists. Eye/Type: Eye/Type: Chemical safety goggles with side-shields. Footwear/Type: Safety shoes per local regulations. Clothing/Type: As required to prevent skin contact. Other/Type: Eye wash facility should be in close proximity. Emergency shower should be in close proximity. Wentilation Local exhaust at points of emission. requirements: Ventilation should be corrosion-proof.

#### MS 01.25.01.03.04.0



**MATERIAL SAFETY DATA SHEET** 

Effective Date: December 13, 2004

### CITRIC ACID SOLUTION

### **SECTION I - MATERIAL IDENTIFICATION**

### MANUFACTURER'S NAME & ADDRESS: **BRENNTAG MID-SOUTH, INC.**

1405 Highway 136 West / Geneva Road Henderson, Kentucky 42420

CHEMICAL NAME AND SYNONYMS: Citric Acid Solution 1 to 51%

CHEMICAL FAMILY: organic acid

7732-18-5

FORMULA: C<sub>6</sub>H<sub>8</sub>O<sub>7</sub>

#### **SECTION II - HAZARDOUS INGREDIENTS** THRESHOLD LIMIT VALUES (UNITS) **ACGIH:** WT % **OSHA: CAS NUMBER** CHEMICAL NAME(S) PEL STEL TLY STEL Citric acid 1 - 51N.E. N.E. N.E. N.E. 77-92-9

Balance

\*\*This product does not contain any chemical (s) subject to reporting requirements of Section 313, Title III of SARA, Part 372.

Water

### **SECTION III - PHYSICAL DATA**

BOILING POINT °F (°C): >212°F(>100°C)

VAPOR DENSITY (AIR =1): 0.62

VAPOR PRESSURE (mmHg): 17.5 @ 20°C

SOLUBILITY IN WATER: Complete

SPECIFIC GRAVITY (H<sub>1</sub>O=1): 1.01 - 1.24

**EVAPORATION RATE:** (butyl acetate = 1): 0.33

FLAMMABLE LIMITS (% BY VOLUME): N.A.

PERCENT VOLATILE BY VOLUME (%): 49 - 99%

— NONE ESTABLISHED ---

APPEARANCE AND ODOR: Clear liquid with no odor.

### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): N.A.

EXTINGUISHING MEDIA: Use as appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should wear protective clothing including a self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Citric acid solution in contact with some metals may release explosive hydrogen gas.

(270) 830-1222

**EMERGENCY TELEPHONE NUMBER:** 



MATERIAL SAFETY DATA SHEET

Effective Date: December 13, 2004

### CITRIC ACID SOLUTION

### **SECTION V - HEALTH HAZARD DATA**

### **EFFECTS OF OVEREXPOSURE:**

INHALATION: Inhalation of mist or spray may cause irritation.

EYE CONTACT: May irritate eyes.

SKIN CONTACT: May irritate skin upon prolonged or repeated over-exposure.

**INGESTION:** None listed

PRIMARY ROUTES OF ENTRY: Inhalation, eyes and skin, ingestion. <u>CHEMICAL LISTED AS CARCINOGEN OR POTENTIAL CARCINOGEN</u>: <u>NTP</u>/No IARC/No OSHA/No

### **EMERGENCY AND FIRST AID PROCEDURES:**

INHALATION: Remove victim to fresh air. Give artificial respiration if not breathing. Get prompt medical attention.

EYE CONTACT: Flush eyes with plenty of water while holding eyelids open. Get prompt medical attention if irritation occurs.

SKIN CONTACT: Flush skin with plenty of water. Remove and wash contaminated clothing prior to reuse.

INGESTION: Seek medical attention.

### SECTION VI - TOXICOLOGICAL INFORMATION

For 100% Citric acid: (rat) Oral LD50 – 11,700 mg/kg Dermal (acute) – 500 mg/24 hr, moderate Eye – 750 mg/24 hr, severe

### SECTION VII - ECOLOGICAL INFORMATION

No information available

### **SECTION VIII - REACTIVITY DATA**

#### STABILITY: Stable

#### HAZARDOUS POLYMERIZATION: none

CONDITIONS TO AVOID: Avoid evaporating to dryness and generating dust.

**INCOMPATIBILITY (MATERIALS TO AVOID):** Metal nitrates, carbonate, bicarbonates and strong oxidizers. Citric acid corrodes copper, zinc, aluminum and their alloys

HAZARDOUS DECOMPOSITION PRODUCTS: May release hydrogen gas with contact with copper, zinc, aluminum and their alloys



MATERIAL SAFETY DATA SHEET

Effective Date: December 13, 2004

### CITRIC ACID SOLUTION

### SECTION IX - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Cover with soda ash or sodium bicarbonate to neutralize. Wash with water into approved sewer.

WASTE DISPOSAL METHOD: All procedures should be done in accordance with all state, local and federal regulations.

#### **SECTION X - SPECIAL PROTECTION INFORMATION**

**RESPIRATORY PROTECTION:** None required...

VENTILATION: Good local ventilation.

**PROTECTIVE GLOVES:** Rubber/vinyl

EYE PROTECTION: Chemical splash goggles.

**<u>OTHER PROTECTIVE EQUIPMENT</u>**: Clothing to prevent prolonged or repeated skin contact. Eye wash fountain, safety shower.

### **SECTION XI - SPECIAL PRECAUTIONS**

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Follow normal good manufacturing practices in handling and storage. Store above 32°F for low concentrations; 25°F for 25% by weight; 16°F for 50% by weight.

OTHER PRECAUTIONS: Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling.

HAZARD RATING: Health 1

Flammability 0

Reactivity 0

### SECTION XII - D.O.T. SHIPPING INFORMATION

**PROPER SHIPPING NAME:** Corrosive liquid, acidic, organic, n.o.s. (Citric Acid)

HAZARD CLASS: 8 (Corrosive)

UN/NA: UN3265

PACKING GROUP: III

D.O.T. LABEL REQUIRED: Corrosive

**REPORTABLE QUANTITY OF PRODUCT: N.A.** 



MATERIAL SAFETY DATA SHEET

Effective Date: December 13, 2004

### CITRIC ACID SOLUTION

### SECTION XIII - REGULATORY INFORMATION

This Regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

TSCA (Toxic Substance Control Act): All components of this product are listed on the TSCA inventory.

Super Fund Amendments and Reauthorization Act (SARA) of 1986, Section 313, Title III, CFR 40 Part 372: none

CERCLA RQ 40 CFR302.4: none

SARA TITLE III: HAZARD CLASSIFICATIONS: Acute: yes Chronic: no Fire: no Pressure: no Reactivity: no

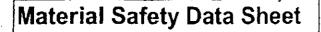
SARA 302 Components 40 CFR 370.2: None

WHILE BRENNTAG MID-SOUTH, INC. BELIEVES THAT THE INFORMATION CONTAINED HEREIN IS FACTUAL; IT IS NOT TO BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH BRENNTAG MID-SOUTH, INC. ASSUMES LEGAL RESPONSIBILITY. IT IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION AND VERIFICATION. ANY USE OF THIS INFORMATION AND DATA MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.

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FORMAT REVISION DATE: April 23, 2001







## **Dry Alum**

#### 1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Dry Alum

OTHER/GENERIC NAMES: Aluminum Sulfate

PRODUCT USE: Water treatment. Food additive. Various industrial uses.

MANUFACTURER: General Chemical Corporation 90 East Halsey Road Parsippany, NJ 07054

FOR MORE INFORMATION CALL: 973-515-1840 (Monday-Friday, 9:00am-4:30pm)

IN CASE OF EMERGENCY CALL: 800-631-8050 (24 Hours/Day, 7 Days/Week)

#### 2. COMPOSITION/INFORMATION ON INGREDIENTS

| INGREDIENT NAME  |                  | CAS NUMBER  | WEIGHT % |
|------------------|------------------|-------------|----------|
| Aluminum sulfate | 4 . <sup>6</sup> | 10043-01-3  | 100      |
|                  | 1e **            | (anhydrous) |          |

Trace impurities and additional material names not listed above may also appear in Section 15 towards the end of the MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

**OSHA Hazard Communication Standard:** 

This product is considered hazardous under the OSHA Hazard Communication Standard.

#### 3. HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** White or creamy while granules or powder with no odor. Can irritate the skin and eyes. Not flammable, but may release toxic vapors if decomposed in a fire.

#### POTENTIAL HEALTH HAZARDS

SKIN: May cause skin irritation, especially under repeated or prolonged contact, or when moisture is present.

EYES: May irritate or burn the eyes. Similarly for the aqueous solution.

INHALATION: Dust or mist inhalation at levels above the TLV may cause irritation to the respiratory tract.

**INGESTION:** May irritate the gastrointestinal tract.

DELAYED EFFECTS: None known.

Ingredients found on one of the three OSHA designated carcinogen lists are listed below.

#### INGREDIENT NAME

NTP STATUS IARC STATUS

OSHA LIST

Page 1 of 6

No ingredients listed in this section.

MSDS Number: GC+2001 Current Issue Date: June, 2001



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### MATERIAL SAFETY DATA SHEET

#### **Dry Alum**

#### 4. FIRST AID MEASURES

SKIN: Flush with plenty of soap water, removing contaminated clothing. If irritation develops, get medical attention.

EYES: Immediately flush with water, continuing for at least 15 minutes. If irritation persists, get medical attention.

INHALATION: Promptly remove to fresh air.

If conscious, immediately give large quantity of water or milk. If not already vomiting, induce INGESTION: vomiting by touching finger to back of throat. Get medical assistance.

**ADVICE TO PHYSICIAN:** Treat symptomatically.

#### FIRE FIGHTING MEASURES 5.

#### FLAMMABLE PROPERTIES

Not flammable FLASH POINT: FLASH POINT METHOD: AUTOIGNITION TEMPERATURE: UPPER FLAME LIMIT (volume % in air): LOWER FLAME LIMIT (volume % in air): FLAME PROPAGATION RATE (solids): **OSHA FLAMMABILITY CLASS:** 

Not applicable Not applicable Not applicable Not applicable Not applicable Not applicable

#### **EXTINGUISHING MEDIA:**

Product is not flammable. Use any extinguishing agent suitable for surrounding fire.

#### **UNUSUAL FIRE AND EXPLOSION HAZARDS:**

None.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

Use self-contained breathing apparatus.

#### 6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (See section 8 for recommended personal protective equipment.) Shovel up dry chemical and place in empty container and cover. Spray residue with plenty of water. Neutralize any further residue with alkali such as soda ash, lime or limestone. Adequate ventilation is required if soda ash or limestone is used, because of the consequent release of carbon dioxide gas. Collect liquid and/or residue and dispose of in accordance with applicable regulations.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

#### HANDLING AND STORAGE 7.

NORMAL HANDLING: (See section 8 for recommended personal protective equipment.) Avoid contact with skin, eyes and clothing. Do not breathe product dusts or mists.



### MATERIAL SAFETY DATA SHEET

Dry Alum

#### STORAGE RECOMMENDATIONS:

Store in a cool, dry area.

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### **ENGINEERING CONTROLS:**

Use local exhaust if dusty or misty conditions prevails.

#### PERSONAL PROTECTIVE EQUIPMENT

| SKIN PROTECTION:               | Wear gloves and appropriate industrial work clothing including long sleeved shirts<br>and trousers for routine product handling. Full impervious clothing is recommended<br>if handling solutions and there is repeated or prolonged contact. |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EYE PROTECTION:                | Wear chemical safety goggles. Do not wear contact lenses.                                                                                                                                                                                     |
| RESPIRATORY<br>PROTECTION:     | A NIOSH approved dust or mist respirator should be worn in areas where product dusts or mists are present.                                                                                                                                    |
| ADDITIONAL<br>RECOMMENDATIONS: | The presence of an eyewash and safety shower is recommended.                                                                                                                                                                                  |

#### EXPOSURE GUIDELINES

| INGREDIENT NAME                | ACGIH TLV           | OSHA PEL            | OTHER LIMIT |
|--------------------------------|---------------------|---------------------|-------------|
| Aluminum sulfate (as Aluminum) | 2 mg/m <sup>3</sup> | 2 mg/m <sup>3</sup> | None        |

<sup>1</sup> = Limit established by General Chemical Corporation.

<sup>2</sup> = Workplace Environmental Exposure Level (AIHA).

<sup>1</sup> = Biological Exposure Index (ACGIH).

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS: None

#### 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: PHYSICAL STATE: MOLECULAR WEIGHT: White or creamy white granules or powder. Solid ~594 for Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>:14H<sub>2</sub>O

CHEMICAL FORMULA:

ODOR: SPECIFIC GRAVITY (water = 1.0): SOLUBILITY IN WATER (weight %): pH: BOILING POINT: MELTING POINT: Odorless

Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> 14H<sub>2</sub>O

1.61 50% at 0°C ~3.5 (1% solution) Not applicable Not applicable



#### Dry Alum

VAPOR PRESSURE: VAPOR DENSITY (air = 1.0): EVAPORATION RATE: % VOLATILES: FLASH POINT:

Negligible Not applicable Not applicable Not applicable Not flammable

COMPARED TO: Not applicable.

(Flash point method and additional flammability data are found in Section 5.)

#### **10. STABILITY AND REACTIVITY**

#### NORMALLY STABLE? (CONDITIONS TO AVOID):

Normally stable. Avoid temperatures above 760°C, as this will yield toxic and corrosive gases.

#### INCOMPATIBILITIES:

Alkalis and water reactive materials such as oleum: causes exothermic reactions.

#### HAZARDOUS DECOMPOSITION PRODUCTS:

At elevated temperatures, sulfur oxides may be formed. These are toxic and corrosive and are oxidizers. Sulfur trioxide is also a fire hazard. The loss of these gases leaves a caustic residue.

#### HAZARDOUS POLYMERIZATION:

Will not occur

#### **11. TOXICOLOGICAL INFORMATION**

#### IMMEDIATE (ACUTE) EFFECTS:

Aluminum sulfate: LD<sub>50</sub> (oral, mouse): 6207 mg/kg LD<sub>50</sub> (oral, rat): 1930 mg/kg

### DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:

Data not available

#### OTHER DATA:

None

#### **12.ECOLOGICAL INFORMATION**

Aluminum sulfate:

.... ....

14 ppm/36 hr/ fundulus/fatal/fresh water.

240 ppm/48 hr/mosquito lish/TL<sub>m</sub>/water type not specified.

TL<sub>m</sub> Mosquito fish, 235 ppm, 96 hours

LC50 Largemouth bass, 250 ppm, 96 hours

MSDS Number: GC-2001 Current issue Date: June, 2001



Dry Alum

#### **13. DISPOSAL CONSIDERATIONS**

RCRA

Is the unused product a RCRA hazardous waste if discarded? No

If yes, the RCRA ID number is: Not applicable

**OTHER DISPOSAL CONSIDERATIONS:** 

If permitted by regulations, material may be dissolved in water and neutralized with alkali. Neutralized waste may have to be disposed of by an approved contractor.

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

#### **14. TRANSPORT INFORMATION**

 US DOT HAZARD CLASS:
 9 (only if greater than 8700 lbs. in one package)

 US DOT ID NUMBER:
 UN3077

 PROPER SHIPPING NAME:
 Environmentally hazardous substances, solid, n.o.s. (contains aluminum sulfate)

For additional information on shipping regulations affecting this material, contact the information number found in Section 1,

#### **15.REGULATORY INFORMATION**

#### TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: All ingredients listed on the TSCA Inventory

OTHER TSCA ISSUES: None

#### SARA TITLE IIVCERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients

| INGREDIENT NAME              | SARA/CERCLA RQ (Ib) | SARA EHS TPQ (Ib) |
|------------------------------|---------------------|-------------------|
| Aluminum sulfate (anhydrous) | 5000                | None              |
|                              | (*as is 8700 lbs.)  |                   |

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Immediate

SARA 313 TOXIC CHEMICALS:

MSDS Number: GC-2001 Current Issue Date: June, 2001 Page 5 of 6



**Dry Alum** 

The following ingredients are SARA 313 "Toxic Chemicals" and may be subject to annual reporting requirements CAS numbers and weight percents are found in Section 2.

#### INGREDIENT NAME

No ingredients listed in this section.

#### STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

#### **INGREDIENT NAME**

WEIGHT % COMMENT

COMMENT

No ingredients listed in this section.

ADDITIONAL REGULATORY INFORMATION: None listed

NONA IISIGO

WHMIS CLASSIFICATION (CANADA):

Class D2B.

Classified in accordance with WHMIS Controlled Product regulations.

FOREIGN CHEMICAL CONTROL INVENTORY STATUS:

All ingredients listed on Canadian DSL.

### **16.OTHER INFORMATION**

CURRENT ISSUE DATE: June, 2001 PREVIOUS ISSUE DATE: December, 1993

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING: Updated to ANSI format.

4.

OTHER INFORMATION: None

# KEMIRON COMPANIES INC

# **MATERIAL SAFETY DATA SHEET**

**Ferric Chloride Solution** 

### SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

SALES OFFICE 3211 Clinton Parkway Court Lawrence, KS 66047 800-879-6353

Product Name: Ferric Chloride SolutionMajor Update: 06/18/99CAS #: 7705-08-0Minor Revision: 11/24/99MSDS Code: FeCl3Product Use: Water treatment chemical and etching solution in the semi-conductor industry.

# Emergency Contacts (24 hr.)

### FOR EMERGENCIES INVOLVING CHEMICAL SPILL OR RELEASE, CALL

### CHEMTREC 1-800-424-9300

### SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

| Ingredient(s)        | % (w/w)       | ACGIH TWA                                            | CAS No.   |
|----------------------|---------------|------------------------------------------------------|-----------|
| Ferric Chloride      | 39-47         | 1 mg/m <sup>3</sup> (as Fe)<br>(Iron salts, soluble) | 7705-08-0 |
| Hydrochloric<br>Acid | 0.5 Max.      | Ceiling value: 5 ppm<br>(7 mg/cu m)                  | 7647-01-0 |
| Water                | 61-53         | Not applicable                                       | 7732-18-5 |
| Insoluble Solids     | 100 mg/L Max. | Not applicable                                       |           |

### **SECTION 3 - HAZARD IDENTIFICATION**

**Emergency Overview:** Corrosive! TOXIC! Inhalation, ingestion or skin contact with material may cause severe injury or death. Causes eye damage and skin burns. Mist and Vapor: Causes respiratory tract and mucous membrane burns. Harmful if inhaled. Harmful or fatal if swallowed.

### FERRIC CHLORIDE Major Update: June 18, 1999

4

Potential Chronic Health Effects: Repeated dosage may cause possible damage to the liver and pancreas.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#### **Potential Health Effects:**

Inhalation: Irritation to mucous membranes, difficulty breathing

Skin Contact: Irritation and possibly burns

**Eye Contact:** Irritation and possibly burns

**Ingestion:** Irritation of the mouth and stomach. Symptoms of severe poisoning include stomach pain, vomiting, diarrhea, dehydration, shock, pallor, weak pulse, drowsiness, dilated pupils, and coma.

Sub-chronic Effects: No data available

Chronic Effects: Repeated dosage may cause hemosiderosis with possible damage to the liver and pancreas.

**Carcinogenicity:** Ferric chloride is not classified as carcinogenic by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as carcinogens by OSHA (Occupational Safety and Health Administration) and not listed as carcinogens by NTP (National Toxicology Program).

### **SECTION 4 - FIRST AID MEASURES**

**General:** If you feel unwell, seek medical advice (show the label where possible). Effects of exposure (inhalation, ingestion or skin contacts) to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

**Inhalation:** If symptoms are experienced, move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Obtain medical attention IMMEDIATELY.

Skin Contact: Remove contaminated clothing, jewellery and shoes. Immediately wash skin with soap or mild detergent and running water for at least 15-20 minutes, until no evidence of chemical remains. For minor skin contact, avoid spreading material on unaffected skin. For burns, obtain medical attention immediately.

**Eye Contact:** Immediately flush eyes with running water for at least 20 minutes, occasionally lifting upper and lower lids, until no evidence of chemical remains. Obtain medical attention IMMEDIATELY.

**Ingestion:** If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen. Avoid gastric lavage or emesis.

| SECTION 5 - FIRE FIGHTING MEASURES |                               |  |
|------------------------------------|-------------------------------|--|
| Flash point                        | Not applicable. Will not burn |  |
| Flammable Limits (Lower)           | Not applicable                |  |
| Flammable Limits (Upper)           | Not applicable                |  |
| Auto Ignition Temperature          | Not applicable                |  |
| Combustion and Thermal             | Hydrogen chloride, phosgene   |  |
| Decomposition Products             |                               |  |
| Rate of Burning                    | Does not burn                 |  |
| Explosive Power                    | Not applicable                |  |
| Sensitivity to Static Discharge    | Not available                 |  |

**Fire and Explosion Hazards**: During a fire, irritating/toxic hydrogen chloride and phosgene gas may be generated. Ferric chloride reacts with most metals to give flammable, potentially explosive hydrogen gas. Hydrogen gas can accumulate to explosive concentrations inside confined spaces.

**Extinguishing Media**: Water spray, fog or regular foam appropriate for surrounding material. Cool any exposed containers with water.

**Special Information:** Fire fighters should wear protective equipment and self-contained breathing apparatus with full-face piece operated in positive pressure mode. Move exposed containers from fire area if it can be done without risk. Use water to keep fire-exposed containers cool.

NOTE: Also see "Section 10 – Stability and Reactivity"

### SECTION 6- ACCIDENTAL RELEASE MEASURES

### Spills, Leaks or Release:

- Restrict access to area until completion of clean up. Ensure trained personnel conduct clean up.
- Wear adequate personal protective equipment. DO NOT TOUCH SPILLED MATERIAL.
- Stop leak if possible without personal risk.
- <u>Small Spills</u>: Absorb spill with sand or non-combustible dry material and collect in appropriate container for disposal. Flush area with water.
- <u>Large Spills</u>: Prevent entry into sewers and confined areas. Dike if possible. Keep unnecessary people away, isolate hazard area and deny entry. Absorb spill with sand or non-combustible dry material and collect in appropriate container for disposal. Flush area with water.

### SECTION 7 - HANDLING AND STORAGE

**Handling:** Store in corrosion-proof area. Containers of this material may be hazardous when empty, since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Use FRP or PVC pipes.

•

Storage Requirements: Store in tightly closed container, preferably the supplier container. Do not store in metal containers. Fibreglass, plastic or rubber-lined tanks may be used for storage. Protect from damage. Keep dry. Read the label before use. Keep separated from incompatible substances.

### **SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION**

### **PREVENTIVE MEASURES**

Recommendations listed in this section indicate the type of equipment, which will provide protection against over-exposure to this product. Conditions of use, adequacy of engineering or other control measures and actual exposures will dictate the need for specific protective devices at your workplace.

**Engineering Controls:** A ventilation system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Ensure that eyewash station and safety showers are proximal to the workstation location.

### PERSONAL PROTECTIVE EQUIPMENT

**Eye Protection:** Wear splash resistant chemical goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Skin Protection: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Recommended Protective Material: Neoprene

**Respiratory Protection:** Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.

- Any chemical cartridge respirator with acid gas cartridge(s)
- Any chemical cartridge respirator with a full face piece and acid gas cartridge(s)
- Any air-purifying respirator with a full-face piece and an acid gas canister.
- For Unknown Concentrations or Immediately Dangerous to Life or Health (IDLH) Any supplied air respirator with full-face piece and operated in a pressure-demand or other positive-pressure mode.

### **EXPOSURE GUIDELINES**

**Product:** ACGIH:  $TLV - 1 \text{ mg/m}^3$  (as Fe) (Iron salts, soluble)

### **SECTION 9 -- PHYSICAL AND CHEMICAL PROPERTIES**

| Alternate Name                 | Iron Chloride        |            |
|--------------------------------|----------------------|------------|
| Chemical Name                  | Ferric chloride      |            |
| Chemical Family                | Iron salt            | ·          |
| Molecular Formula              | FeCl₃                |            |
| Molecular Weight               | 162.21               |            |
| Appearance                     | Red-brown liquid     |            |
| Odor                           | Slightly acidic odor |            |
| рН                             | Less than 1          | <b>-</b> . |
| Vapor Pressure (mm Hg at 20°C) | 40                   |            |
| Vapor Density (Air = 1)        | Not applicable       |            |
| Boiling Point                  | 106°C (223°F)        |            |
| Solubility (Water)             | 100%                 |            |
| Solubility (Other)             | Acetone, ethanol     |            |
| Specific Gravity               | 1.47                 |            |
| Evaporation Rate               | Not applicable       | <u>.</u>   |
| % Volatile Organic Compounds   | Not applicable       |            |

#### SECTION 10 - STABILITY AND REACTIVITY

Hazardous Decomposition Products: Thermal decomposition: hydrochloric acid. Contact with metals may evolve flammable hydrogen gas. Container may explode when heated.

Chemical Stability: Stable at normal temperatures and pressure.

**Conditions to Avoid:** Heat, flames, sparks and other sources of ignition. Dangerous gases may accumulate in confined spaces. May ignite or explode on contact with combustible materials.

**Incompatibility with other Substances:** Metals, bases (alkaline materials), halocarbons, acids, and combustible materials. Forms shock sensitive explosive mixtures with some metals (e.g. potassium; sodium).

Hazardous Polymerization: Will not occur.

### **SECTION 11 - TOXICOLOGICAL INFORMATION**

TOXICOLOGICAL DATA: Ferric Chloride Solid (anhydrous) LD<sub>50</sub> (oral, rat) = 450 mg/kg

**Mutagenicity:** Other mutation test systems: Escherichia coli – 500 nmol/tube; Phage inhibition capacity: Escherichia coli 41 ng/well

**Reproductive Effects:** TDLo Rat 1 day(s) intratesticular 12976 µg/kg; TDLo Rat 1 day(s) intravaginal 29 mg/kg pre pregnancy continuous

Teratogenicity and Fetotoxicity: Not available

Synergistic Materials: Not available

### SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicological Information: TLm Daphnia 15 ppm/96 hr fresh water / Conditions of bioassay not specified

Persistence and Degradation: No data available

#### SECTION 13 - DISPOSAL CONSIDERATIONS

Review federal, state and local government requirements prior to disposal.

Whatever cannot be saved for recovery or recycling, including containers, should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options.

RCRA: Test waste material for corrosivity, D002, prior to disposal.

#### SECTION 14 - TRANSPORTATION REGULATIONS

|                       | Canada (TDG)                                                      | U.S. (DOT)               |
|-----------------------|-------------------------------------------------------------------|--------------------------|
| Shipping Name         | Ferric Chloride Solution                                          | Ferric Chloride Solution |
| Hazard Class/Division | 8: Corrosive liquid<br>9.2: Environmentally hazardous<br>material | 8: Corrosive liquid      |
| Identification No.    | UN2582                                                            | UN2582                   |
| Packing Group:        | II                                                                | Ш                        |

Transportation Emergency Telephone Number: 1800-424-9300 CHEMTREC

IATA/ICAO Class: 8

#### **SECTION 15 - REGULATORY INFORMATION**

#### **USA CLASSIFICATION:**

**OSHA Classification:** Hazardous by definition of Hazard Communication Standard (29 CFR 1920.1200)

CERCLA: hazardous substance/reportable quantity (RQ): final RQ = 1000 lb. (454 kg)

SARA Regulations sections 313 and 40 CFR 372: N

SARA Hazard Categories, SARA SECTIONS 311/312 (40CRF370.21):

Acute: Y Chronic: N Fire: N Reactive: N Sudden Release: N OSHA Process Safety (29CFR1910.119): Y 4

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**Clean Water Act Requirements:** Designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance.

#### **TSCA Inventory Status:** Y

Other Regulations/Legislation which apply to this product:

California Proposition 65: N

**Right-To-Know Lists:** Massachusetts, New Jersey, Pennsylvania, California This product does not contain, nor is it manufactured with ozone-depleting substances.

#### **CANADIAN CLASSIFICATION**

This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all information required by the CPR.

Controlled Products Regulation (WHMIS) Classification: E: Corrosive

**CEPA / Canadian Domestic Substances List (DSL):** The substance in this product is not on the Canadian Domestic Substances List (CEPA DSL).

EEC CLASSIFICATION

**EINECS:** 231-729-4

### **SECTION 16 - OTHER INFORMATION**

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and PIONEER will not be liable for any damages, losses, injuries or consequential damages that may result from the use of, or reliance on, any information contained herein. This Material Safety Data Sheet is valid for three years.

#### **Revision Indicators:**

 $\Delta$  In the left margin indicates a revision or addition of information since the previous issue.

| Hazardous Materials Identification System (HMIS) Kating |      |      |  |
|---------------------------------------------------------|------|------|--|
|                                                         | NFPA | HMIS |  |
| HEALTH                                                  | 2    | 2    |  |
| FIRE                                                    | 0    | 0    |  |
| REACTIVITY                                              | 1    | 1    |  |

National Fire Protection Association (NFPA) Rating

4 = Extreme/Severe

- 3 = High/Serious
- 2 = Moderate
- 1 =Slight
- 0 = Minimum

### **REFERENCES:**

- 1. RTECS-Registry of Toxic Effects of Chemical Substances, On-line search, Canadian Centre for Occupational Health and Safety RTECS database, Doris V. Sweet, Ed., National Institute for Occupational Safety and Health, U.S. Dept. of Health and Human Services, Cincinnati, Updated Dec 1997.
- 2. "CHEMINFO", through "CCINFOdisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada (August 1998).
- 3. HSDB-Hazardous Substances Data Bank, through "CCINFO disc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada, (August 1998).
- 4. NIOSH POCKET GUIDE TO CHEMICAL HAZARDS, U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, June 1997
- 5. Sax, N.I., "Dangerous Properties of Industrial Materials", 7th Edition, 1989
- 6. "1999 Threshold Limit Values and Biological Exposure Indices", American Conference of Government Industrial Hygienists, 1999.
- 7. Merck, 11<sup>th</sup> Edition, 1989

### Legend:

CAS # - Chemical Abstracts Service Registry Number

- CERCLA- Comprehensive Environmental Response, Compensation, and Liability Act
- CFR Code of Federal Regulations
- DOT Department of Transportation
- LC<sub>50</sub> The concentration of material in air expected to kill 50% of a group of test animals
- LD<sub>50</sub> Lethal Dose expected to kill 50% of a group of test animals
- LEL Lower Explosive Limit
- MSHA Mine Safety and Health Administration
- NIOSH National Institute for Occupational Safety and Health
- PEL Permissible Exposure Limit
- PVC Polyvinyl chloride
- RCRA Resource Conservation and Recovery Act
- SARA Superfund Amendments and Reauthorization Act of the U.S. EPA
- STEL Short Term Exposure Limit
- TC Transport Canada
- TDG Transportation of Dangerous Goods Act/Regulations
- TLV Threshold Limit Value
- TSCA Toxic Substances Control Act
- TWA Time-Weighted Average
- UEL Upper Explosive Limit

### Prepared By: KEMIRON (912) 234-8605



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# **Material Safety Data Sheet**

SECTION I - Material Identity SECTION II - Manufacturer's Information SECTION III - Physical/Chemical Characteristics SECTION IV - Fire and Explosion Hazard Data SECTION V - Reactivity Data SECTION VI - Health Hazard Data SECTION VII - Precautions for Safe Handling and Use SECTION VIII - Control Measures SECTION IX - Label Data SECTION X - Transportation Data SECTION XI - Site Specific/Reporting Information SECTION XII - Ingredients/Identity Information

#### **SECTION I - Material Identity**

| Item Name              |                                              |
|------------------------|----------------------------------------------|
| Part Number/Trade Name | O-S-602,SODIUM HYPOCHLORITE<br>SOLUTION,GR A |
| National Stock Number  | 6810005987316                                |
| CAGE Code              | 60777                                        |
| Part Number Indicator  | А                                            |
| MSDS Number            | 1888                                         |
| HAZ Code               | В                                            |
|                        |                                              |

### **SECTION II - Manufacturer's Information**

| Manufacturer Name | GEORGIA-PACIFIC CORPORATION<br>(DISTR:CHEM COMMODITY) |
|-------------------|-------------------------------------------------------|
| Street            | 27447 PACIFIC STREET                                  |
| City              | HIGHLAND                                              |
| State             | CA                                                    |
| Country           | US                                                    |
| Zip Code          | 92346-2640                                            |
| Emergency Phone   | 714-864-2310                                          |
| Information Phone | 714-864-2310                                          |

#### **MSDS** Preparer's Information

| Date MSDS Prepared/Revised | PRE-HCS |
|----------------------------|---------|
| Date of Technical Review   | 07MAY79 |
| Active Indicator           | N       |
| Item Manager               | сх      |

### **Alternate Vendors**

Vendor #5 CAGE

BFHMX

### SECTION III - Physical/Chemical Characteristics

| Specification Number              | 0-S-602                                    |
|-----------------------------------|--------------------------------------------|
| Hazard Storage Compatibility Code | C3-L3                                      |
| Appearance/Odor                   | LIGHT YELLOW COLOR;SLIGHT<br>CHLORINE ODOR |
| Boiling Point                     | UNK                                        |
| Specific Gravity                  | 1.090                                      |
| Solubility in Water               | APPRECIABLE                                |
| Container Pressure Code           | 4                                          |
| Temperature Code                  | 8                                          |
| Product State Code                | υ                                          |
|                                   |                                            |

### **SECTION IV - Fire and Explosion Hazard Data**

| · · · · ·                        |      |  |
|----------------------------------|------|--|
| Flash Point Method               | UNK  |  |
| Extinguishing Media              | NONE |  |
| Special Fire Fighting Procedures | NONE |  |
| Unusual Fire/Explosion Hazards   | NONE |  |
|                                  |      |  |

### **SECTION V - Reactivity Data**

| Stability                        | YES                                                              |
|----------------------------------|------------------------------------------------------------------|
| Stability Conditions to Avoid    | AVOID SUNLIGHT & TEMPERATURES<br>> 90F.DECOMPOSES GIVES OXYGEN   |
| Materials to Avoid               | ACIDS, SOAPS, ORGANICS, TOILET<br>CLEANERS-SEE SUPPLEMENTAL DATA |
| Hazardous Decomposition Products | CHLORINE ON CONTACT WITH<br>ACIDS                                |
| Hazardous Polymerization         | NO                                                               |

### SECTION VI - Health Hazard Data

Symptoms of Overexposure

IRRITATION OF EYES; SKIN IRRITATION WITH BLISTERING & ECZEMA; BLISTERING IN \$

|                                | THROAT; COUGH, DYSPENA, COMA                                                                                                                                                                                                    |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Emergency/First Aid Procedures | IF SWALLOWED GIVE SEVERAL<br>GLASSES OF MILK OR<br>WATER, FOLLOW BY OLIVE OIL OR<br>COOKING OIL.IF SPLASHED ON<br>SKIN OR EYES, FLOOD WITH<br>WATER.CALL A DOCTOR<br>IMMEDIATELY.WASH CONTAMINATED<br>AREAS OF BODY WITH SOAP & |
|                                | WATER.TREAT SKIN BURNS                                                                                                                                                                                                          |

SECTION VII - Precautions for Safe Handling and Use

| Steps if Material Released/Spilled | ABSORB WITH CLAY OR<br>DIATOMACEOUS EATH; DO NOT BRING<br>ABSORBED WASTE INTO CONTACT<br>WITH OXIDIZABLE MATERIALS, OR<br>COVER WITH REDUCING AGENTS<br>SUCH AS HYPO, BISULFITES OR<br>FERROUS SALTS.TRANSFER SLURRY<br>INTO LARGE CONTAINER OF WATER<br>& NEUTRALIZE WITH SODA ASH |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Waste Disposal Method              | USE VAST VOLUME OF<br>CONCENTRATED OF REDUCING AGENT<br>(BISULFITES,OR FERROUS SALTS<br>WITH 3M-H*2SO*4 OR<br>HYPO).NEUTRALIZE WITH SODA ASH<br>OR DILUTE HCL.DRAIN INTO AN<br>APPROVED DISPOSAL AREA WITH<br>ABUNDANT WATER                                                        |
| Handling and Storage Precautions   | RE IN A COOL DARK PLACE,AWAY<br>FROM COMBUSTIBLE<br>MATERIALS.LONG STORAGE IS<br>IMPOSSIBLE WITHOUT<br>DECOMPOSITION.KEEP CONTAINERS<br>WELL CLOSED,KEEP WATER OUT AD                                                                                                               |
| Other Precautions                  | ADEQUATE VENTILATION.WEAR<br>RUBBER GLOVES,FACE<br>SHIELDS,OVERALLS & PREFERABLY<br>BODY SHIELD.DO NOT<br>CONTAMINATED WITH OXIDIZABLE<br>MATERIAL.KEEP OUT OF REACH OR<br>CHILDEN.HARMFULIF SWALLOWED                                                                              |

#### SECTION VIII - Control Measures

Ventilation

Protective Gloves Eye Protection Other Protective Equipment Supplemental Health/Safety Data AS REQUIRED TO CONTROLMISTS OR GASES RUBBER FULL GOGGLES RUBBER APRONS & BOOTS CAUTION-DO NOT MIX WITH AMMONIA COMPOUNDS-CREATES GAS WHICH IS BOTH TOXIC AND

| Disposal Code                             | EXPLOSIVE]]<br>O               |  |
|-------------------------------------------|--------------------------------|--|
| SECTION IX - Label Data                   |                                |  |
| Protect Eye                               | NO                             |  |
| Protect Skin                              | NO                             |  |
| Protect Respiratory                       | NO                             |  |
| Chronic Indicator                         | UNKNOWN                        |  |
| Contact Code                              | UNKNOWN                        |  |
| Fire Code                                 | UNKNOWN                        |  |
| Health Code                               | UNKNOWN                        |  |
| React Code                                | UNKNOWN                        |  |
| SECTION X - Transportation Data           |                                |  |
| Container Quantity 1                      |                                |  |
| Unit of Measure                           | GL                             |  |
| SECTION XI - Site Specific/Reporting Info | Drmation                       |  |
| Volatile Organic Compounds (P/G)          | 0                              |  |
| Volatile Organic Compounds (G/L)          | 0                              |  |
| SECTION XII - Ingredients/Identity Infor  | mation                         |  |
| Ingredient #                              | 01                             |  |
| Ingredient Name                           | HYPOCHLOROUS ACID, SODIUM SALT |  |
| CAS Number                                | 7681529                        |  |
| NIOSH Number                              | NH3486300                      |  |
| Proprietary                               | NO                             |  |
| Percent                                   | 5.25                           |  |
| ACGIH TLV                                 | UNKNOWN                        |  |
| Ingredient #                              | 02                             |  |
| Ingredient Name                           | SODIUM CHLORIDE                |  |
| NIOSH Number                              | VZ4725000                      |  |
| Proprietary                               | NO                             |  |
| Percent                                   | 6.0                            |  |
| ACGIH TLV                                 | UNKNOWN                        |  |
| Ingredient #                              | 03                             |  |
| Ingredient Name                           | WATER                          |  |
| NIOSH Number                              | ZC0110000                      |  |
| Proprietary                               | NO                             |  |
| Percent                                   | 87.0                           |  |
| ACGIH TLV N/A                             |                                |  |

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## MATERIAL SAFETY DATA SHEET

#### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

| PRODUCT NAME:<br>PRODUCT ID: | Prestochlor Calcium Hypochlorite Granules 27488            |
|------------------------------|------------------------------------------------------------|
| SYNONYMS:                    | Calcium Hypochlorite Granular; Cal Hypo Granules; Ca(OCI)2 |
| ISSUE DATE:                  | 07/18/2001                                                 |
| EDITION NO.:                 | 8                                                          |

### **PPG Industries, Inc.** One PPG Place, Pittsburgh, PA 15272, USA 24-hour Emergency Telephone Number: 1-304-843-1300 For Product Information (8am-5pm Eastern time): 1-800-245-2974 (Cal Hypo)

Product Safety, Chemicals PREPARER:

#### COMPOSITION/INFORMATION ON INGREDIENTS 2.

Material/CAS Number Percent

>65 Calcium Hypochlorite 7778-54-3

Note: 65% Available Chlorine. 35% inert Ingredients (includes 5.5-10% moisture).

#### HAZARDS IDENTIFICATION з.

#### **EMERGENCY OVERVIEW:**

DANGER! Strong Oxidizing Agent! Mix only with water. Contamination may cause fire or explosion. Do not add this product to any dispensing device containing remnants of any other product.

Do not swallow. Swallowing may cause injury or death. Do not get in eyes, on skin, Precautions: or on clothing. May cause burns. Avoid breathing dust. Irritating to nose and throat. Wash hands after handling. Keep out of reach of children.

#### FIRST AID MEASURES 4.

INHALATION: Remove from area to fresh air. If symptomatic, contact a poison control center.

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# PPG: 27488 Prestochlor Calcium Hypochlorite Granules 07/18/2001

emergency room or physician for treatment information.

**EYE/SKIN CONTACT:** EYE: Remove contact lens and pour a gentle stream of warm water through the affected eye for at least 15 minutes. Contact a poison control center, emergency room or physician right away as further treatment will be necessary. SKIN: Run a gentle stream of water over the affected area for 15 minutes. A mild soap may be used if available. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

**INGESTION:** Gently wipe or rinse the inside of the mouth with water. Sips of water may be given if person is fully conscious. Never give anything by mouth to an unconscious or convulsing person. Do Not induce vomiting. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

#### 5. FIRE FIGHTING MEASURES

FLASH POINT: None

EXTINGUISHING MEDIA: Water only. Smothering ineffective - product supplies own oxygen.

**SPECIAL FIREFIGHTING PROCEDURES:** Product decomposes at 180°C releasing oxygen gas. Container may rupture. Fire-fighters must wear NIOSH approved, pressure demand, self-contained breathing apparatus with full face piece for possible exposure to hazardous gases.

### 6. ACCIDENTAL RELEASE MEASURES

#### ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Use extreme caution in handling spilled material. Contamination with organic or combustible material may cause fire or violent decomposition. If fire or decomposition occurs in area of spill, immediately douse with plenty of water. Otherwise, sweep up all visible material using a clean, dry shovel and broom and dissolve material in water. Spilled material that has been swept up and dissolved in water should be used immediately in the normal application for which this product is being consumed.

#### 7. HANDLING AND STORAGE

#### PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORAGE:

Store in a cool, dry, well-ventilated place. Keep in original container. Keep container closed when not in use. Keep away from heat, sparks, flames, direct sunlight, and other sources of heat, including lighted tobacco products. Use only a clean, dry scoop made of metal or plastic each time product is taken from the container. Do not add this product to any dispensing device containing remnants of any other product. Such use may cause violent reaction leading to fire or explosion. Add this product only to water. May cause fire or explosion if mixed with other chemicals. Fire may result if contaminated with acids or easily combustible materials such as oil, kerosene, gasoline, paint products and most other organic materials. Do not reuse container. Residual material remaining in empty drum can react to cause fire. Thoroughly flush empty container with water then destroy by

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PPG: 27488 Prestochlor Calcium Hypochlorite Granules 07/18/2001

placing in trash collection. Do not contaminate water, food, or feed by storage or disposal.

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### Exposure Limits:

#### 8-hour Time Weighted Average (TWA); 15-minute Short-Term Exposure Limit (STEL)

**OSHA:** No occupational exposure limits have been established by OSHA for this product.

ACGIH: No occupational exposure limits have been established by ACGIH for this product.

PPG (IPEL): 1 mg/cu.m. TWA. 2 mg/cu.m. STEL.

**RESPIRATORY PROTECTION:** If dusty conditions are encountered, use NIOSH approved respirator with acid gas cartridge and dust prefilter. The respiratory use limitations made by NIOSH or the manufacturer must be observed. Respiratory protection programs must be in accordance with 29 CFR 1910.134.

**VENTILATION:** None required unless dusty conditions are encountered.

EYE AND FACE PROTECTION: Chemical safety goggles.

PROTECTIVE GLOVES: Natural or synthetic rubber.

**OTHER PROTECTIVE EQUIPMENT:** Boots, aprons, or chemical suits should be used when necessary to prevent skin contact. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.132 (general requirements), .133 (eye and face protection), and .138 (hand protection).

### 9. PHYSICAL AND CHEMICAL PROPERTIES

217 g/l @ 27° C 65-67 lbs./cu.ft.

NA NA Alkaline NA

NA NA NA

Powder

White

Decomposes at 180° C

| BOILING POINT:<br>VAPOR DENSITY (Air=1):<br>SPECIFIC GRAVITY (Water=1):<br>pH:<br>FREEZING/MELTING POINT:<br>SOLUBILITY (wt.% in water):<br>BULK DENSITY:<br>VOLUME % VOLATILE:<br>VAPOR PRESSURE:<br>EVAPORATION RATE:<br>HEAT OF SOLUTION: |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                                                                                                                                                                                                              |  |

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Slightly exothermic

Slight chlorine

PPG:

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07/18/2001

## 10. STABILITY AND REACTIVITY

27488 Prestochlor Calcium Hypochlorite Granules

**STABILITY:** Unstable above 177° C.

HAZARDOUS POLYMERIZATION: Will not occur.

### INCOMPATIBILITY (CONDITIONS/MATERIALS TO AVOID):

Contamination. Excessive heat above 177°C. Acids. Combustible materials. Organics. Reducing agents.

### HAZARDOUS THERMAL DECOMPOSITION/COMBUSTION PRODUCTS:

Acid or ammonia contamination will release toxic gases. Excessive heat will cause decomposition resulting in the release of oxygen and chlorine gas.

### 11. TOXICOLOGICAL INFORMATION

| ACUTE INHALATION LC50: | (rat) no mortality at 3.5 mg/l (1 hour). Irritating. |
|------------------------|------------------------------------------------------|
| ACUTE DERMAL LD50:     | (rabbit) >1000 mg/kg. Slight to very low toxicity.   |
| SKIN IRRITATION:       | Causes burns.                                        |
| EYE IRRITATION:        | Causes burns.                                        |
| ACUTE ORAL LD50:       | (rat) 850 mg/kg. Slight to very low toxicity.        |

CHRONIC EFFECTS/CARCINOGENICITY: This product is NOT listed as a carcinogen or suspected carcinogen by NTP, IARC, or OSHA.

MEDICAL CONDITIONS AGGRAVATED: None known.

#### **EFFECTS OF OVEREXPOSURE:**

#### ACUTE:

Inhalation: Inhalation of calcium hypochlorite dust and deposition of particles in the respiratory tract can lead to irritation of the tissue and cause a variety of effects. These effects are dependent on concentration and include: upper respiratory tract irritation, nasal congestion, coughing, sore throat, laryngitis and shortness of breath. In operations where there are high concentrations of respirable particulates, pulmonary edema (fluid in the lung) may be produced. If not treated immediately, pulmonary edema can be life threatening. Since this product is in granular or tablet form, particles of respirable size are not generally encountered.

Eye/Skin: Calcium hypochlorite is corrosive to the eyes. Contact of calcium hypochlorite dust with the eyes, even a minute amount for a short duration, can cause severe irritation and even blindness. Contact with the skin may cause severe irritation, burns, or tissue destruction. In studies utilizing rabbits, the skin irritation score was 8/8 and the eye irritation score was 98.5/110.

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#### PPG: 07/18/2001 27488 Prestochlor Calcium Hypochlorite Granules

Ingestion: Calcium hypochlorite, if swallowed, causes severe burns to the digestive tract and can be fatal.

#### CHRONIC:

Genotoxicity: Calcium hypochlorite produced positive responses in in-vitro assays using bacterial systems (the Ames test) and chromosomal aberrations in Chinese hamster fibroblasts. In a whole animal experiment (mouse micronucleus test), exposures ranging from 20 to 160 mg/kg produced no compound related chromosomal abnormalities.

Carcinogenisis: Although no study has been conducted with calcium hypochlorite, the carcinogenic potential of sodium hypochlorite was studled in F344 rats. After 104 weeks of drinking water containing up to 2000 ppm sodium hypochlorite, there was no evidence that this chemical produced any carcinogenic response. In addition, this exposure did not result in any adverse effects in blood, clinical chemistry, or other target organs.

One of the major uses of calcium hypochlorite is as a source of chlorine for water sanitization in drinking and recreational water. Studies have been conducted to determine the long-term effects of chlorinated drinking water. Seven generations of rats were given 100 ppm chlorine in their drinking water. No difference in fertility, growth, blood parameters, or specific organ toxicity was observed between control and exposed animals. Two separate animal studies conducted by different government agencies determined that the chlorination of municipal drinking water did not result in bxicity to the developing mouse fetus.

Safe handling of this material on a long-term basis should emphasize minimizing repeated acute exposures.

#### ECOLOGICAL INFORMATION 12.

### ECOTOXICOLOGICAL INFORMATION:

Highly toxic to aquatic life. 0.088 mg/l (Bluegill) 96-hour LC50

#### DISPOSAL CONSIDERATIONS 13.

#### **DISPOSAL METHOD:**

Spilled material that has been swept up and dissolved in water should be used immediately in the normal application for which this product is being used. If this is not possible, carefully neutralize dissolved material by adding hydrogen peroxide (one pint of 35% hydrogen peroxide solution per pound of calcium hypochlorite to be neutralized) then dilute the neutralized material with plenty of water and flush to sewer. Note: Only properly neutralized material should be flushed to sewer. Unneutralized material can cause environmental damage to receiving water or can interfere with treatment plant operation. For on-site neutralization, carefully and slowly pour the appropriate quantity of 35% hydrogen peroxide solution over all spilled material then flush area with plenty of water. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their

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PPG: 27488 Prestochlor Calcium Hypochlorite Granules 07/18/2001

containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, as well as any other relevant Federal, State, or local laws/regulations regarding disposal.

#### **RCRA:**

Waste calcium hypochlorite and contaminated soils/materials from spill cleanup are D001 hazardous waste as per 40 CFR 261.21(a)(4) and must be disposed of accordingly under RCRA.

#### 14. TRANSPORT INFORMATION

USA DOT DESCRIPTION: Proper Shipping Name: Hazard Class: Identification Number: Packing Group: Reportable Quantity:

Calcium Hypochlorite, Hydrated 5.1 (Oxidizer) UN2880 II 10 lbs./4.5 kg.

#### 15. REGULATORY INFORMATION

USA TSCA: This product is listed on the TSCA Inventory.EUROPE EINECS: This product is listed on EINECS.CANADA DSL:This product is listed on the Canadian DSL.AUSTRALIA AICS: This product is listed on AICS.KOREA ECIL:This product is listed on ECL.JAPAN MITI (ENCS): This product is listed on MITI.

#### SARA TITLE III:

SARA (311, 312) Hazard Class: Acute Health Hazard. Reactive Hazard. Fire Hazard. SARA (313) Chemicals: Not listed. SARA Section 302: Not listed as an Extremely Hazardous Substance.

#### **CERCLA HAZARDOUS SUBSTANCE:**

Listed in Table 302.4 of 40 CFR Part 302 as a hazardous substance with a reportable quantity of 10 pounds. Releases to air, land or water which exceed the RQ must be reported to the National Response Center, 800-424-8802.

#### HAZARD RATING SYSTEM (HMIS/NFPA):

NFPA: Health 3, Flammability 0, Reactivity 1 (Oxidizer)

#### FIFRA:

This product is registered with EPA as a pesticide.

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27488 Prestochlor Calcium Hypochlorite Granules 07/18/2001

### 16. OTHER INFORMATION

#### **Other Information:**

PPG:

NSF Drinking Water Treatment Chemicals Listing - PPG calcium hypochlorite is certified for maximum use at 15 mg/L under ANSI/NSF Standard 60.

#### The following has been revised since the last issue of this MSDS:

Date. Edition. Section 4 has been updated. Section 16 has been updated.

| Previous revision date:  | 06/15/1998 |
|--------------------------|------------|
| Previous edition number: | 007        |

NA = Not Available

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### MATERIAL SAFETY DATA SHEET

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

| PRODUCT NAME: | Liquid Caustic Soda, 50%                    |
|---------------|---------------------------------------------|
| PRODUCT ID:   | 0014                                        |
| SYNONYMS:     | Liquid Caustic Soda; Sodium Hydroxide; NaOH |
| ISSUE DATE:   |                                             |
| EDITION NO.:  | 20                                          |

### PPG Industries, Inc. One PPG Place, Pittsburgh, PA 15272, USA 24-hour Emergency Telephone Number: 1-304-843-1300 For Product Information (8am-5pm Eastern time): 1-800-243-6774 (C/A)

#### **PREPARER:** Product Safety, Chemicals

WEUUH HING, 2.01.00 + 11

ELEMENTIS Friday, March 26, 2004

| 2.                            | COMPOSITION/INFORMATION ON INGREDIENTS |
|-------------------------------|----------------------------------------|
| Material/CAS Number           | Percent                                |
| Sodium Hydroxide<br>1310-73-2 | 50                                     |
| Water<br>7732-18-5            | 50                                     |
|                               | 3. HAZARDS IDENTIFICATION              |

#### **EMERGENCY OVERVIEW:**

DANGER! Corrosive - Causes severe burns to eyes and skin.

**Precautions:** Do not get in eyes, on skin, or on clothing. Corrosive to skin. Even a small amount in the eye can cause blindness. Do not swallow. Avoid breathing dusts or mists from solutions. Use only with adequate ventilation. Ventilation must be sufficient to limit employee exposure to this product below permissible exposure limits. When making solutions or diluting, only add caustic soda slowly to surface of cold water while stirring. Do not add to warm or hot water, a violent eruption or explosive reaction can result. Avoid contact with organic materials and concentrated acids - may cause violent reactions. Caustic soda reacts with magnesium, aluminum, zinc (galvanized), tin, chromium, brass and bronze, generating hydrogen which is explosive. Caustic soda may react with various sugars to generate carbon monoxide. Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed vessels and can cause death. Wash thoroughly

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after handling. Do not eat, drink or smoke in work area. Liquid caustic soda is shipped hot (100-180 F). Avoid skin contact -- can cause thermal burns.

| 4. | FIRST | AID | MEASURES |
|----|-------|-----|----------|
|----|-------|-----|----------|

**INHALATION:** Remove from area to fresh air. If symptomatic, contact a poison control center, emergency room or physician for treatment information.

**EYE/SKIN CONTACT:** EYE: Remove contact lens and pour a gentle stream of warm water through the affected eye for at least 15 minutes. Contact a poison control center, emergency room or physician right away as further treatment will be necessary. SKIN: Run a gentle stream of water over the affected area for 15 minutes. A mild soap may be used if available. Contact a poison control center, emergency room or physician right away as further treatment will be necessary. If skin feels slippery, this product may still be present in sufficient quantities to cause rash or burn. Continue washing until slick skin feeling is gone. Thoroughly clean contaminated clothing and shoes before reuse or discard.

**INGESTION:** Gently wipe or rinse the inside of the mouth with water. Sips of water may be given if person is fully conscious. Never give anything by mouth to an unconscious or convulsing person. Do Not induce vomiting. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

5. FIRE FIGHTING MEASURES

FLASH POINT: None

EXTINGUISHING MEDIA: Not applicable.

**SPECIAL FIREFIGHTING PROCEDURES:** Contact with some metals (particularly magnesium, aluminum and galvanized zinc) can rapidly generate hydrogen, which is explosive.

6. ACCIDENTAL RELEASE MEASURES

# ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Only trained personnel equipped with NIOSH approved, full facepiece combination dust/mist respirators should be permitted in area. For dry material, use appropriate methods, shovels, brooms, and vacuums to clean up the spill. If mixed with water, or likely to become mixed with water or any liquid, dike area to contain spill. Reclaim if possible. Or, dilute spill with large amounts of water then neutralize with dilute acid. Use vacuum truck to pick up neutralized material for proper disposal. Properly neutralized liquid residues (pH 6 to 9) may be disposed of in waste water treatment facilities which allow the discharge of neutral salt solutions. After all visible traces have been removed, flush area with large amounts of water.

#### 7. HANDLING AND STORAGE

## PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORAGE:

Wear appropriate personal protective equipment when handling this product. Never touch eyes or face with hands or gloves that may be contaminated with this product. When making solutions or

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faile.

#### PPG: 0014 Liquid Caustic Soda, 50%

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diluting, only add caustic soda slowly to surface of cold water while stirring. Do not add to warm or hot water, a violent eruption or explosive reaction can result. Avoid contact with organic materials and concentrated acids - may cause violent reactions. Caustic soda reacts with magnesium, aluminum, zinc (galvanized), tin, chromium, brass and bronze, generating hydrogen which is explosive. Caustic soda may react with various sugars to generate carbon monoxide. Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed vessels and can cause death. Follow appropriate tank entry procedures (see ANSI Z177.1 - 1977). Do not enter a storage tank or container (truck or rail) that has contained this product, even if it appears empty. Liquid caustic soda is shipped hot (100-180 °F). Avoid skin contact -- can cause thermal burns.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### Exposure Limits:

8-hour Time Weighted Average (TWA); 15-minute Short-Term Exposure Limit (STEL)

OSHA: 2 mg/cu.m. Ceiling. 29 CFR 1910.1000 (Rev. 3/1/89).

**RESPIRATORY PROTECTION:** Use a NIOSH approved dust/mist filter respirator for all routine activities when exposure to dusts/mists exceed the permissible exposure limits. The respiratory use limitations made by NIOSH or the manufacturer must be observed. Respiratory protection programs must be in accordance with 29 CFR 1910.134.

**VENTILATION:** Use local exhaust sufficient to maintain dust/mist levels below permissible exposure limits.

EYE AND FACE PROTECTION: Close fitting chemical safety goggles with faceshield.

**PROTECTIVE GLOVES:** Nitrile. Neoprene. Natural rubber.

**OTHER PROTECTIVE EQUIPMENT:** Rubber boots with safety toes, rubber aprons, PVC clothing, and plastic hard hats should be used when necessary to prevent skin contact. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.132 (general requirements), .133 (eye and face protection), and .138 (hand protection).

|                                                     | IES      |
|-----------------------------------------------------|----------|
| BOILING POINT: 142°C                                | <u>.</u> |
| VAPOR DENSITY (Air=1): NA                           |          |
| SPECIFIC GRAVITY (Water=1):1.530 @ 60/60°F          |          |
| pH: Strongly basic                                  |          |
| FREEZING/MELTING POINT: 5-11°C (41-51°F)            |          |
| SOLUBILITY (wt.% in water): 347g/100g water @ 100°C |          |
| BULK DENSITY: 12.76 lbs/gal @ 60°F                  |          |
| VOLUME % VOLATILE: 50                               |          |

| EVAPORATION RATE: | NA         |
|-------------------|------------|
| HEAT OF SOLUTION: | Exothermic |

VAPOR PRESSURE:

1 mm Hg

07/15/2002

| PHYSICAL STATE:<br>ODOR: | Liquid<br>Odorless             |
|--------------------------|--------------------------------|
| COLOR:                   | Water white to slightly turbid |
| 10.                      | STABILITY AND REACTIVITY       |

#### STABILITY: Stable.

#### HAZARDOUS POLYMERIZATION: Will not occur.

#### INCOMPATIBILITY (CONDITIONS/MATERIALS TO AVOID):

Contact with organic materials and concentrated acids may cause violent reactions. Contact with magnesium, aluminum, galvanized zinc, tin, chromium, brass and bronze generates explosive hydrogen. Reactions with various food sugars may form carbon monoxide.

#### HAZARDOUS THERMAL DECOMPOSITION/COMBUSTION PRODUCTS:

Carbon monoxide.

#### 11. TOXICOLOGICÁL INFORMATION

| ACUTE INHALATION LC50: | Corrosive                           |
|------------------------|-------------------------------------|
| SKIN IRRITATION:       | Corrosive.                          |
| EYE IRRITATION:        | Corrosive.                          |
| ACUTE ORAL LD50:       | LDLo (rabbit) 500 mg/kg. Corrosive. |

**CHRONIC EFFECTS/CARCINOGENICITY:** This product is NOT listed as a carcinogen or suspected carcinogen by NTP, IARC, or OSHA.

#### MEDICAL CONDITIONS AGGRAVATED: None known.

#### **EFFECTS OF OVEREXPOSURE:**

#### ACUTE:

Eye/Skin: Causes severe burns to the eyes. Small quantities can result in permanent damage and/or loss of vision. For skin contact, corrosive action causes burns and frequently deep ulcerations with subsequent scarring. Prolonged contact destroys tissue. Dust or mist from solutions can cause irritant dermatitis.

Ingestion: Ingestion either in solid or liquid form can cause very serious damage to the mucous membranes or other tissues with which contact is made, and may be fatal.

Inhalation: Inhalation of dusts or mists can cause damage to the upper respiratory tract and to the lung tissue depending on severity of exposure. Effects can range from mild irritation of mucous membranes, severe pneumonitis and destruction of lung tissues.

CHRONIC: The effects of long-term, low level exposures to this product have not been determined.

07/15/2002

Safe handling of this material on a long-term basis should emphasize the prevention of all contact with this material to avoid any effects from repetitive acute exposures.

12. ECOLOGICAL INFORMATION

### **ECOTOXICOLOGICAL INFORMATION:**

Highly toxic to aquatic life. 240 ug/l (Bluegill) 96-hour TLM LC50

13. DISPOSAL CONSIDERATIONS

#### **DISPOSAL METHOD:**

Waste material must be disposed of in accordance with federal, state, provincial, and local environmental control regulations. Empty containers should be recycled or disposed of through an approved waste management facility. PPG recommends disposal of dry residues in an approved hazardous waste management facility or by neutralizing and disposing of according to local or permitted regulations.

|                       | 14. | TRANSPORT    | INFORMATION      |  |
|-----------------------|-----|--------------|------------------|--|
| Proper Shipping Name: |     | Sodium Hydró | xide, Solution   |  |
| Hazard Class:         |     |              |                  |  |
| UN Number:            |     | UN1824       |                  |  |
| Packing Group:        |     |              |                  |  |
|                       |     |              | 1000 lbs./454 kg |  |
|                       | 15. | REGULATORY   | INFORMATION      |  |

**USA TSCA:** All components of this product are listed on the TSCA Inventory.

**EUROPE EINECS:** All components in this product are listed on EINECS.

CANADA DSL: This product and/or all of its components are listed on the Canadian DSL.

AUSTRALIA AICS: All components of this product are listed on AICS.

**KOREA ECL:** All components in this product are listed on the Korean Existing Chemicals Inventory (KECI).

JAPAN MITI (ENCS): All components of this product are listed on MITI.

**PHILIPPINES PICCS:** All of the components in this product are listed on the Philippines Inventory of Chemicals and Chemical Substances (PICCS).

### SARA TITLE III:

SARA (311, 312) Hazard Class: Acute Health Hazard. Reactive Hazard. SARA (313) Chemicals: Not listed. SARA Extremely Hazardous Substance: Not listed.

#### **CERCLA Hazardous Substance:**

Listed in Table 302.4 of 40 CFR Part 302 as a hazardous substance with a reportable quantity of 1000 pounds. Releases to air, land or water which exceed the RQ must be reported to the National Response Center, 800-424-8802.

07/15/2002

#### RCRA:

Not listed.

**CANADA REGULATIONS (WHMIS):** Class E - Corrosive Material. Sensitization to product: None known. Reproductive toxicity: None known. Odor threshold: No odor. Product use: Neutralization, chemical processing.

### HAZARD RATING SYSTEM (HMIS/NFPA):

Health 3, Flammability 0, Reactivity 1

| 16.         | OTHER | INFORMATION  |  |
|-------------|-------|--------------|--|
| <b>TO</b> . | VIDER | TNL OKHULTON |  |

#### Other Information:

In case of emergency in Canada, contact PPG Canada, Inc., B.P.2010, Beauharnois, Quebec J6N 3C3, 450-429-3552, or Canutec 613-996-6666. ANSI/NSF Drinking Water Treatment Chemicals - Health Effects Listing - PPG sodium hydroxide/caustic soda is certified for maximum use at 200 mg/l under ANSI/NSF Standard 60.

### The following has been revised since the last issue of this MSDS:

Date. Edition. Section 16 has been updated.

| Previous revision date:  | 7/12/2002 |
|--------------------------|-----------|
| Previous edition number: | 019       |

NA = Not Available



PRODUCT

NALCO 8103 PLUS

EMERGENCY TELEPHONE NUMBER(S) (800) 424-9300 (24 Hours) CHEMTREC

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME :

**APPLICATION:** 

#### NALCO 8103 PLUS

WATER TREATMENTWATER CLARIFICATION AID

**COMPANY IDENTIFICATION :** 

Nalco Company 1601 W. Diehl Road Naperville, Illinois 60563-1198

EMERGENCY TELEPHONE NUMBER(S) :

(800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH: 0/1 FLAMMABILITY: 0/1 INSTABILITY: 0/0 OTHER: 0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous.

### 3. HAZARDS IDENTIFICATION

#### \*\*EMERGENCY OVERVIEW\*\*

#### CAUTION

May cause irritation with prolonged contact.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. May evolve ammonia (NH4) under fire conditions. May evolve HCl under fire conditions.

PRIMARY ROUTES OF EXPOSURE : Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT : May cause irritation with prolonged contact.

SKIN CONTACT : May cause irritation with prolonged contact.

INGESTION : Not a likely route of exposure. No adverse effects expected.



PRODUCT

# NALCO 8103 PLUS

EMERGENCY TELEPHONE NUMBER(S) (800) 424-9300 (24 Hours) CHEMTREC

#### INHALATION :

Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned. Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

#### AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

#### 4. FIRST AID MEASURES

#### EYE CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

#### SKIN CONTACT :

Remove contaminated clothing. Wash off affected area immediately with plenty of water. If symptoms develop, seek medical advice.

#### INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

If Swallowed: Do not induce vomiting. Drink large quantities of water. Never give anything by mouth to an unconscious or convulsing person.

If in Eyes: Flood eyes with water for at least 15 minutes.

If on Skin: Wash thoroughly soap and water.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

### 5. FIRE FIGHTING MEASURES

FLASH POINT :

#### Not flammable

#### **EXTINGUISHING MEDIA:**

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire. Water mist may be used to cool closed containers.



PRODUCT

### NALCO 8103 PLUS

EMERGENCY TELEPHONE NUMBER(S) (800) 424-9300 (24 Hours) CHEMTREC

#### FIRE AND EXPLOSION HAZARD

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. May evolve ammonia (NH4) under fire conditions. May evolve HCI under fire conditions.

#### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING : In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

| 6. | ACCIDENTAL RELEASE MEASURES |  |
|----|-----------------------------|--|
|    |                             |  |

#### **PERSONAL PRECAUTIONS:**

Notify appropriate government, occupational health and safety and environmental authorities. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

### METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

#### **ENVIRONMENTAL PRECAUTIONS:**

This product is toxic to fish. It should not be directly discharged into lakes, ponds, streams, waterways or public water supplies.

### 7. HANDLING AND STORAGE

#### HANDLING :

Do not take internally. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Avoid eye and skin contact.

#### STORAGE CONDITIONS :

Store separately from oxidizers. Store the containers tightly closed. Protect product from freezing.

#### SUITABLE CONSTRUCTION MATERIAL :

HDPE (high density polyethylene), Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

# ENGINEERING MEASURES :

General ventilation is recommended.

#### RESPIRATORY PROTECTION : Respiratory protection is not normally needed.

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PRODUCT

# NALCO 8103 PLUS

EMERGENCY TELEPHONE NUMBER(S) (800) 424-9300 (24 Hours) CHEMTREC

HAND PROTECTION : Nitrile gloves, PVC gloves

SKIN PROTECTION : Wear standard protective clothing.

EYE PROTECTION : Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS : Keep an eye wash fountain available. Keep a safety shower available.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE Viscous liquid

APPEARANCE Clear Yellow

ODOR None

SPECIFIC GRAVITY DENSITY SOLUBILITY IN WATER pH (100 %) VISCOSITY FREEZING POINT BOILING POINT VAPOR PRESSURE VAPOR DENSITY VOC CONTENT

Note: These physical properties are typical values for this product and are subject to change.

8.5 - 8.81 lb/gal

14 °F / -9.9 °C

Same as water

Same as water

> 212 °F / > 100 °C

0.00 % EPA Method 24

Complete

5.0 - 8.0

1.018 - 1.058 @ 77 °F / 25 °C

< 1,050 cps @ 77 °F / 25 °C

### 10. STABILITY AND REACTIVITY

STABILITY : Stable under normal conditions.

HAZARDOUS POLYMERIZATION : Hazardous polymerization will not occur.

CONDITIONS TO AVOID : Freezing temperatures.

#### MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

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PRODUCT

### NALCO 8103 PLUS

EMERGENCY TELEPHONE NUMBER(S) (800) 424-9300 (24 Hours) CHEMTREC

HAZARDOUS DECOMPOSITION PRODUCTS :

Oxides of carbon, Oxides of nitrogen, May evolve ammonia (NH4) under fire Under fire conditions: conditions., HCI

**Test Descriptor** 

Similar Product

**Test Descriptor** 

40% Active Ingredient

#### TOXICOLOGICAL INFORMATION 11.

The following results are for the polymer.

ACUTE ORAL TOXICITY : LD50 Species 25,500 mg/kg Rat Rating: Non-Hazardous

ACUTE DERMAL TOXICITY : LD50 Species > 20,000 mg/kg Rabbit Rating : Non-Hazardous

PRIMARY SKIN IRRITATION : Draize Score 1.0 / 8.0 Rating : Slightly imitating

**Test Descriptor** Similar Product

PRIMARY EYE IRRITATION : **Draize Score** 8 / 110.0 Rating : Practically non-irritating

**Test Descriptor** Similar Product

SENSITIZATION : This product is not expected to be a sensitizer.

#### CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

#### ECOLOGICAL INFORMATION 12.

ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

**ACUTE FISH RESULTS :** 

| Species           | Exposure | LC50          | Test Descriptor                             |
|-------------------|----------|---------------|---------------------------------------------|
| Rainbow Trout     | 96 hrs   | 0.85 mg/l     | Product tested in clean water               |
| Inland Silverside | 96 hrs   | > 5.000 ma/l  | Product tested in clean water               |
|                   | 96 hrs   | 10 - 100 mg/l | Representative polymer tested in water with |
| Zebra Danio       | <u></u>  | 110 100 1191  |                                             |

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PRODUCT

# NALCO 8103 PLUS

EMERGENCY TELEPHONE NUMBER(S) CHEMTREC (800) 424-9300 (24 Hours)

| [ · · · · · · · · · · · · · · · · · · · |        |           | DOC     |
|-----------------------------------------|--------|-----------|---------|
| Fathead Minnow                          | 96 hrs | 3.29 mg/l | Product |

#### ACUTE INVERTERRATE RESULTS :

| Species            | Exposure | LC50          | EC50 | Test Descriptor                                    |
|--------------------|----------|---------------|------|----------------------------------------------------|
| Daphnia magna      | 48 hrs   | 2.06 mg/l     |      | Product tested in clean water                      |
| Ceriodaphnia dubia | 48 hrs   | 1.09 mg/l     |      | Similar product tested in clean water              |
| Ceriodaphnia dubia | 48 hrs   | 2.5 mg/l      |      | Product tested in clean water                      |
| Daphnia magna      | 48 hrs   | 10 - 100 mg/l |      | Representative polymer tested in<br>water with DOC |

### AND IN COTODATE DECLI TO

| CHRUNIC INVERTEDIVATE NE | <u>SULIS.</u> |                      |              | Trad Descripton |
|--------------------------|---------------|----------------------|--------------|-----------------|
| Species                  | Test Type     | NOEC / LOEC          | End Point    | Test Descriptor |
|                          |               | 1.25 mg/1 / 2.5 mg/l | Reproduction | Product         |
| Ceriodaphnia dubia       | 3 Brood       | 1.20 1100 / 2.0 1100 | 1.001000000  |                 |

#### ADDITIONAL ECOLOGICAL DATA:

NOEC on earthworm: > 1000 mg/l (representative polymer) AOX information: Product contains no organic halogens.

#### **MOBILITY:**

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

| Air | Water    | Soil/Sediment |
|-----|----------|---------------|
| <5% | 30 - 50% | 50 - 70%      |

The portion in water is expected to be soluble or dispersible.

#### **BIOACCUMULATION POTENTIAL**

This preparation or material is not expected to bioaccumulate.

#### OTHER INFORMATION

The hazard characterization is based on the tests or potential hazard in the clean water.

If released into the environment, see CERCLA/SUPERFUND in Section 15.

#### **DISPOSAL CONSIDERATIONS** 13.

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.



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NALCO 8103 PLUS

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As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

### 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of tading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### 15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 : Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLAVSUPERFUND, 40 CFR 117, 302 : Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) : This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) : Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.



PRODUCT

### NALCO 8103 PLUS

EMERGENCY TELEPHONE NUMBER(S) (800) 424-9300 (24 Hours) CHEMTREC

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) : This product does not contain substances on the List of Toxic Chemicals.

#### TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :

When use situations necessitate compliance with FDA regulations, this product is acceptable under: 21 CFR 176.170 Components of paper and paperboard in contact with aqueous and fatty foods and 21 CFR 176.180 Components of paper and paperboard in contact with dry foods.

1) As a flocculant employed prior to the sheet-forming operation in the manufacture of paper and paperboard and used at a level not to exceed 10 mg/L (10 ppm) of influent water. 2) As a pigment dispersant and/or retention aid prior to the sheet-forming operation at a level not to exceed 10 pounds of active polymer per ton of finished paper and paperboard with the level of residual monomer not to exceed 1 weight percent of the polymer (dry basis). 3) As a pigment dispersant in coatings at a level not to exceed 3.5 pounds of active polymer per ton of finished paper and paperboard.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

**NSF INTERNATIONAL:** 

This product has received NSF/International certification under NSF/ANSI Standard 60 in the coagulation and flocculation category. The official name is "Poly (Diallyldimethylammonium Chloride) (pDADMAC)." Maximum product application dosage is : 57 mg/l.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerty Sec. 311 :

None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) : None of the substances are specifically listed in the regulation.

**CALIFORNIA PROPOSITION 65**:

This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

None of the substances are specifically listed in the regulation.

NATIONAL REGULATIONS, CANADA :



PRODUCT

## NALCO 8103 PLUS

EMERGENCY TELEPHONE NUMBER(S) (800) 424-9300 (24 Hours) CHEMTREC

#### WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

#### WHMIS CLASSIFICATION : Not considered a WHMIS controlled product.

### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

#### INTERNATIONAL CHEMICAL CONTROL LAWS

#### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

#### EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

#### KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

### 16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

#### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

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PRODUCT

# NALCO 8103 PLUS

EMERGENCY TELEPHONE NUMBER(S) (800) 424-9300 (24 Hours) CHEMTREC

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department Date issued : 07/14/2005 Version Number : 4.5

# **BRENNTAG MID-SOUTH, INC.**

## MATERIAL SAFETY DATA SHEET

Effective Date: July 20, 2005

# **PHOSPHORIC ACID 75 - 80% BY WEIGHT**

# SECTION I - MATERIAL IDENTIFICATION

# MANUFACTURER'S NAME & ADDRESS:

### **EMERGENCY TELEPHONE NUMBER:**

# (270) 830-1222

BRENNTAG MID-SOUTH, INC. 1405 Highway 136 West / Geneva Road Henderson, Kentucky 42420

CHEMICAL, NAME AND SYNONYMS: Phosphoric Acid, Orthophosphoric Acid, Monophosphoric Acid

## CHEMICAL FAMILY: Phosphate

# SECTION II - HAZARDOUS INGREDIENTS

|           |                   |         |                     |                    | VALUES (UI         | ITS)               |
|-----------|-------------------|---------|---------------------|--------------------|--------------------|--------------------|
|           | CHEMICAL          | WT      | OSE                 | IA:                | AC                 | GIH:               |
| CAS       | NAME(S)           | %       | - PEL               | STEL               | TLV                | STEL               |
| NUMBER    | Water             | 20-25   |                     | None estab         | lished             |                    |
|           |                   | 75 - 80 | l mg/m <sup>3</sup> | $3 \text{ mg/m}^3$ | $1 \text{ mg/m}^3$ | $3 \text{ mg/m}^3$ |
| 7664-38-2 | **Phosphoric Acid | 73-00   | 1 шАш               |                    |                    |                    |

\*\* This product contains chemical (s) subject to reporting requirements of Section 313, Title III of SARA, Part 372.

# **SECTION III - PHYSICAL DATA**

BOILING POINT \*F (\*C): 275-316\*F/135-158\*C

VAPOR DENSITY (AIR =1): Not applicable

VAPOR PRESSURE (mmHg): 2.2 to 5.6 @ 20 °C

SOLUBILITY IN WATER: Complete

FREEZING POINT: Phosphoric Acid 75% 0.5°F (-17.5°C); Phosphoric Acid 85% 70°F (21.1°C)

# SECTION IV - FIRE AND EXPLOSION HAZARD DATA

## FLASH POINT (METHOD USED): N/A

EXTINGUISHING MEDIA: This product does not support combustion.

SPECIAL FIRE FIGHTING PROCEDURES: Use full protective clothing and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Can produce explosive gas when in contact with metals. Keep containers cool with water spray to prevent rupture. Thermal decomposition emits toxic fumes of oxides of phosphorus.

# FLAMMABLE LIMITS (% BY VOLUME): N/A



FORMULA: H3PO4

SPECIFIC GRAVITY (H\_O=1): 1.57 to 1.69

PERCENT VOLATILE BY VOLUME (%): Not applicable

EVAPORATION RATE: Not applicable

APPEARANCE AND ODOR: Clear, colorless liquid, no odor.



# **BRENNTAG MID-SOUTH, INC.**

MATERIAL SAFETY DATA SHEET Effective Date: July 20, 2005

**PHOSPHORIC ACID 75 - 80% BY WEIGHT** 

# SECTION V - HEALTH HAZARD DATA

# **EFFECTS OF OVEREXPOSURE:**

DANGER! Corrosive. Causes Severe irritation and burns to every area of contact. Harmful If swallowed or inhaled.

INHALATION: Vapors or mist cause irritation, including sneezing, burning taste, coughing, and difficulty breathing. Severe exposure can lead to a chemical pneumonitis.

EYE CONTACT: Corrosive. May cause redness, pain, blurred vision, cye burns, and permanent eye damage.

SKIN CONTACT: Corrosive. May cause redness, pain, and severe skin burns.

INGESTION: Corrosive. May cause sore throat, abdominal pain, nausea, and severe burns of the mouth, throat, and stomach. Severe exposures can lead to shock, circulatory collapse, and death.

AGGRAVATION OF PRE-EXISTING CONDITIONS: Persons with pre-existing skin disorders or eye problems, or impaired respiratory function may be more susceptible to the effects of the substance.

PRIMARY ROUTES OF ENTRY: Inhalation and skin contact.

CHEMICAL LISTED AS CARCINOGEN OR POTENTIAL CARCINOGEN: <u>NTP</u>/No <u>LARC</u>/No <u>OSHA</u>/No

# EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Move immediately to fresh air. If not breathing, give artifici8al respiration. Obtain immediate medical attention.

EYE CONTACT: Flush immediately with plenty of cool water while holding eyelids open. Call a physician immediately.

SKIN CONTACT: Flush skin immediately with plenty of cool water and remove contaminated clothing. If irritation occurs or persists, get medical attention. Clean clothing before reuse.

INGESTION: Rinse mouth immediately, then drink 1 or 2 large glasses of milk or water. DO NOT INDUCE VOMITING. Get immediate medical attention.

# SECTION VI - REACTIVITY DATA

### STABILITY: Stable

## HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Stable under normal conditions. Flame temperatures.

INCOMPATIBILITY (MATERIALS TO AVOID): Can react violently with alkaline material, also can react with aluminum, copper, mild steel, brass and bronze. Do not mix with bleach or chlorinated detergents.

HAZARDOUS DECOMPOSITION PRODUCTS: At flame temperatures, will emit toxic phosphorus oxide fumes and hydrogen gass from reaction with metals.



# BRENNTAG MID-SOUTH, INC. MATERIAL SAFETY DATA SHEET Effective Date: July 20, 2005

PHOSPHORIC ACID 75 - 80% BY WEIGHT

# SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Personnel with proper personal protective equipment should dike and contain large spills. Then pump to containers or soak up with inert absorbent. Salvage or neutralize with soda ash or lime. Adequate ventilation is required for ash due to the release of carbon dioxide gas.

WASTE DISPOSAL METHOD: Disposal is to be in accordance with Federal, State, and Local regulations. If material cannot be salvaged, neutralization followed by disposal into a treatment system in accordance with Federal, State, and Local regulations.

# SECTION VIII - SPECIAL PROTECTION INFORMATION

**RESPIRATORY PROTECTION:** Wear NIOSH approved respiratory protective equipment when vapor or mists may exceed applicable concentration limits.

VENTILATION: Local exhaust as required to control vapor concentration below permissible limits.

EYE PROTECTION: Splash-proof glasses with goggles or face shield. PROTECTIVE GLOVES: Rubber gloves.

OTHER PROTECTIVE EQUIPMENT: Clothing to prevent skin contact. Eye wash fountain and safety shower.

# SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Avoid exposing to extreme heat or cold. Store in unopened container in cool, well ventilated area, away from potential sources of heat and fire. Keep away from combustible materials, strong bases and metals. Large storage tanks should be bermed and electrically grounded. Avoid using unprotected steel containers.

OTHER PRECAUTIONS: DANGER!! May cause severe burns to eyes and skin. Do not get in eyes, on skin or clothing. Wash thoroughly after handling. Avoid breathing mist or fumes. Use with adequate ventilation.

HAZARD RATING: Health 3

Flammability 0

Reactivity 0

REPORTABLE QUANTITY OF PRODUCT: 5000 Pounds.

# SECTION X - D.O.T. SHIPPING INFORMATION

# PROPER SHIPPING NAME: Phosphoric Acid Solution

UN/NA: UN 1805

PACKING GROUP: III

HAZARD CLASS: 8 (Corrosive Material)

D.O.T. LABEL REQUIRED: Corrosive



# **BRENNTAG MID-SOUTH, INC.**

MATERIAL SAFETY DATA SHEET Effective Date: July 20, 2005

# PHOSPHORIC ACID 75 - 80% BY WEIGHT

# SECTION XI - REGULATORY INFORMATION

TSCA (Toxic Substance Control Act): All components of this product are listed on the TSCA inventory.

SARA TITLE III: HAZARD CLASSIFICATIONS: Acute: yes Chronic; no Fire: no Pressure: no Reactivity: no

This product contains 75 to 85% phosphoric acid CAS #: 7664-38-2 which is subject to reporting requirements of Section 313, Title III of SARA, Part 372.

CANADA: This product is WHMIS controlled. Category D1a, E. This product does contain ingredients) ont Ingredient Disclosure List. All intentional ingredients are listed on the Domestic Substance List.

WHILE BRENNTAG MID-SOUTH, INC. BELIEVES THAT THE INFORMATION CONTAINED HEREIN IS FACTUAL; IT IS NOT TO BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH BRENNTAG MID-SOUTH, INC. ASSUMES LEGAL RESPONSIBILITY. IT IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION AND VERIFICATION. ANY USE OF THIS INFORMATION AND DATA MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.

PPROVED BY

FORMAT REVISION DATE: April 23, 2001

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# Thermo

ELECTRON CORPORATION 166 Cummings Center Beverly, MA 01915 USA Telephone: 978-232-6000

# Orion 080514 Polarographic D.O. Probe Electrolyte Solution Material Safety Data Sheet

| elephone. 976-232-0000                                                                                                                                         | ·                                                                                                                                                                                         |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| I. PRODUCT IDENTIFICATION: Polarographic D. O. Probe Electrolyle Solution                                                                                      |                                                                                                                                                                                           |  |
| Orion 080514                                                                                                                                                   | X. STABILITY AND REACTIVITY                                                                                                                                                               |  |
| PRODUCT USE: Reagent                                                                                                                                           | Product is stable. Hazardous polymerization will not occur.<br>Incompatibles: None.                                                                                                       |  |
| NEPA RATINGS: HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 0                                                                                                          | Hazardous decomposition product: None.                                                                                                                                                    |  |
| IL COMPOSITION/INFORMATION ON INGREDIENTS                                                                                                                      | XL TOXICOLOGICAL INFORMATION                                                                                                                                                              |  |
| % LD <sub>58</sub> mg/kg                                                                                                                                       | Route of Exposure: Itching of skin, initation of eyes if allowed to come in direct contact,<br>Teratogen Status: None                                                                     |  |
| COMPONENT Potassium Chloride (KCI)<br>CAS NO. 7447-40-7 4 3,600 (ORL-RAT)                                                                                      | Mutagen Status: None<br>Reproductive Toxicity: None<br>Carcinogen Status: None                                                                                                            |  |
| COMPONENT Deionized Water (H <sub>2</sub> O)<br>CAS NO. 7732-18-5 96 190,000 (IPR-MUS)                                                                         | XII. ECOLOGICAL INFORMATION                                                                                                                                                               |  |
| III. HAZARDS IDENTIFICATION                                                                                                                                    | None available.                                                                                                                                                                           |  |
| TADACT OPCANS: Skin and eves                                                                                                                                   | XIII. DISPOSAL CONSIDERATIONS                                                                                                                                                             |  |
| ACLITE TOXICITY: Low hazard. An electrolyte imbalance might occur if swallowed.                                                                                | Dispose of in a manner consistent with Federal, State and Local Regulations.                                                                                                              |  |
| CHRONIC TOXICITY: Low hazaid.<br>MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Cause stinging in an open cut.                                                     | XIV. TRANSPORT INFORMATION                                                                                                                                                                |  |
|                                                                                                                                                                | Product is not hazardous for transport.                                                                                                                                                   |  |
| IV. FIRST AID MEASURES                                                                                                                                         | XV. REGULATORY INFORMATION                                                                                                                                                                |  |
| EYE AND SKIN CONTACT: Irrigate with water.<br>INGESTION: Dilute with water and seek medical attention.<br>INHALATION: Not hazardous.                           | EUROPEAN INFORMATION:                                                                                                                                                                     |  |
|                                                                                                                                                                | None                                                                                                                                                                                      |  |
| V. FIRE FIGHTING MEASURES                                                                                                                                      | US/CANADA INFORMATION                                                                                                                                                                     |  |
| FLASH POINT: NA AUTOIGNITTON POINT NA<br>FLAMMABILITY LIMITS: UPPER: NA LOWER: NA<br>EXTINGUISHING MEDIA: Dry chemical, water spray, foam or CO <sub>2</sub> . | SARA/Title III: Ingredients not listed.<br>Cal. Proposition 65: Ingredients not listed.<br>US TSCA Inventory: Ingredients are listed.                                                     |  |
| VI. ACCIDENTAL RELEASE MEASURES                                                                                                                                | CPR Class: None.                                                                                                                                                                          |  |
| Clean up and set aside for waste disposal.                                                                                                                     | TDG Class: None.<br>MSDS discloses elements required by the CPR.                                                                                                                          |  |
|                                                                                                                                                                | XVL. OTHER INFORMATION                                                                                                                                                                    |  |
| VIL HANDLING AND STORAGE                                                                                                                                       | THE ABOVE INFORMATION IS BELIEVED TO BE ACCURATE AND REPRESENTS                                                                                                                           |  |
| Always wear eye protection and gloves when working with this product.<br>Product is low hazard.                                                                | THE BEST INFORMATION CURRENTLY AVAILABLE TO US. ALL PRODUCTS ARE<br>OFFERED IN ACCORDANCE WITH THE MANUFACTURER'S CURRENT<br>PRODUCTION SPECIFICATIONS AND ARE INTENDED SOLELY FOR USE IN |  |
| Vill         EXPOSURE CONTROLS/ PERSONAL PROTECTION                                                                                                            | ANALYTICAL TESTING. THE MANUFACTURES SHALL IN NO EVENT BE LABLE<br>FOR ANY INJURY, LOSS OR DAMAGE RESULTING FROM THE HANDLING, USE                                                        |  |
|                                                                                                                                                                | OR MISUSE OF THESE PRODUCTS.                                                                                                                                                              |  |
| <b>OSHA &amp; ACGIH THRESHOLD LIMIT: None listed.</b><br>PROTECTIVE EQUIPMENT: Safety glasses, lab coat and gloves.                                            | MSDS prepared by Quality Assurance Group.                                                                                                                                                 |  |
| DL. PHYSICAL AND CHEMICAL PROPERTIES                                                                                                                           |                                                                                                                                                                                           |  |
| STATE: Clear liquid ODOR THRESHOLD: None                                                                                                                       |                                                                                                                                                                                           |  |
| SENSITIVITY TO MECHANICAL IMPACT: None<br>SENSITIVITY TO STATIC DISCHARGE: None                                                                                |                                                                                                                                                                                           |  |
| CORRECTENT OF OILWATER DISTRIBUTION: NOR                                                                                                                       |                                                                                                                                                                                           |  |
| SOLUBILITY IN WATER: Soluble pH: 5.5 - 7.5<br>SPECIFIC GRAVITY: 1.06                                                                                           | · · · · ·                                                                                                                                                                                 |  |
| BOILING POINT: 106°C MELTING POINT: Not determined                                                                                                             |                                                                                                                                                                                           |  |
| VAPOR DENSITY: Not determined                                                                                                                                  | · · ·                                                                                                                                                                                     |  |
|                                                                                                                                                                |                                                                                                                                                                                           |  |
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|                                                                                                                                                                | Document Number 232337-001 Rev. E Effective Date: Feb. 24, 2005                                                                                                                           |  |
|                                                                                                                                                                | Document Number 232337-001 Rev. E Effective Date: Feb. 24, 2005                                                                                                                           |  |
|                                                                                                                                                                | Document Number 232337-001 Rev. E Effective Date: Feb. 24, 2005                                                                                                                           |  |
|                                                                                                                                                                | Document Number 232337-001 Rev. E Effective Date: Feb. 24, 2005                                                                                                                           |  |
|                                                                                                                                                                | Document Number 232337-001 Rev. E Effective Date: Feb. 24, 2005                                                                                                                           |  |

# **MATERIAL SAFETY DATA SHEET**

Sodium Carbonate, Anhydrous



MSDS Ref. No: 497-19-8 Version: US/Canada Date Approved: 04/13/2001 Revision No: 3

# **1. PRODUCT AND COMPANY IDENTIFICATION**

PRODUCT NAME: Sodium Carbonate, Anhydrous

SYNONYM(s): Soda Ash, Sodium Carbonate Anhydrous

GENERAL USE: Glass manufacture, detergent manufacture, sodium chemicals and carbonate chemicals manufacture, pulp and paper, brine treatment, water hardness removal, pH adjustment in water or waste water, flue gas desulfurization, coal treatment, ion exchange resin regeneration.

This chemical is certified to ANSI/NSF Standard 60, Drinking Water Chemicals-Health Effects. The maximum dosage level for this chemical is 150 mg/L.

### MANUFACTURER

**Emergency Telephone Numbers:** 

FMC Wyoming Corporation Alkali Chemicals Division 1735 Market Street Philadelphia, PA 19103 General Information: 215-299-6000 CHEMTREC (U.S.): (800) 424-9300 Emergency Phone (303)595-9048 (Medical - call collect) Emergency Phone (307) 875-2580 (Green River, WY-call collect)

# 2. COMPOSITION / INFORMATION ON INGREDIENTS

### **Chemical Name**

Sodium carbonale

CAS# Wt.% 497-19-8 99.8

# **3. HAZARDS IDENTIFICATION**

# **EMERGENCY OVERVIEW**

IMMEDIATE CONCERNS: White, granular solid. Product is non-combustible. Reacts with acids to release carbon dioxide gas and heat. Irritating to the eyes. Continuous contact may irritate skin.

POTENTIAL HEALTH EFFECTS: Direct contact with the product causes irritation of the eyes and continuous contact may cause skin irritation (red, dry, cracked skin). Excessive

levels of airborne dust may irritate the mucous membranes and upper respiratory tract.

# **4. FIRST AID MEASURES**

**EYES:** Immediately flush with water for at least 15 minutes, lifting the upper and lower eyelids intermittently. See a medical doctor or ophthalmologist immediately.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

**INGESTION:** Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

**INHALATION:** Remove to fresh air. If breathing difficulty or discomfort occurs and persists, obtain medical attention.

NOTES TO MEDICAL DOCTOR: While internal toxicity is low, irritant effects of high concentrations may produce corneal opacities, and vesicular skin reactions in humans with abraded skin only. Treatment is symptomatic and supportive.

# **5. FIRE FIGHTING MEASURES**

FLAMMABLE LIMITS: Not applicable

EXTINGUISHING MEDIA: Water, water fog, carbon dixoide (CO2), dry chemical

HAZARDOUS COMBUSTION PRODUCTS: Fumes of sodium oxide.

FIRE / EXPLOSION HAZARDS: Not applicable

FIRE FIGHTING PROCEDURES: Wear full protective clothing and selfcontained breathing apparatus.

AUTOIGNITION TEMPERATURE: Not applicable

PROPERTIES CONTRIBUTING TO FLAMMABILITY: Not applicable

FLASH POINT: Non-combustible

SENSITIVITY TO STATIC DISCHARGE: None

SENSITIVITY TO IMPACT: None

HAZARDOUS DECOMPOSITION PRODUCTS: Heated to decomposition, it emits fumes of sodium oxide.

# 6. ACCIDENTAL RELEASE MEASURES

**GENERAL PROCEDURES:** Sweep up and recycle into process if contamination does not present a problem. Use appropriate protective equipment if dust is generated or contact with eyes or skin is expected. Flush residues and liquid to holding area for neutralization before discharge.

# 7. HANDLING AND STORAGE

**HANDLING:** Use air conveying/mechanical systems for bulk transfer to storage. For manual handling of bulk transfer use mechanical ventilation to remove airborne dust from railcar, ship or truck. Use approved respiratory protection when ventilation systems are not available. Selection of respirators is based on the dust cloud generated.

STORAGE: Store in a cool dry area, away from acids.

**COMMENTS:** Provide general mechanical and/or local exhaust ventilation to prevent release of airborne dust into the work environment. Approved respiratory protection should be used when airborne dust is expected to be released.

# 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**ENGINEERING CONTROLS:** Minimize eye and skin contact by using appropriate protective equipement. Use local or general room ventilation to control airborne dust that may be generated into the work environment.

# PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Use cup type chemical goggles.

**RESPIRATORY:** Use approved dust respirator for low levels of airborne dust. High concentrations may require air supplied systems.

**PROTECTIVE CLOTHING:** Use impervious gloves to prevent skin contact, arm protectors and aprons. If clothing becomes contaminated, remove and launder before reuse. Industrial safety shocs.

# 9. PHYSICAL AND CHEMICAL PROPERTIES

### **ODOR:** Odorless

APPEARANCE: White, granular solid.

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**pH:** (1% solution): 11.4

**PERCENT VOLATILE:** Not applicable

VAPOR PRESSURE: Not applicable

VAPOR DENSITY: Not Applicable

**BOILING POINT:** Decomposes

FREEZING POINT: 851°C (1564°F)

SOLUBILITY IN WATER: 33.2 % maximum

EVAPORATION RATE: (Butyl Acetate - 1) Not applicable

**DENSITY:** (g/ml) Dense Grades = 0.86 - 1.12; Light Grades = 0.70 - 0.90

**SPECIFIC GRAVITY:** 2.509 (water = 1)

COEFF. OIL/WATER: Not applicable

**ODOR THRESHOLD:** Not applicable

**OXIDIZING PROPERTIES:** Not applicable

# **10. STABILITY AND REACTIVITY**

CONDITIONS TO AVOID: Contact with acids except under controlled conditions.

STABILITY: Stable

POLYMERIZATION: Will not occur

HAZARDOUS DECOMPOSITION PRODUCTS: None

**INCOMPATIBLE MATERIALS:** Reacts with acids with release of large volumes of carbon dioxide gas and heat.

COMMENTS: Materials to Avoid : Aluminum powder, acids, fluorine, molten lithium

# **11. TOXICOLOGICAL INFORMATION**

EYE EFFECTS: Severe irritant (rabbit) [Toxicology 23:281 (1982)]

SKIN EFFECTS: Non-irritating to intact skin. Minor irritation may occur on abraded skin.

[Toxicol. Appl. Pharmacol. 31:481 (1975)]

DERMAL LD<sub>s</sub>: No data available for the product.

ORAL LD<sub>so</sub>: 4090 mg/kg (rat) [RTECS 1986]

INHALATION LC<sub>30</sub>: 2.3 mg/L (rat, 2 hr) [Environ, Res. 31:138 (1983)]

SENSITIZATION: Non-sensitizing (humans, 0.25% sodium carbonate) [Toxicol. Appl. Pharmacol. 31:481 (1975)]

TARGET ORGANS: Eyes

ACUTE EFFECTS FROM OVEREXPOSURE: May cause severe irritation of the eyes, including comeal opacities. Dusts and mists may be irritating to the skin, mucous membranes and upper respiratory tract.

CHRONIC EFFECTS FROM OVEREXPOSURE: No data available for the product.

### CARCINOGENICITY:

IARC: Not listed

NTP: Not listed

OSHA: Not listed

OTHER: (ACGIH) Not listed

# **12. ECOLOGICAL INFORMATION**

ECOTOXICOLOGICAL INFORMATION: Daphnia Magna 96 hr LC50 = 265 - 565 mg/L

Bluegill Sunfish 96 hr LC50 = 300 - 320 mg/L

CHEMICAL FATE INFORMATION: Biodegradability does not apply to inorganic substances.

# **13. DISPOSAL CONSIDERATIONS**

**DISPOSAL METHOD:** Salvage as much material as possible and return to process if contamination does not present a problem. Dispose in an accepted landfill in accordance with accepted governmental regulations.

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# **14. TRANSPORT INFORMATION**

### U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PROPER SHIPPING NAME: Not regulated

PRIMARY HAZARD CLASS/DIVISION: Not applicable

UN/NA NUMBER: None

**PLACARDS:** Not applicable

LABEL: Not applicable

### **OTHER SHIPPING INFORMATION:**

DOT Marking: Not applicable Hazardous Substance/RQ: Not applicable 49 STCC Number: Not applicable

SPECIAL SHIPPING NOTES: IMDG: Not regulated IATA: Not regulated

# **15. REGULATORY INFORMATION**

### UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355): Not listed

SECTION 311 HAZARD CATEGORY (40 CFR 370): Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370): 10000 lbs.

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372): Not listed

**CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)** 

CERCLA REGULATORY (40 CFR 302.4): Not applicable

# TSCA (TOXIC SUBSTANCE CONTROL ACT)

### TSCA STATUS (40 CFR 710): Listed

# CANADA

# WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

Product Identification Number: Not applicable Hazard Classification: Toxic, Class D, Div. 2, Subdiv. B Ingredient Disclosure List: Listed

# **16. OTHER INFORMATION**

### **REVISION SUMMARY** Revision #: 3

This MSDS replaces the September 10, 1998 MSDS. Any changes in information are as follows: In Section 9 (Group Field) for Density

In Section 16 Section 16 Footnotes

### HMIS RATING

| HEALTH:      | 2 |
|--------------|---|
| FLAMMABILITY | U |
| REACTIVITY:  | 0 |
| PROTECTION:  | 1 |

Key

- 4 =Severe
- 3 =Serious
- 2 = Moderate
- I = Slight
- 0 Minimal

### **HMIS RATINGS NOTES:**

Protection - I (Safety goggles, gloves, apron & combination dust & vapor respirator)

The contents and format of this MSDS are in accordance with OSHA Hazard Communication Standard and Canada's Workplace Hazardous Information System (WHMIS).

National Fire Protection Association (NFPA)

Hazardous Materials Identification System (HMIS)

#### NFPA RATING

| HEALTH:        | 7 2 ] |
|----------------|-------|
| FLAMMABILITY - | 0     |
| REACTIVITY:    | 1 0   |
| SPECIAL:       | None  |

# Material Safety Data Sheet



# **Sodium Metabisulfite**

## 1. PRODUCT AND COMPANY IDENTIFICATION

- PRODUCT NAME: Sodium Metabisulfite
- OTHER/GENERIC NAMES: Anhydrous Sodium Bisulfite Sodium Pyrosulfite ABS

**PRODUCT USE:** Drug manufacture, food additive, water treatment, textile manufacture, photographic chemicals, and other chemical processes.

MANUFACTURER: Esseco General Chemical 90 East Halsey Road Parsippany, NJ 07054 USA

FOR MORE INFORMATION CALL: 973-515-1840

IN CASE OF EMERGENCY CALL: (24 Hours/Day, 7 Days/Week) 800-631-8050 or 973-515-0900 (Outside of USA)

(Monday-Friday, 9:00am-4:30pm)

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

| INGREDIENT NAME      | CAS NUMBER | WEIGHT % |
|----------------------|------------|----------|
| Sodium metabisulfite | 7681-57-4  | >98      |
| Sodium sulfite       | 7757-83-7  | <1.5     |

Trace impurities and additional material names not listed above may appear in Section 15 of this MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

OSHA Hazard Communication Standard:

This product is considered hazardous under the OSHA Hazard Communication Standard.

### 3. HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** Fine, white granular product with a pungent sulfur dioxide gas odor. May irritate the skin. May cause irritation and/or burns to the eyes. Harmful if swallowed or inhaled. May cause severe and possibly fatal allergic reactions if inhaled or swallowed by some asthmatics and other 'sulfite-sensitive' individuals. Reacts with acids to form toxic and irritating sulfur dioxide gas. Releases sulfur dioxide if heated above 300°F.

### POTENTIAL HEALTH HAZARDS

- SKIN: Repeated or prolonged contact with dust may cause irritation. Contact with solutions will cause skin irritation.
- EYES: Dust or mist may irritate or burn the eyes. Solutions will irritate or burn.

# 3

# MATERIAL SAFETY DATA SHEET

## Sodium Metabisulfite

- **INHALATION:** Contact with acids, water and/or ice, releases sulfur dioxide gas which may be harmful or deadly if inhaled. May cause severe or deadly allergic reactions in some asthmatics and sulfite sensitive individuals. Inhalation of dust or mist can irritate the respiratory tract. Possible signs and symptoms of allergic reactions include bronchoconstriction, sweating, flushing, hives, rapid heart rate, decreased blood pressure and anaphylaxis.
- **INGESTION:** May irritate the gastrointestinal tract. May cause severe or deadly allergic reactions in some asthmatics and sulfite sensitive individuals. Very large doses may cause violent colic, diarrhea, depression, and even death.

DELAYED EFFECTS: None known.

Ingredients found on one of the three OSHA designated carcinogen lists are listed below.

### INGREDIENT NAME

NTP STATUS

IARC STATUS OSHA LIST

No ingredients listed in this section.

## 4. FIRST AID MEASURES

- SKIN: Immediately wash skin with plenty of soap and water. Remove contaminated clothing and wash before reuse. Get medical attention if irritation persists.
- EYES: Flush eyes immediately with water for at least 15 minutes. Get medical attention.
- **INHALATION:** Promptly remove to fresh air. Get immediate medical attention if signs of suffocation, irritation or other symptoms develop.
- **INGESTION:** If conscious, immediately give a large quantity of water or milk and induce vomiting by touching finger to back of throat. Get immediate medical attention. Never give anything by mouth to an unconscious person.

ADVICE TO PHYSICIAN: Treat symptomatically. Note potential for anaphylactic shock with allergic individuals.

## 5. FIRE FIGHTING MEASURES

### FLAMMABLE PROPERTIES

FLASH POINT: FLASH POINT METHOD: AUTOIGNITION TEMPERATURE: UPPER FLAME LIMIT (volume % in air): LOWER FLAME LIMIT (volume % in air): FLAME PROPAGATION RATE (solids): OSHA FLAMMABILITY CLASS:

Not flammable Not applicable Not applicable Not applicable Not applicable Not applicable Not applicable

### **EXTINGUISHING MEDIA:**

Material is not flammable. Use extinguishing media appropriate for material in surrounding fire.

### UNUSUAL FIRE AND EXPLOSION HAZARDS:

Releases toxic and irritating sulfur dioxide at fire temperatures.



## Sodium Metabisulfite

### SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

Wear NIOSH-approved self-contained breathing apparatus.

### 6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (See section 8 for recommended personal protective equipment.) Promptly sweep up material with minimum dusting and shovel into an empty container with a cover. Cautiously spray residue with plenty of water. Provide ventilation to clear sulfur dioxide fumes which may be generated by contact with water.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

### 7. HANDLING AND STORAGE

NORMAL HANDLING: (See section 8 for recommended personal protective equipment.) Avoid contact with skin, eyes and clothing. Do not breathe dust. Do not eat or drink in the work area. Use normal personal hygiene and housekeeping. Keep away from water, ice, acids, heat and oxidizing agents. For Food Grade product, see precautions in section 16 regarding on-board use in preserving shrimp and fish.

### STORAGE RECOMMENDATIONS:

Store in a cool, dry, well-ventilated area away from water, ice, acids and oxidizing agents. Releases sulfur dioxide gas slowly at ambient temperatures.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### ENGINEERING CONTROLS:

Local exhaust if dusty conditions exist or if there is a release of sulfur dioxide gas. Do not use in unventilated spaces, e.g., the holds of fishing boats, walk-in coolers or confined spaces.

### PERSONAL PROTECTIVE EQUIPMENT

| SKIN PROTECTION:               | For handling dry material, wear cotton gloves and full work clothing, including long-<br>sleeved shirt and trousers. When handling solutions and there is prolonged or<br>repeated contact, wear impervious gloves, clothing and boots. |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EYE PROTECTION:                | Wear a hard hat (or other head covering) and chemical safety goggles. Do not wear contact lenses.                                                                                                                                       |
| RESPIRATORY<br>PROTECTION:     | Where required, use a NIOSH-approved respirator for dust, mist and/or sulfur dioxide gas, as conditions indicate. Some exposures may require a NIOSH-approved self-contained breathing apparatus or supplied-air respirator.            |
| ADDITIONAL<br>RECOMMENDATIONS: | Eyewash and safety shower is recommended.                                                                                                                                                                                               |



# Sodium Metabisulfite

### **EXPOSURE GUIDELINES**

| INGREDIENT NAM<br>Sodium metabisulf                                                                                                                                                                                     |                       | ACGIH TLV<br>5 mg/m <sup>3</sup> TWA | OSHA PEL  | OTHER LIMIT |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------|-----------|-------------|
| <ul> <li><sup>1</sup> = Limit established by General Chemical Corporation.</li> <li><sup>2</sup> = Workplace Environmental Exposure Level (AIHA).</li> <li><sup>3</sup> = Biological Exposure Index (ACGIH).</li> </ul> |                       |                                      |           |             |
| • • • • • • • • •                                                                                                                                                                                                       | RE LIMITS FOR POTENTI | AL DECOMPOSITION F                   | PRODUCTS: |             |
| Sulfur dioxide:                                                                                                                                                                                                         | OSHA TWA = 5 ppm      |                                      |           |             |
|                                                                                                                                                                                                                         | ACGIH TLV = 2 ppm     |                                      |           |             |
|                                                                                                                                                                                                                         | ACGIH STEL = 5 ppm    |                                      |           |             |

### 9. PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE:** Fine, white granular material. Solid. **PHYSICAL STATE: MOLECULAR WEIGHT:** 190.11 CHEMICAL FORMULA: Na<sub>2</sub>S<sub>2</sub>O<sub>5</sub> Pungent sulfur dioxide odor. ODOR: SPECIFIC GRAVITY (water = 1.0): 1.48 **SOLUBILITY IN WATER (weight %):** 39% at 16C pH: 1% solution - 4.3 **BOILING POINT:** Not applicable. **MELTING POINT:** Begins to rapidly decompose above 150C VAPOR PRESSURE: Not applicable. VAPOR DENSITY (air = 1.0): Not applicable. Not applicable. **EVAPORATION RATE: COMPARED TO:** Not applicable Not applicable. % VOLATILES: FLASH POINT: Not flammable.

(Flash point method and additional flammability data are found in Section 5.)

### 10. STABILITY AND REACTIVITY

### NORMALLY STABLE? (CONDITIONS TO AVOID):

Normally stable. Avoid elevated temperatures. Temperatures above 150C cause the rapid evolution of toxic and corrosive sulfur dioxide gas.

### **INCOMPATIBILITIES:**

Oxidizers: may cause strong exothermic reactions.

Acids, water and ice: releases sulfur dioxide gas which is toxic, corrosive, and potentially deadly. Water and/or ice speeds the production of sulfur dioxide gas.

### HAZARDOUS DECOMPOSITION PRODUCTS:

Sulfur dioxide and sodium sulfide residue. Sodium sulfide is flammable, a dangerous fire risk, a strong irritant to skin and tissue, and is incompatible with acids.

### HAZARDOUS POLYMERIZATION:

Will not occur.

# Sodium Metabisulfite

## **11.TOXICOLOGICAL INFORMATION**

## IMMEDIATE (ACUTE) EFFECTS:

Sodium metabisulfite –  $LD_{50}$  (oral, rat) = 424 mg/kg Sodium bisulfite –  $LD_{50}$  (oral, mouse) = 820 mg/kg

### DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:

Sodium sulfite has been demonstrated to be mutagenic in microbial systems; however, it is not mutagenic in studies involving insects and is not considered to present a mutagenic threat to multi-cell organisms.

### OTHER DATA:

None

### 12. ECOLOGICAL INFORMATION

For Sodium sulfite: 2600 ppm/24, 48 & 96 hr/mosquito fish/TL<sub>m</sub>/fresh water Biological Oxygen Demand (BOD): 0.12 lb/lb, instantaneous

### **13. DISPOSAL CONSIDERATIONS**

### **RCRA**

Is the unused product a RCRA hazardous waste if discarded? No.

If yes, the RCRA ID number is: Not applicable.

### OTHER DISPOSAL CONSIDERATIONS:

Dispose of in accordance with applicable Federal, State and Local regulations.

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

### 14. TRANSPORT INFORMATION

US DOT HAZARD CLASS: Not regulated.

US DOT ID NUMBER: Not applicable.

**PROPER SHIPPING NAME:** Not applicable.

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

### **15. REGULATORY INFORMATION**

### TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: All components are listed on TSCA Inventory of Chemical Substances.

OTHER TSCA ISSUES: None.



Sodium Metabisulfite

### SARA TITLE III/CERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

#### INGREDIENT NAME

SARA/CERCLA RQ (Ib) SARA EHS TPQ (Ib)

No ingredients listed in this section.

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Immediate.

#### SARA 313 TOXIC CHEMICALS:

The following ingredients are SARA 313 "Toxic Chemicals" and may be subject to annual reporting requirements. CAS numbers and weight percents are found in Section 2.

#### INGREDIENT NAME

<u>COMMENT</u>

No ingredients listed in this section.

#### STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

#### INGREDIENT NAME

WEIGHT % COMMENT

No ingredients listed in this section.

ADDITIONAL REGULATORY INFORMATION: None

WHMIS CLASSIFICATION (CANADA): D2B

FOREIGN CHEMICAL CONTROL INVENTORY STATUS: Listed on Canadian DSL and EU EINECS.

### 16. OTHER INFORMATION

CURRENT ISSUE DATE: April, 2003 PREVIOUS ISSUE DATE: January, 2002

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING: Change in company name.



# Sodium Metabisulfite

| OTHER INFORMATION: | Only NF grade is for use in drug formulation. | Only Food Grade material is for use as a |
|--------------------|-----------------------------------------------|------------------------------------------|
|                    | food additive.                                |                                          |

# On-board ship use of Food Grade material to preserve shrimp and fish:

**NEVER** apply dry material to shrimp or fish. ALWAYS prepare and use a solution in a well-ventilated area.

**NEVER** use below deck or in any confined space such as a hold or cooler. Injury or death may occur.

ALWAYS use on deck with plenty of ventilation.

Follow mixing and use directions printed on bag.



Wednesday, March 29, 2006



# 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

| Product Name: | SODIUM TRIPOLYPHOSPHATE ANHYDROUS |
|---------------|-----------------------------------|
|               |                                   |

Reference Number: AST10056 Date: July 10, 2000

Chemical Family: Phosphate Salts

Chemical Name: Triphosphoric Acid, Pentasodium Salt

Synonyms: STP; STPP; Polysorb®

Company Information:

ASTARIS LLC 622 Emerson Road - Suite 500 St. Louis, Missouri 63141

Emergency telephone: In USA call CHEMTREC: 1-800-424-9300 In Canada call CANUTEC: 1-613-996-6666

General Information: 1-800-244-6169

# 2. COMPOSITION/INFORMATION ON INGREDIENTS

Component

CAS No.

| Sodium Tripolyphosphate Anhydrous | 7758-29-4          |
|-----------------------------------|--------------------|
| Tetrasodium Pyrophosphate (TSPP)  | 7722-88-5          |
| Sodium Trimetaphosphate           | 778 <b>5-84-</b> 4 |

#### 3. HAZARDS IDENTIFICATION

## EMERGENCY OVERVIEW

Appearance and Odor: White powder or granules with no odor

WARNING STATEMENTS

CAUTION!

| Astaris Material Safety Data Sheet          |               |
|---------------------------------------------|---------------|
| Material: Sodium Tripolyphosphate Anhydrous | Page 2 of 6   |
| Reference No.: AST10056                     | July 10, 2000 |

MAY CAUSE RESPIRATORY TRACT IRRITATION

#### POTENTIAL HEALTH EFFECTS

Likely Routes of Exposure: Skin contact and inhalation

EYE CONTACT: No more than slightly irritating based on toxicity studies. The dry powder may cause foreign body irritation in some individuals.

SKIN CONTACT: No more than slightly toxic or slightly irritating based on toxicity studies. Prolonged contact with the dry powder may cause drying or chapping of the skin.

INHALATION: This product may cause coughing, chest tightness, runny nose, chest pain, and burning throat.

INGESTION: No more than slightly toxic if swallowed based on toxicity tests. No significant adverse health effects are expected to develop if only small amounts (less than a mouthful) are swallowed. Swallowing large quantities may cause gastrointestinal tract irritation, nausea, vomiting, and diarrhea.

Refer to Section 11 for toxicological information.

#### 4. FIRST AID MEASURES

IF IN EYES OR ON SKIN, immediate first aid is not likely to be required. However, this material can be removed with water. Remove material from eyes, skin and clothing. Wash heavily contaminated clothing before reuse.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

IF SWALLOWED, immediate first aid is not likely to be required. A physician or Poison Control Center can be contacted for advice.

#### 5. FIRE FIGHTING MEASURES

FLASH POINT: Not combustible

HAZARDOUS PRODUCTS OF COMBUSTION: Not applicable

EXTINGUISHING MEDIA: Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS: None known

### 6. ACCIDENTAL RELEASE MEASURES

In case of spill, sweep, scoop or vacuum and remove. If possible, complete cleanup on a dry basis. Flush residual spill area with water.

Refer to Section 13 for disposal information and Sections 14 and 15 for reportable quantity information.

Page 3 of 6 July 10, 2000

#### 7, HANDLING AND STORAGE

#### HANDLING

Avoid breathing dust. Keep container closed. Use only with adequate ventilation.

Emptied container retains product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

STORAGE: Store in a cool, dry place to maintain product performance.

#### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EYE PROTECTION: This product does not cause significant eye irritation or eye toxicity requiring special protection. Use good industrial practice to avoid eye contact.

SKIN PROTECTION: Although this product does not present a significant skin concern, minimize skin contamination by following good industrial practice. Wearing protective gloves is recommended. Wash hands and contaminated skin thoroughly after handling.

RESPIRATORY PROTECTION: Avoid breathing dust. Use NIOSH/MSHA approved respiratory protection equipment when airborne exposure limits are exceeded (see below). Consult the respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer. Respiratory protection programs must comply with 29 C.F.R. 1910 134.

VENTILATION: Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). The use of local mechanical exhaust ventilation is preferred at sources of air contamination such as open process equipment.

AIRBORNE EXPOSURE LIMITS: OSHA and ACGIH have not established specific exposure limits for this material. However, OSHA and ACGIH have established limits for particulates not otherwise classified (PNOC) which are the least stringent exposure limits applicable to dusts.

<u>OSHA PEL</u> 15 mg/m3 (total dust) 8-hr TWA 5 mg/m3 (respirable) 8-hr TWA ACGIH TLV 10 mg/m3 (inhalable) 8-hr TWA 3 mg/m3 (respirable) 8-hr TWA

Sodium tripolyphosphate anhydrous contains tetrasodium pyrophosphate which has the following airborne exocute quidelines:

OSHA PEL 5 mg/m3 8-hr. TWA ACGIH TLV 5 mg/m3 8-hr. TWA

Components referred to herein may be regulated by specific Canadian provincial legislation. Please refer to exposure limits legislated for the province in which the substance will be used.

#### 9. PHYSICAL AND CHEMICAL PROPERTIES

Chemical Formula: Appearance: Na<sub>5</sub>P<sub>3</sub>O<sub>10</sub> White powder or granules

#### Astaris Material Safety Data Sheet Material: Sodium Tripolyphosphate Anhydrous Reference No.: AST10056

| Odor:<br>pHt                       | None<br>9.7-10.1 (as a 1% solution @ 25 C)                                                                         |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Melting Point @ 760 mm Hg:         | Begins to melt incongruently @ 552 degrees C;<br>completely melted @ 622 degrees C                                 |
| Bulk Density (Ib./cu. ft):         | Powder - 50-65; Granular - 43-52 (medium dense)                                                                    |
| Solubility In Water (g/100 g H2O): | 6.0 @ 0 degrees C.<br>14.8 @ 25 degrees C.<br>16.7 @ 60 degrees C.<br>22.2 @ 80 degrees C.<br>32.2 @ 100 degrees C |

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

#### 10. STABILITY AND REACTIVITY

STABILITY: Product is stable under normal conditions of storage and handling

MATERIALS TO AVOID: None known

HAZARDOUS DECOMPOSITION PRODUCTS: None known

HAZARDOUS POLYMERIZATION: Will not occur

#### 11. TOXICOLOGICAL INFORMATION

Data from Astaris single-dose (acute) animal studies with this material are given below:

Oral - rat LD50 - 5,400 mg/kg; practically non-toxic Dermal - rabbit LD50 - > 7,940 mg/kg; practically non-loxic Eye Irritation - rabbit - 3.3/110.0; slightly irritating Skin Irritation - rabbit - 0-0/8.0 (24-hr exp.); not irritating Inhalation - LC50 > 0.39 mg/L (rat, 4 hr) (maximum attainable concentration)

Rats fed Sodium Tripolyphosphate Anhydrous in their diet for two years exhibited decreased growth, increased kidney/body weight ratios, and kidney changes. No birth defects were noted in rabbits given Sodium Tripolyphosphate Anhydrous orally during pregnancy. No effects were seen on the ability of male and female rats to reproduce when fed Sodium Tripolyphosphate Anhydrous for 3 successive generations. Sodium Tripolyphosphate Anhydrous has generally produced no genetic changes in a variety of standard tests using animals and animal or bacterial cells. Genetic changes were reported in a standard test using yeast cells.

The following component has been defined as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Tetrasodium pyrophosphate (a component of sodium tripolyphosphate anhydrous)

The dry powder may cause foreign body irritation in some individuals. Excessive inhalation of dust may be approving and can mechanically impede respiration. The high alkalinity of tetrasodium pyrophosphate (TSPP) may cause upper respiratory tract irritation. Prolonged

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| Astaris Material Safety Data Sheet          |               |
|---------------------------------------------|---------------|
| Material: Sodium Tripolyphosphate Anhydrous | Page 5 of 6   |
| Reference No.: AST10056                     | July 10, 2000 |

contact with the dry powder may cause drying or chapping of the skin.

Acute studies indicate that this material is slightly toxic orally (rat) and practically nontoxic after skin application (rabbit). It is slightly irritating to rabbit eyes and nonirritating to rabbit skin. Rats fed tetrasodium pyrophosphate in their diet for four months showed a reduced weight gain, urinary changes, increased organ-to-body weight ratios, and slight kidney damage. No birth defects were reported in rabbits, hamsters, mice or rats given this material orally during pregnancy.

Tetrasodium pyrophosphate produced no genetic changes in standard tests using bacterial and yeast cells.

#### 12. ECOLOGICAL INFORMATION

The following data have been classified using the criteria adopted by the European Economic Community (EEC) for aquatic organism toxicity.

Invertebrate: 48-hr EC50 Daphnia magna: > 1000 mg/L; Practically Nontoxic

96 hr. LC 50 > 100 mg/L, non-toxic (Rainbow trout, Inland silversides and mysid schrimp). [FMC 189-1081, 1082 & 1083]

48 hr. EC 50> 100 mg/L, non-toxic (Daphnia magna) [FMC 189-1084]

Astans has not conducted biodegradation studies with this product since when dissolved/hydrolyzed in water it yields completely mineralized materials.

#### 13. DISPOSAL CONSIDERATIONS

This material when discarded is not a hazardous waste as that term is defined by the Resource, Conservation and Recovery Act (RCRA), 40 CFR 261. Dry material may be landfilled or recycled in accordance with local, state and federal regulations. Consult your attorney or appropriate regulatory officials for information on such disposal.

#### 14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to property classify your shipment for transportation.

#### US DOT

Not regulated for transportation

#### Canadian TDG

Not regulated for transportation

#### 15. REGULATORY INFORMATION

TSCA Inventory: Listed

.....

DSL Inventory:

Listed

### Astaris Material Safety Data Sheet Material: Sodium Tripolyphosphate Anhydrous Reference No.: AST10056

WHMIS Classification: D2(B) - Materials Causing Other toxic Effects

SARA Hazard Notification

Hazard Categories Under Title III Rules (40 CFR 370): Immediate Section 302 Extremely Hazardous Substances: Not Applicable Section 313 Toxic Chemical(s): Not Applicable

CERCLA Reportable Quantity: Not applicable

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation and the MSDS contains all the information required by the Canadian Controlled Products Regulation.

Refer to Section 11 for OSHA/HPA Hazardous Chemical(s) and Section 13 for RCRA classification.

### 16. OTHER INFORMATION

|                       | Health | Fire | Reactivity | Additional Information |
|-----------------------|--------|------|------------|------------------------|
| Suggested NFPA Rating | 1      | 0    | 0          |                        |
| Suggested HMIS Rating | 1      | 0    | 0          | F                      |

Reason for revision: New Company

Supersedes MSDS dated: Not Applicable

Product Use: Food Ingredient, Cleaning Compound

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Responsible Care® is a registered trademark of the Chemical Manufacturers Association

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AST10056.700.doc



Cas Jim Walters 7-13-6

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### UREA PRILL XTL IND 104703

# 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Ashland P.O. Box 2219 Columbus, OH 43216 Regulatory Information Number Telephone Emergency telephone number 1-800-325-3751 614-790-3333 1-800-ASHLAND (1-800-274-5263)

Product name Product code Product Use Description UREA PRILL XTL IND 104703 No data

### 2. HAZARDS IDENTIFICATION

### **Emergency Overview**

Appearance: solid, Almost odorless, White

WARNING! Moderate skin irritant, Moderate eye irritant.

### **Potential Health Effects**

## **Routes of exposure**

Inhalation, Skin absorption, Skin contact, Eye Contact, Ingestion

### Eye contact

Dust can cause severe eye irritation. Symptoms include stinging, tearing, redness, and swelling of eyes. Can injure eye tissue.

#### Skin contact

May cause mild skin irritation. Symptoms may include redness and burning of skin. Passage of this material into the body through the skin is possible, but it is unlikely that this would result in harmful effects during safe handling and use.

### Ingestion

Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful.

### Inhalation

Breathing of vapor or mist is possible. Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful. Symptoms are not expected at air concentrations below the recommended exposure limits, if applicable (see Section 8.).



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## UREA PRILL XTL IND 104703

### **Aggravated Medical Condition**

Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material:, lung (for example, asthma-like conditions)

### Symptoms

Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include:, stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), headache, dizziness

### **Target Organs**

Overexposure to this material (or its components) has been suggested as a cause of the following effects in humans:, emphysema

### Carcinogenicity

Based on the available information, this material cannot be classified with regard to carcinogenicity., This material is not listed as a carcinogen by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or the Occupational Safety and Health Administration (OSHA).

### **Reproductive hazard.**

Based on the available information, risk to the fetus from maternal exposure to this material cannot be assessed.

### Other information

No data

| 3. COMPOSITION/INFORMATION ON INGREDIENTS |            |               |  |  |
|-------------------------------------------|------------|---------------|--|--|
| Components                                | CAS-No.    | Concentration |  |  |
| AMIDE                                     | NJTS#      | <=100%        |  |  |
|                                           | 254504001- |               |  |  |
|                                           | 5518       |               |  |  |

### 4. FIRST AID MEASURES

Eyes

If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

#### Skin

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## UREA PRILL XTL IND 104703

Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

### Ingestion

Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

### Inhalation

If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.

## Notes to physician

Hazards: No information available. Treatment: No information available.

### 5. FIRE-FIGHTING MEASURES

### Suitable extinguishing media

foam, water spray, carbon dioxide (CO2), dry chemical

### **Hazardous combustion products**

May form:, acid vapors, ammonia, carbon dioxide and carbon monoxide, nitrogen compounds

### **Precautions for fire-fighting**

No special fire hazards are known to be associated with this product.Wear full firefighting turn-out gear (full Bunker gear), and respiratory protection (SCBA).

### 6. ACCIDENTAL RELEASE MEASURES

Personal precautions No data

Environmental precautions No data

Methods for cleaning up



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### UREA PRILL XTL IND 104703

Shovel material into containers. Thoroughly sweep area of spill to clean up any residual material.

### 7. HANDLING AND STORAGE

### Handling

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.

#### Storage

No data

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

#### **Exposure Guidelines**

### **General advice**

These recommendations provide general guidance for handling this product. Personal protective equipment should be selected for individual applications and should consider factors which affect exposure potential, such as handling practices, chemical concentrations and ventilation. It is ultimately the responsibility of the employer to follow regulatory guidelines established by local authorities.

### **Exposure controls**

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below level of overexposure (from known, suspected or apparent adverse effects).

#### Eye protection

Wear safety glasses in compliance with OSHA regulations. (Consult your safety representative.)

### Skin and body protection

Wear normal work clothing covering arms and legs.Wear resistant gloves such as: Neoprene

### **Respiratory protection**

If needed, use a NIOSH-approved dust respirator. (Ask your safety representative.)



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# 9. PHYSICAL AND CHEMICAL PROPERTIES

| Physical state<br>Form<br>Colour<br>Odour<br>Boiling point/range<br>Melting point/range<br>pH<br>Flash point<br>Evaporation rate<br>Explosion limits | solid<br>Crystals or powder,<br>White<br>Almost odorless<br>No data<br>270.86 °F / 132.70 °C<br>7.2<br>No data<br>No data<br>No data<br>0.000002 kPa @ 77 °F / 25 °C |
|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vapour pressure<br>Vapour density<br>Density                                                                                                         | No data<br>1.335 g/cm3 @ 77.00 °F / 25.00 °C<br>No data                                                                                                              |
| Solubility<br>Partition coefficient (n-<br>octanol/water)<br>Autoignition temperature                                                                | No data<br>No data<br>No data                                                                                                                                        |

# **10. STABILITY AND REACTIVITY**

# Stability

Stable.

Conditions to avoid

None known.

### Incompatible products

Avoid contact with:, acids, nitrates, strong bases, strong oxidizing agents

# Hazardous decomposition products

May form:, acid vapors, ammonia, carbon dioxide and carbon monoxide, nitrogen compounds

### Hazardous reactions

Product will not undergo hazardous polymerization., Reacts with sodium or calcium hypochlorite to form explosive nitrogen trichloride.

# Thermal decomposition

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## UREA PRILL XTL IND 104703

No data

# **11. TOXICOLOGICAL INFORMATION**

Acute oral toxicity AMIDE

LD 50 Rat: 8,471 mg/kg

Acute inhalation toxicity

Acute dermal toxicity

### **12. ECOLOGICAL INFORMATION**

Aquatic toxicity

Acute and Prolonged Toxicity to Fish No data

Acute Toxicity to Aquatic Invertebrates No data

Environmental fate and pathways No data

### **13. DISPOSAL CONSIDERATIONS**

### Waste disposal methods

Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution Company, IC&S Environmental Services Group at 800-637-7922.

## **14. TRANSPORT INFORMATION**

Dangerous goods descriptions may not reflect package size, quantity, end-use or regionspecific exceptions that can be applied to shipments. Consult shipping documents for material-specific descriptions.

## **15. REGULATORY INFORMATION**



UREA PRILL XTL IND 104703

### California Prop. 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

# **Additional regulations**

US. High Production Volume Chemicals

# SARA 313 Component(s)

| OSHA Hazards Moderate skin irritant<br>Moderate eye irritant |        |              |                        |         |
|--------------------------------------------------------------|--------|--------------|------------------------|---------|
|                                                              | Health | Flammability | <b>Reactivity</b><br>0 | Other   |
| HMIS<br>NFPA                                                 | 2      | I            | U                      | No data |

# **16. OTHER INFORMATION**

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

This MSDS has been prepared by Ashland's Environmental Health and Safety Department (1-800-325-3751)



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UREA PRILL XTL IND 104703

.

# ATTACHMENT I

# **EMISSION UNITS TABLE**

# Attachment I

# **Emission Units Table**

(includes all emission units and air pollution control devices

that will be part of this permit application review, regardless of permitting status)

| Emission<br>Unit ID <sup>1</sup> | Emission<br>Point ID <sup>2</sup> | Emission Unit Description                        | Year Installed/<br>Modified | Design<br>Capacity          | Type <sup>3</sup> and Date<br>of Change | Control<br>Device <sup>4</sup> |
|----------------------------------|-----------------------------------|--------------------------------------------------|-----------------------------|-----------------------------|-----------------------------------------|--------------------------------|
| 7-17A                            | 7-17B                             | 2-Vacuum Pumps                                   | 1974,1980                   | 3,675 lb/hr,<br>4,410 lb/hr | Modification*                           | CO-320001                      |
| CO-<br>320001                    | 7-17B                             | Catalytic Oxidizer                               | 1995                        | 3.0 MMBTU<br>Burner         | Modification                            | NA                             |
| 10                               | 10                                | Pug Mill/51 Mill Process                         | 1995                        | 4,410 lb/hr<br>each         | Modification                            | PV-780303<br>&<br>DC-780401    |
| 8                                | 8                                 | 3x3 Rotary-Drum Filter                           | <del>1998</del>             | 280 CFM                     | Remove                                  | None                           |
| 9C                               | 9C                                | Pug Mill Feed Hopper                             | 1995                        | 4,410 lb/hr                 | Modification*                           | Baghouse<br>DC-780201          |
| 7B                               | 7B                                | Straight Line Filter and Parkson A<br>Vapor Hood | 1974                        | 3,675 lb/hr                 | Modification*                           | None                           |
| 9A                               | 9A                                | Clay Storage Silos A-F(6)                        | 1974                        | 154 tons<br>each            | Modification*                           | Baghouse<br>DC-701300          |
| 9B                               | 9B                                | Day Bin                                          | 1974                        | 20 tons                     | Modification*                           | Baghouse<br>DC-720100          |
| 13                               | 13                                | Haver A Packer                                   | 1974                        | 3,675 lbs/hr                | Modification*                           | Baghouse<br>DC-770025          |
| 009                              | 009                               | Haver C Packer                                   | 1974                        | 4,410 lbs/hr                | Modification*                           | Baghouse<br>DC-790001          |
| 2A                               | 2A                                | Dispersion Batch Tanks (2)                       | 1974                        | Clay Slurry<br>84,000 lb/hr | Modification*                           | None                           |
| 2                                | 2                                 | Rx and Disp. Tanks (6)                           | 1974                        | Clay Slurry<br>84,000 lb/hr | Modification*                           | None                           |
| 3                                | 3                                 | Flash Dryer System                               | 1994                        | 3,675 lb/hr                 | Modification*                           | Baghouse<br>DC-751500          |
| 5                                | 5                                 | ACM #2 Mill                                      | 1991                        | 3,675 lb/hr                 | Modification*                           | Baghouse<br>DC-750030          |
| 16                               | 16                                | ACM #1 Mill                                      | 1980                        | 3,675 lb/hr                 | Modification*                           | Baghouse<br>DC-750029          |

<sup>1</sup> For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
 <sup>2</sup> For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
 <sup>3</sup> New, modification, removal
 <sup>4</sup> For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

\*Not a physical change. Change in the operating schedule.

# Does not have a physical vent outside the building

# Attachment I

# **Emission Units Table**

(includes all emission units and air pollution control devices

that will be part of this permit application review, regardless of permitting status)

| Emission<br>Unit ID <sup>1</sup> | Emission<br>Point ID <sup>2</sup> | Emission Unit Description                  | Year Installed/<br>Modified | Design<br>Capacity | Type <sup>3</sup> and Date<br>of Change | Control<br>Device <sup>4</sup>       |
|----------------------------------|-----------------------------------|--------------------------------------------|-----------------------------|--------------------|-----------------------------------------|--------------------------------------|
| 17B                              | 17B                               | EIMCO B Filter and Parkson B<br>Vapor Hood | 1980                        | 3,675 lb/hr        | Modification*                           | None                                 |
| 18                               | 18                                | Boiler 1 (Kewanee Boiler)                  | 2010                        | 20.085<br>MMBtu/hr | Modification*                           | None                                 |
| 19                               | 19                                | Hot Water Heater                           | 1984                        | 400,000<br>Btu/hr  | Modification*                           | None                                 |
| 007                              | 007                               | West Vacuum Filter Vent                    | 1987                        | 2,205 lb/hr        | Modification*                           | None                                 |
| 008                              | 008                               | East Vacuum Filter Vent                    | 1987                        | 2,205 lb/hr        | Modification*                           | None                                 |
| 017                              | 017                               | West 1 <sup>st</sup> Stage FBD             | 1987                        | 2,205 lb/hr        | Modification*                           | Baghouse<br>DF-760017                |
| 018                              | 018                               | West 2 <sup>nd</sup> Stage FBD             | 1987                        | 2,205 lb/hr        | Modification*                           | Baghouse<br>DF-760018                |
| 019                              | 019                               | East 1 <sup>st</sup> Stage FBD             | 1987                        | 2,205 lb/hr        | Modification*                           | Baghouse<br>DF-760019                |
| 020                              | 020                               | East 2 <sup>nd</sup> Stage FBD             | 1987                        | 2,205 lb/hr        | Modification*                           | Baghouse<br>DF-760020                |
| 28                               | 7-17B/28                          | D Tank                                     | 1974                        | 9,988 gallons      | Modification*                           | 7-17B<br>(Working)<br>28 (Breathing) |
| 29                               | 7-17B/29                          | C Tank                                     | 1984                        | 11,374<br>gallons  | Modification*                           | 7-17B<br>(Working)<br>29 (Breathing) |
| 30                               | 7-17B/30                          | B Tank                                     | 1984                        | 11,374<br>gallons  | Modification*                           | 7-17B<br>(Working)<br>30 (Breathing) |
| 32                               | 7-17B/32                          | S3 Tank                                    | 1980                        | 9,988 gallons      | Modification*                           | 7-17B<br>(Working)<br>32 (Breathing) |
| 33                               | 7-17B/33                          | S1 Tank                                    | 1980                        | 20,305<br>gallons  | Modification*                           | 7-17B<br>(Working)<br>33 (Breathing) |
| 34                               | 7-17B/34                          | S2 Tank                                    | 1980                        | 20,305<br>gallons  | Modification*                           | 7-17B<br>(Working)<br>34 (Breathing) |
| 36                               | 36                                | Central Vacuum System                      | 1980                        | NA                 | NA                                      | NA                                   |
| 40                               | 40                                | Bulk Sack Packer                           | 2013                        | 3,000 pph          | Modification*                           | DC-770135                            |

<sup>1</sup> For Emission Units (or <u>Sources</u>) use the following numbering system:1S, 2S, 3S,... or other appropriate designation. For <u>Emission</u> Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation. <sup>3</sup> New, modification, removal

Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

\*Not a physical change.

# Does not have a physical vent outside the building

**Emission Units Table** 03/2007 2

<sup>4</sup> For <u>Control</u>

# Attachment I

### **Emission Units Table**

# (includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

| Emission<br>Unit ID <sup>1</sup> | Emission<br>Point ID <sup>2</sup> | Emission Unit Description       | Year Installed/<br>Modified | Design<br>Capacity | Type <sup>3</sup> and Date<br>of Change | Control<br>Device <sup>4</sup> |
|----------------------------------|-----------------------------------|---------------------------------|-----------------------------|--------------------|-----------------------------------------|--------------------------------|
| 41                               | 41                                | ACM #1 Feed Bin                 | 1995                        | 3,675 pph          | Modification                            | HP-752500                      |
| 42                               | 42                                | ACM #2 Feed Bin                 | 1995                        | 3,675 pph          | Modification                            | HP-753400                      |
| 43                               | 43                                | 51 Mill Recycle Bin             | 1995                        | 4,000 pph          | Modification                            | HP-780304                      |
| 44                               | 44                                | Haver A Packing Hopper          | 1992                        | 3,675 pph          | Modification                            | DC-77002                       |
| 45                               | 45                                | "A" Bag Dump Station            | 1992                        | 3,675 pph          | Modification                            | DC-770001                      |
| 46                               | 46                                | "C" Bag Dump Station            | 1995                        | 4,000 pph          | Modification                            | DC-780100                      |
| 47                               | 47                                | Haver C Packing Hopper          | 1995                        | 4,410 pph          | Modification                            | DC-790000                      |
| 17C                              | 17C                               | Eimco C Filter Vapor Hood       | 1998                        | 4,410 pph          | Modification                            | None                           |
| 48                               | 48                                | CO <sub>2</sub> Transfer System | 1995                        | 2,628 tpy          | No Change                               | None                           |
| 20                               | 20                                | Anion Addition                  | 2007-2008                   | 4,000 pph          | Modification                            | TK-750310                      |
| 49                               | 49                                | Long Conveyor                   | 1995                        | 3,675 pph          | Modification                            | DC-752010                      |
| 50                               | 50                                | Parkson C Vapor Hood            | 1998                        | 4,410 pph          | Modification                            | None                           |
| 51                               | 51                                | Soda Ash System                 | 2017                        | 3,000 pph          | New                                     | TK-720560<br>TK-720565         |
| WWTP                             | WWTP                              | Wastewater Treatment Plant      | 2003                        | 400 gpm            | New                                     | NA                             |
|                                  |                                   |                                 |                             |                    |                                         |                                |
|                                  |                                   |                                 |                             |                    |                                         |                                |

<sup>1</sup> For Emission Units (or <u>Sources</u>) use the following numbering system:1S, 2S, 3S,... or other appropriate designation. <sup>2</sup> For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.

<sup>3</sup> New, modification, removal <sup>4</sup> For <u>C</u>ontrol Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

\*Not a physical change.

# Does not have a physical vent outside the building

# ATTACHMENT J

# **EMISSION POINTS DATA SUMMARY SHEET**

Attachment J EMISSION POINTS DATA SUMMARY SHEET

|                         |                                                                                                         |                            | 1                                                                                         | _                        |                                                           |                                                           |                                                           |                                                           |
|-------------------------|---------------------------------------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
|                         | Emission 7<br>Concentration 7<br>(ppmv or<br>mg/m <sup>4</sup> )                                        |                            | <b>V</b> N                                                                                | NA                       | NA                                                        | AN                                                        | AN                                                        | NA                                                        |
|                         | Est.<br>Method<br>Used <sup>6</sup>                                                                     |                            | MB                                                                                        | EE                       | MB                                                        | E                                                         | EE                                                        | EE                                                        |
|                         | Emission<br>Form or<br>Phase<br>(At exit<br>conditions,<br>Solid, Liquid                                | or<br>Gas/Vapor)           | Solid<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor       | Solid                    | Solid<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor | Solid<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor | Solid<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor | Solid<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor |
|                         | Maximum<br>Potential<br>Controlled<br>Emissions <sup>5</sup>                                            | ton/yr                     | 0.10<br>1.10<br>1.27<br>0.04<br>17.53<br>0.15<br>1.44                                     | 0.0141                   | 1.21<br>3.59<br>4.29<br>0.04<br>7.59                      | 0.66<br>7.23<br>8.63<br>0.04<br>0.48                      | 0.04<br>0.18<br>0.18<br>0.04<br>0.04                      | 0.54<br>1.88<br>2.23<br>0.04<br>3.31                      |
|                         | May<br>Pot<br>Emis                                                                                      | lb/hr                      | 0.03<br>0.25<br>0.29<br>0.01<br>29.30<br>0.06<br>0.06                                     | 0.0138                   | 0.44<br>0.82<br>0.98<br>0.01<br>3.06                      | 0.15<br>1.65<br>1.97<br>0.01<br>0.11                      | 0.01<br>0.04<br>0.01<br>0.01<br>0.01                      | 0.13<br>0.43<br>0.51<br>0.01<br>0.81                      |
|                         | num<br>ntial<br>rrolled<br>ions 4                                                                       | ton/yr                     | 14.22<br>1.27<br>1.31<br>0.04<br>320.95<br>2.91                                           | 14.13                    | 9,000<br>3.59<br>4.29<br>0.04<br>7.59                     | 0.66<br>7.23<br>8.63<br>0.04<br>0.48                      | 0.04<br>0.18<br>0.18<br>0.04<br>0.04                      | 9,000<br>1.88<br>2.23<br>0.04<br>3.31                     |
| ata                     | Maximum<br>Potential<br>Uncontrolled<br>Emissions <sup>4</sup>                                          | lb/hr                      | 13.87<br>0.25<br>0.29<br>0.01<br>164.30<br>1.30                                           | 13.85                    | 3,675<br>0.82<br>0.98<br>0.01<br>3.06                     | 0.15<br>1.65<br>1.97<br>0.01<br>0.11                      | 0.01<br>0.04<br>0.01<br>0.01<br>0.01                      | 2,205<br>0.43<br>0.51<br>0.01<br>0.81                     |
| Table 1: Emissions Data | All Regulated<br>Pollutants -<br>Chemical<br>Name/CAS <sup>3</sup><br>(Speciate VOCs<br>& HAPS)         |                            | PM/PM10/PM2.5<br>CO<br>NOX<br>SO2<br>VOC<br>Methyl Chloride<br>Hydrogen Chloride          | PM/PM10/PM2.5            | PM/PM10/PM2.5<br>CO<br>NOx<br>SO2<br>VOC                  | PM/PM10/PM2.5<br>CO<br>NOX<br>VOC<br>VOC                  | PM/PM10/PM2.5<br>CO<br>NOX<br>SO2<br>VOC                  | PM/PM10/PM2.5<br>CO<br>NOx<br>SO2<br>VOC                  |
| Table 1:                | Vent Time for<br>Emission Unit<br><i>(chemical</i><br><i>processes only)</i>                            | Max<br>(hr/yr)             | 8,760                                                                                     | 8,760                    | 8,760                                                     | 8,760                                                     | 8,760                                                     | 8,760                                                     |
| ·                       | Vent Time for<br>Emission Unit<br><i>(chemical</i><br>processes only)                                   | Short<br>Term <sup>2</sup> | υ                                                                                         | U<br>U                   | J                                                         | сı                                                        | U                                                         | U                                                         |
|                         | Air Pollution<br>Control Device<br>(Must match<br>Emission Units<br>Table & Plot Plan)                  | Device<br>Type             | Catalytic<br>Oxidizer                                                                     | Baghouse                 | NA                                                        | ¥.                                                        | NA                                                        | Baghouse                                                  |
|                         | Air Po<br>Control<br>(Must<br>Emissic<br>Table & I                                                      | ID No.                     | 7-17B                                                                                     | 10                       | NA                                                        | NA                                                        | AA                                                        | DF-<br>760017                                             |
|                         | Emission Unit<br>Vented<br>Through This<br>Point<br>(Must match<br>Emission Units<br>Table & Plot Plan) | Source                     | Vacuum<br>Pumps<br>D Tank<br>C Tank<br>B Tank<br>S3 Tank<br>S1 Tank<br>S1 Tank<br>S2 Tank | Pug Mill/<br>51 Mill     | Flash<br>Dryer                                            | Boiler                                                    | Gas Fired<br>Heater                                       | West 1 <sup>st</sup><br>Stage FBD                         |
|                         |                                                                                                         | ID No.                     | 7-17A<br>28<br>29<br>30<br>32<br>33<br>33                                                 | 10                       | ÷                                                         | 8                                                         | 19                                                        | 017                                                       |
|                         | Emission<br>Point Type                                                                                  |                            | Upward<br>Vertical Stack                                                                  | Upward<br>Vertical Stack | Upward<br>Vertical Stack                                  | Upward<br>Vertical Stack                                  | Upward<br>Vertical Stack                                  | Upward<br>Vertical Stack                                  |
|                         | Emission<br>Point ID<br>No.<br><i>(Must match match Emission Units Table &amp; Plot</i>                 | Plan)                      | 7-17B                                                                                     | 10                       | m                                                         | 18                                                        | 19                                                        | 017                                                       |

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|                | Emission<br>Concentration<br>(ppmv or<br>mg/m <sup>4</sup> )                                            |                            | AA                                                        | NA                                                        | AN                                                        | NA        | NA        | ΥN                   |
|----------------|---------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------|-----------|----------------------|
|                | Est.<br>Method<br>Used <sup>6</sup>                                                                     |                            | E                                                         | ш                                                         | Н                                                         | E         | EE        | E                    |
|                | Emission<br>Form or<br>Phase<br>(At exit<br>conditions,<br>Solid, Liquid                                | or<br>Gas/Vapor)           | Solid<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor | Solid<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor | Solid<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor<br>Gas/Vapor | Gas/Vapor | Gas/Vapor | Gas/Vapor            |
|                | Maximum<br>Potential<br>Controlled<br>Emissions <sup>5</sup>                                            | ton/yr                     | 0.54<br>1.88<br>2.23<br>0.04<br>3.31                      | 0.54<br>1.88<br>2.23<br>0.04<br>3.31                      | 0.54<br>1.88<br>2.23<br>0.04<br>3.31                      | 0.05      | 0.06      | 0.06                 |
|                | E C Pa                                                                                                  | lb/hr                      | 0.13<br>0.43<br>0.51<br>0.01<br>0.81                      | 0.13<br>0.43<br>0.51<br>0.01<br>0.01<br>0.81              | 0.13<br>0.43<br>0.51<br>0.01<br>0.01<br>0.81              | 0.01      | 0.01      | 0.01                 |
|                | num<br>ntial<br>rolled<br>ons <sup>4</sup>                                                              | ton/yr                     | 9,000<br>1.88<br>2.23<br>0.04<br>3.31                     | 9,000<br>1.88<br>2.23<br>0.04<br>3.31                     | 9,000<br>1.88<br>2.23<br>0.04<br>3.31                     | 0.05      | 0.06      | 0.06                 |
| Data           | Maximum<br>Potential<br>Uncontrolled<br>Emissions <sup>4</sup>                                          | lb/hr                      | 2,205<br>0.43<br>0.51<br>0.01<br>0.81                     | 2,205<br>0.43<br>0.51<br>0.01<br>0.81                     | 2,205<br>0.43<br>0.51<br>0.01<br>0.81                     | 0.01      | 0.01      | 0.01                 |
| 1: Emissions D | All Regulated<br>Pollutants -<br>Chemical<br>Name/CAS <sup>3</sup><br>(Speciate VOCs<br>& HAPS)         |                            | PM/PM10/PM2.5<br>CO<br>NOX<br>SO2<br>VOC                  | PM/PM10/PM2.5<br>CO<br>NOX<br>SO2<br>VOC                  | PM/PM10/PM2.5<br>CO<br>NOX<br>SOZ<br>VOC                  | VOC       | voc       | voc                  |
| Table 1        | Vent Time for<br>Emission Unit<br><i>(chemical</i><br><i>processes only)</i>                            | Max<br>(hr/yr)             | 8,760                                                     | 8,760                                                     | 8,760                                                     | 8,760     | 8,760     | 8,760                |
|                | Vent T<br>Emissi<br>(che<br>process                                                                     | Short<br>Term <sup>2</sup> | υ                                                         | U                                                         | U                                                         | U         | υ         | υ                    |
|                | Air Pollution<br>Control Device<br>( <i>Nust match</i><br><i>Emission Units</i><br>Table & Plot Plan)   | Device<br>Type             | Baghouse                                                  | Baghouse                                                  | Baghouse                                                  | NA        | NA        | VA                   |
|                | Air Po<br>Control<br>(Must<br>Emissic<br>Table & F                                                      | D No.                      | DF-<br>760018                                             | DF-<br>760019                                             | DF-<br>760020                                             |           | NA NA     | NA                   |
|                | Emission Unit<br>Vented<br>Through This<br>Point<br>(Must match<br>Emission Units<br>Table & Plot Plan) | Source                     | West 2 <sup>nd</sup><br>Stage FBD                         | East 1 <sup>st</sup><br>Stage FBD                         | East 2 <sup>nd</sup><br>Stage FBD                         | D Tank    | C Tank    | B Tank               |
|                | Emis:<br>Ve<br>Throt<br>P<br>(Mus<br>Table &                                                            | ID No.                     | 018                                                       |                                                           | 0                                                         |           |           | 30                   |
|                | Emission<br>Point Type                                                                                  |                            | Upward<br>Vertical Stack                                  | Upward<br>Vertical Stack                                  |                                                           |           |           | Conservation<br>Vent |
| Ī              | Emission<br>Point ID<br>No.<br>(Must<br>match<br>Emission<br>Units Table<br>& Plot                      |                            |                                                           |                                                           |                                                           |           |           | 30                   |

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|                         |                                                                                                         |                            |                      |                      | T                    |                            |                                      |                          |
|-------------------------|---------------------------------------------------------------------------------------------------------|----------------------------|----------------------|----------------------|----------------------|----------------------------|--------------------------------------|--------------------------|
|                         | Emission<br>Concentration 7<br>(ppmv or<br>mg/m <sup>4</sup> )                                          |                            | NA                   | AN                   | VN                   | AN                         | AN                                   | VN                       |
|                         | Est.<br>Method<br>Used <sup>6</sup>                                                                     |                            | E                    | B                    | H                    | Э                          | E                                    | EE                       |
|                         | Emission<br>Form or<br>Phase<br>(At exit<br>conditions,<br>Solid, Liquid                                | or<br>Gas/Vapor)           | Gas/Vapor            | Gas/Vapor            | Gas/Vapor            | Solid                      | Solid                                | Solid                    |
|                         | Maximum<br>Potential<br>Controlled<br>Emissions                                                         | ton/yr                     | 0.05                 | 60.0                 | 60.0                 | 0.0141                     | 0.26                                 | 0.0316                   |
|                         | Ma:<br>Cor<br>Emis                                                                                      | lb/hr                      | 0.01                 | 0.02                 | 0.02                 | 0.0069                     | 0.18                                 | 0.0785                   |
|                         | num<br>ntial<br>trolled<br>ions <sup>4</sup>                                                            | ton/yr                     | 0.05                 | 0.09                 | 60.0                 | 14.13                      | 0.26                                 | 31.57                    |
| ata                     | Maximum<br>Potential<br>Uncontrolled<br>Emissions <sup>4</sup>                                          | lb/hr                      | 0.01                 | 0.02                 | 0.02                 | 6.92                       | 0.18                                 | 78.50                    |
| Table 1: Emissions Data | All Regulated<br>Pollutants -<br>Chemical<br>Name/CAS <sup>3</sup><br>(Speciate VOCs<br>& HAPS)         |                            | VOC                  | voc                  | VOC                  | PM/PM10/PM2.5              | PM/PM10/PM2.5                        | PM/PM10/PM2.5            |
| Table 1:                | Vent Time for<br>Emission Unit<br>(chemical<br>processes only)                                          | Max<br>(hr/yr)             | 8,760                | 8,760                | 8,760                | 8,760                      | 8,760                                | 800                      |
|                         | Vent T<br>Emissi<br>(che<br>process                                                                     | Short<br>Term <sup>2</sup> | U                    | C                    | C                    | υ                          | C                                    | U                        |
|                         | Air Pollution<br>Control Device<br>(Must match<br>Emission Units<br>Table & Plot Plan)                  | Device<br>Type             | NA                   | NA                   | NA                   | Baghouse                   | NA                                   | Baghouse                 |
|                         | Air Po<br>Contro<br>(Musi<br>Emissi<br>Table &                                                          | ID No.                     | NA                   | NA                   | NA                   | DC-<br>780201              | ΡN                                   | DC-<br>701300            |
|                         | Emission Unit<br>Vented<br>Through This<br>Point<br>(Must match<br>Emission Units<br>Table & Plot Plan) | Source                     | S3 Tank              | S1 Tank              | S1 Tank              | Pug Mill<br>Feed<br>Hopper | Straight<br>Line Filter<br>Hood Vent | Silos                    |
|                         | Emiss<br>V(<br>Throu<br>F<br>(Mus<br>Emiss<br>Table 8                                                   | ID No.                     | 32                   | 33                   | 34                   | 9C                         | 7B                                   | V6                       |
|                         | Emission<br>Point Type                                                                                  |                            | Conservation<br>Vent | Conservation<br>Vent | Conservation<br>Vent | Upward<br>Vertical Stack   | Upward<br>Vertical Stack             | Upward<br>Vertical Stack |
|                         | Emission<br>Point ID<br>No.<br>(Must<br>match<br>Emission<br>Units Table<br>& Plot                      | Plan)                      |                      |                      |                      |                            |                                      | 96                       |

|                         | Emission<br>Concentration<br>(ppmv or<br>mg/m <sup>4</sup> )                                            |                            | NA                       | NA                       | NA                       | NA                                                  | ИА                       | NA                       |
|-------------------------|---------------------------------------------------------------------------------------------------------|----------------------------|--------------------------|--------------------------|--------------------------|-----------------------------------------------------|--------------------------|--------------------------|
|                         | Est.<br>Method<br>Used <sup>6</sup>                                                                     |                            | EE                       | EE                       | EE                       | EE                                                  | EE                       | Е                        |
|                         | Emission<br>Form or<br>Phase<br>(At exit<br>conditions,<br>Solid, Liquid                                | Gas/Vapor)                 | Solid                    | Solid                    | Solid                    | Solid<br>Solid<br>Solid                             | Solid                    | Solid                    |
|                         | Maximum<br>Potential<br>Controlled<br>Emissions                                                         | ton/yr                     | 0.0316                   | 0.0141                   | 0.0141                   | 0.35<br>0.13<br>0.22                                | 0.35                     | 0.0141                   |
|                         | Max<br>Con<br>Emis                                                                                      | lb/hr                      | 0.0785                   | 0.0058                   | 0.0069                   | 0.08<br>0.03<br>0.05                                | 0.08                     | 0.0058                   |
|                         | Maximum<br>Potential<br>Uncontrolled<br>Emissions <sup>4</sup>                                          | ton/yr                     | 31.57                    | 14.13                    | 14.13                    | 0.35<br>0.13<br>0.22                                | 0.35                     | 14.13                    |
| ata                     | Maximum<br>Potential<br>Uncontrolle<br>Emissions                                                        | lb/hr                      | 78.50                    | 5.77                     | 6.92                     | 0.08<br>0.03<br>0.05                                | 0.08                     | 5.77                     |
| Table 1: Emissions Data | All Regulated<br>Pollutants -<br>Chemical<br>Name/CAS <sup>3</sup><br>(Speciate VOCs<br>& HAPS)         |                            | PM/PM10/PM2.5            | PM/PM10/PM2.5            | PM/PM10/PM2.5            | PM/PM10/PM2.5<br>Methyl Chloride<br>Benzyl Chloride | PM/PM10/PM2.5            | PM/PM10/PM2.5            |
| Table 1:                | Vent Time for<br>Emission Unit<br><i>(chemical</i><br><i>processes only)</i>                            | Max<br>(hr/yr)             | 800                      | 8,760                    | 8,760                    | 8,760                                               | 8,760                    | 8,760                    |
|                         | Vent T<br>Emissi<br>(che<br>process                                                                     | Short<br>Term <sup>2</sup> | C                        | C                        | С                        | C                                                   | C                        | v                        |
|                         | Air Pollution<br>Control Device<br>(Must match<br>Emission Units<br>Table & Plot Plan)                  | Device<br>Type             | Baghouse                 | Baghouse                 | Baghouse                 | NA                                                  | NA                       | Baghouse                 |
|                         | Air Pc<br>Control<br>(Must<br>Emissi<br>Table &                                                         | ID No.                     | DC-<br>720100            | DC-<br>770025            | DC-<br>760091            | NA                                                  | AN                       | DC-<br>750030            |
|                         | Emission Unit<br>Vented<br>Through This<br>Point<br>(Must match<br>Emission Units<br>Table & Plot Plan) | Source                     | Day Bin<br>Vent          | Haver A<br>Packer        | Haver C<br>Packer        | Process<br>Tanks                                    | Dispersion<br>Tanks      | ACM #2                   |
|                         | Emiss<br>Ve<br>Throu<br>R<br>Emiss<br>Table &                                                           | ID No.                     | 9B                       | 13                       | 600                      | 7                                                   | 2A                       | 2                        |
|                         | Emission<br>Point Type <sup>1</sup>                                                                     |                            | Upward<br>Vertical Stack | Upward<br>Vertical Stack | Upward<br>Vertical Stack | Upward<br>Vertical Stack                            | Upward<br>Vertical Stack | Upward<br>Vertical Stack |
|                         | Emission<br>Point ID<br>No.<br><i>(Must<br/>match<br/>Emission<br/>Units Table</i>                      | Plan)                      | 9B                       | 13                       | 600                      | 5                                                   | 2A                       | Ś                        |

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|                         | N                                                                                                       |                            |                          |                          |                          |                          | T                             | T                        |
|-------------------------|---------------------------------------------------------------------------------------------------------|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------------|--------------------------|
|                         | Emission<br>Concentration<br>(ppmv or<br>mg/m <sup>4</sup> )                                            |                            | NA                       | NA                       | NA                       | NA                       | AN                            | NA                       |
|                         | Est.<br>Method<br>Used <sup>6</sup>                                                                     |                            | EE                       | EE                       | EE                       | EE                       | E                             | EE                       |
|                         | Emission<br>Form or<br>Phase<br>(At exit<br>conditions,<br>Solid, Liquid                                | or<br>Gas/Vapor)           | Solid                    | Solid                    | Solid                    | Solid                    | Solid<br>Gas/Vapor            | Solid<br>Gas/Vapor       |
|                         | Maximum<br>Potential<br>Controlled<br>Emissions <sup>5</sup>                                            | ton/yr                     | 0.0141                   | 0.26                     | 0.43                     | 0.43                     | 0.25                          | 0.25<br>1.91             |
|                         | Max<br>Cor<br>Emis                                                                                      | lb/hr                      | 0.0058                   | 0.18                     | 0.21                     | 0.21                     | 0.10<br>0.78                  | 0.10<br>0.78             |
|                         | Maximum<br>Potential<br>Uncontrolled<br>Emissions <sup>4</sup>                                          | ton/yr                     | 14.13                    | 0.26                     | 0.43                     | 0.43                     | 0.25                          | 0.25                     |
| ata                     | Maxi<br>Pote<br>Uncon<br>Emiss                                                                          | lb/hr                      | 5.77                     | 0.18                     | 0.21                     | 0.21                     | 0.10<br>0.78                  | 0.10<br>0.78             |
| Table 1: Emissions Data | All Regulated<br>Pollutants -<br>Chemical<br>Name/CAS <sup>3</sup><br>(Speciate VOCs<br>& HAPS)         |                            | PM/PM10/PM2.5            | PM/PM10/PM2.5            | PM/PM10/PM2.5            | PM/PM10/PM2.5            | PM/PM10/PM2.5<br>VOC          | PM/PM10/PM2.5<br>VOC     |
| Table 1:                | Vent Time for<br>Emission Unit<br>( <i>chemical</i><br><i>processes only</i> )                          | Max<br>(hr/yr)             | 8,760                    | 8,760                    | 8,760                    | 8,760                    | 8,760                         | 8,760                    |
|                         | Vent T<br>Emissi<br><i>(che.</i><br><i>process</i>                                                      | Short<br>Term <sup>2</sup> | υ                        | U                        | U                        | U                        | C                             | U                        |
|                         | Air Pollution<br>Control Device<br>(Must match<br>Emission Units<br>Table & Plot Plan)                  | Device<br>Type             | Baghouse                 | NA                       | NA                       | NA                       | NA                            | NA                       |
|                         | Air Po<br>Contro<br>(Musi<br>Emissi<br>Table &                                                          | ID No.                     | DC-<br>750029            | NA                       | NA                       | NA                       | NA                            | NA                       |
|                         | Emission Unit<br>Vented<br>Through This<br>Point<br>(Must match<br>Emission Units<br>Table & Plot Plan) | Source                     | ACM #1                   | Eimco<br>Filter Hood     | Eimeo<br>Filter Hood     | Parkson C                | West<br>Vacuum<br>Filter Vent | East<br>Vacuum           |
|                         |                                                                                                         | ID No.                     | 16                       |                          | 17C                      |                          | 007                           | 800                      |
|                         | Emission<br>Point Type                                                                                  |                            | Upward<br>Vertical Stack      | Upward<br>Vertical Stack |
|                         | Emission<br>Point ID<br>No.<br>(Must<br>match<br>Emission<br>Units Table<br>& Plot                      | Plan)                      | 16                       |                          |                          |                          |                               | 000                      |

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| _                       |                                                                                                         | -                          |                          |                          |                          |                          |                          |                          |
|-------------------------|---------------------------------------------------------------------------------------------------------|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                         | Emission 7<br>Concentration 7<br>(ppmv or<br>mg/m <sup>4</sup> )                                        |                            | NA                       | NA                       | NA                       | NA                       | <b>V</b> N               | NA                       |
|                         | Est.<br>Method<br>Used <sup>6</sup>                                                                     |                            | EE                       | EE                       | B                        | EB                       | E                        | EE                       |
|                         | Emission<br>Form or<br>Phase<br>(At exit<br>conditions,<br>Solid, Liquid                                | or<br>Gas/Vapor)           | Solid                    | Solid                    | Solid                    | Solid                    | Solid                    | Solid                    |
|                         | Maximum<br>Potential<br>Controlled<br>Emissions <sup>5</sup>                                            | ton/yr                     | 0.0141                   | 0.0141                   | 0.0141                   | 0.0076                   | 0.0141                   | 0.0063                   |
|                         | Max<br>CO<br>Emis                                                                                       | lb/hr                      | 0.0047                   | 0.0058                   | 0.0058                   | 0.0069                   | 0.0058                   | 0.0058                   |
|                         | Maximum<br>Potential<br>Uncontrolled<br>Emissions <sup>4</sup>                                          | ton/yr                     | 14.13                    | 14.13                    | 14.13                    | 7.58                     | 14.13                    | 6.32                     |
| ata                     | Maxi<br>Pote<br>Uncon<br>Emiss                                                                          | lb/hr                      | 4.71                     | 5.77                     | 5.77                     | 6.92                     | 5.77                     | 5.77                     |
| Table 1: Emissions Data | All Regulated<br>Pollutants -<br>Chemical<br>Name/CAS <sup>3</sup><br>(Speciate VOCs<br>& HAPS)         |                            | PM/PM10/PM2.5            | PM/PM10/PM2.5            | PM/PM10/PM2.5            | PM/PM10/PM2.5            | PM/PM10/PM2.5            | PM/PM10/PM2.5            |
| Table 1:                | ent Time for<br>nission Unit<br>( <i>chemical</i><br>ocesses only)                                      | Max<br>(hr/yr)             | 8,760                    |                          |                          |                          |                          |                          |
|                         | Vent Time for<br>Emission Unit<br><i>(chemical</i><br><i>processes only)</i>                            | Short<br>Term <sup>2</sup> | U<br>U                   | U                        | U                        | U                        | υ                        | υ                        |
|                         | Air Pollution<br>Control Device<br>(Must match<br>Emission Units<br>Table & Plot Plan)                  | Device<br>Type             | BH                       | ВН                       | ВН                       | BH                       | BH                       | BH                       |
|                         | Air Pc<br>Control<br>(Must<br>Emissi<br>Table &                                                         | ID No.                     | DC-<br>770135            | DC-<br>752500            | DC-<br>753400            | HP-<br>780304            | DC-<br>770021            | 770001                   |
|                         | Emission Unit<br>Vented<br>Through This<br>Point<br>(Must match<br>Emission Units<br>Table & Plot Plan) | Source                     | Bulk Sack<br>Packer      | ACI Bin                  | AC2 Bin                  | 51 Recycle<br>Bin        | Haver A<br>Hopper        | Dump<br>Station A        |
|                         | Emis:<br>V(<br>Throt<br>F<br>(Nus<br>Emiss<br>Table &                                                   | ID No.                     | 40                       |                          | 42                       | 43                       | 44                       | 45                       |
|                         | Emission<br>Point Type <sup>1</sup>                                                                     |                            | Upward<br>Vertical Stack |
|                         | Emission<br>Point ID<br>No.<br>(Must<br>match<br>Emission<br>Units Table<br>& Plot                      | Plan)                      | 40                       |                          | 42                       | 43                       | 44                       | 45                       |

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|                         | Emission 7<br>Concentration 7<br>(ppmv or<br>mg/m <sup>4</sup> )                                        |                            | NA                       | NA                       | NA                                    | NA                         | NA                              | ]                                                                                                                                                                                                                                                       |
|-------------------------|---------------------------------------------------------------------------------------------------------|----------------------------|--------------------------|--------------------------|---------------------------------------|----------------------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | Est.<br>Method<br>Used <sup>6</sup>                                                                     |                            | EE                       | EE                       | EE                                    | EE                         | EE                              |                                                                                                                                                                                                                                                         |
|                         | Emission<br>Form or<br>Phase<br>(At exit<br>conditions,<br>Solid, Liquid                                | or<br>Gas/Vapor)           | Solid                    | Solid                    | Vapor                                 | Solid                      | Solid                           |                                                                                                                                                                                                                                                         |
|                         | Maximum<br>Potential<br>Controlled<br>Emissions <sup>5</sup>                                            | ton/yr                     | 0.0069                   | 0.0141                   | 2,384                                 | 0.0141                     | 0.0005                          |                                                                                                                                                                                                                                                         |
|                         | May<br>Con<br>Emis                                                                                      | lb/hr                      | 0.0063                   | 0.0069                   | NA                                    | 0.0058                     | 0.0047                          |                                                                                                                                                                                                                                                         |
|                         | Maximum<br>Potential<br>Uncontrolled<br>Emissions <sup>4</sup>                                          | ton/yr                     | 6.88                     | 14.13                    | NA                                    | 14.13                      | 0.55                            | viceion<br>ini                                                                                                                                                                                                                                          |
| ata                     | Maximum<br>Potential<br>Uncontrollec<br>Emissions                                                       | lb/hr                      | 6.28                     | 6.92                     | NA                                    | 5.77                       | 4.71                            | e sacoord                                                                                                                                                                                                                                               |
| Table 1: Emissions Data | All Regulated<br>Pollutants -<br>Chemical<br>Name/CAS <sup>3</sup><br>(Speciate VOCs<br>& HAPS)         |                            | PM/PM10/PM2.5            | PM/PM10/PM2.5            | cO <sub>2</sub>                       | PM/PM10/PM2.5              | PM/PM10/PM2.5                   | The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncantured increase emission unit and access emission unit and access emission unit and access emission of emission of emissions by emission unit. |
| Table 1:                | Vent Time for<br>Emission Unit<br><i>(chemical</i><br><i>processes only)</i>                            | Max<br>(hr/yr)             |                          |                          |                                       |                            | NA                              | emission unit                                                                                                                                                                                                                                           |
|                         | Vent Time for<br>Emission Unit<br>( <i>chemical</i><br><i>processes only</i> )                          | Short<br>Term <sup>2</sup> | U                        | J                        | NA                                    | υ                          | NA                              | missions by                                                                                                                                                                                                                                             |
|                         | Air Pollution<br>Control Device<br>(Must match<br>Emission Units<br>Table & Plot Plan)                  | Device<br>Type             | BH                       | ВН                       | NA                                    | BH                         | BH                              | mmation of e                                                                                                                                                                                                                                            |
|                         | Air Pe<br>Contro<br>(Musi<br>Emissi<br>Table &                                                          | ID No.                     | NEEDED                   | PV-<br>780303            | NA                                    | DC-<br>752010              | TK-<br>720560,<br>TK-<br>720565 | ovides a sur                                                                                                                                                                                                                                            |
|                         | Emission Unit<br>Vented<br>Through This<br>Point<br>(Must match<br>Emission Units<br>Table & Plot Plan) | Source                     | Dump<br>Station C        | 51 Mill<br>Hopper        | CO <sub>2</sub><br>Transfer<br>System | Long<br>Conveyor<br>Torrit | Soda Ash<br>System              | RY SHEET pro                                                                                                                                                                                                                                            |
|                         | Emiss<br>Ve<br>Throu<br>P<br>(Mus<br>Emiss<br>Table &                                                   | ID No.                     | 46                       | 47                       | 48                                    | 49                         | 51                              | A SUMMAF                                                                                                                                                                                                                                                |
|                         | Emission<br>Point Type <sup>1</sup>                                                                     |                            | Upward<br>Vertical Stack | Upward<br>Vertical Stack | Upward<br>Vertical Stack              | Upward<br>Vertical Stack   | Upward<br>Vertical Stack        | N POINTS DATA                                                                                                                                                                                                                                           |
|                         | Emission<br>Point ID<br>No.<br>(Mus:<br><i>match</i><br>Emission<br>Units Table<br>& Plot               | Plan)                      | 46                       | 47                       | 48                                    | 49                         | 51                              | The EMISSIO                                                                                                                                                                                                                                             |

encounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION point. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be encounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions and neutrinor such as uncound variant according to the EMISSIONS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive "Please and neutrinor such as uncound variant according to the EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

<sup>2</sup> Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk). List all regulated air pollutarits. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS<sub>2</sub>, VOCs, H<sub>2</sub>S, Inorganics, Lead, Organics, O<sub>3</sub>, List all regulated air pollutarits. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS<sub>2</sub>, VOCs, H<sub>2</sub>S, Inorganics, Lead, Organics, O<sub>3</sub>,

Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

<sup>6</sup> Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

<sup>6</sup> Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify). <sup>7</sup> Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (suffuric, nitric, hydrochloric or phosphoric) use units of milligram per dy cubic meter (mg/m<sup>3</sup>) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO<sub>2</sub>, use units of ppmv (See 45CSR10).

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| Attachment J | EMISSION POINTS DATA SUMMARY SHEET |  |
|--------------|------------------------------------|--|
| Attachm      | <b>EMISSION POINTS DAT</b>         |  |

|                        |                               |                                                                                     | 1       | 1       | T       |         |         |         |         |         |         |         |         | 1       |         | · · · · · |         |
|------------------------|-------------------------------|-------------------------------------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|---------|
|                        | tes (km)                      | Easting                                                                             | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2     | 442.2   |
|                        | UTM Coordinates (km)          | Northing                                                                            | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7   | 4,245.7 |
|                        | evation (ft)                  | Stack Height <sup>2</sup><br>(Release height of<br>emissions above<br>ground level) | ~55     | ~80     | ~104    | ~64     | ~18     | ~38     | ~38     | ~38     | ~38     | ~49     | ~49     | ~49     | ~49     | ~49       | ~49     |
| er Data                | Emission Point Elevation (ft) | Ground Level<br>(Height above<br>mean sea level)                                    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600      | ~600    |
| Release Parameter Data |                               | Velocity<br>(fps)                                                                   | 48      | 54      | 57.4    | 5.6     | 6.5     | 61      | 61      | 61      | 61      | 4.5     | 4.5     | 4.5     | 4.5     | 4.5       | 4.5     |
| Table 2: Rele          | Exit Gas                      | Volumetric Flow <sup>1</sup><br>(acfm)<br>af operating conditions                   | 10,143  | 4,500   | 25,000  | 2,500   | 137     | 18,000  | 18,000  | 18,000  | 18,000  | 13.4    | 13.4    | 13.4    | 13.4    | 13.4      | 13.4    |
|                        |                               | Temp.<br>(°F)                                                                       | 609     | 100     | 230     | 300     | 300     | 150     | 150     | 150     | 150     | 100     | 100     | 100     | 100     | 100       | 100     |
|                        | Inner<br>Diameter             | (ft.)                                                                               | 2.125   | 1.25    | 3.33    | 3.08    | 0.67    | 2.5     | 2.5     | 2.5     | 2.5     | 0.25    | 0.25    | 0.25    | 0.25    | 0.25      | 0.25    |
|                        | Emission<br>Point ID          | No.<br>( <i>Must match</i><br><i>Emission</i><br>Units Table)                       | 7-17B   | 10      | 3       | 18      | 19      | 017     | 018     | 019     | 020     | 28      | 29      | 30      | 32      | 33        | 34      |

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|                                                             |                   |               | I able Z: Kele                                                    | Release Parameter Data | ter Data                                         |                                                                                     |                      |          |
|-------------------------------------------------------------|-------------------|---------------|-------------------------------------------------------------------|------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------|----------------------|----------|
| Emission<br>Point ID                                        | Inner<br>Diameter |               | Exit Gas                                                          |                        | Emission Point Elevation (ft)                    | evation (ft)                                                                        | UTM Coordinates (km) | tes (km) |
| Molecture<br>No.<br>(Must match<br>Emission<br>Units Table) | (ft.)             | Temp.<br>(°F) | Volumetric Flow <sup>1</sup><br>(acfm)<br>at operating conditions | Velocity<br>(fps)      | Ground Level<br>(Height above<br>mean sea level) | Stack Height <sup>2</sup><br>(Release height of<br>emissions above<br>ground level) | Northing             | Easting  |
| 9C                                                          | 0.25              | 70            | 1,160                                                             | 4.5                    | ~600                                             | 10                                                                                  | 4,245.7              | 442.2    |
| 2A                                                          | 0.83              | 110           | 1,160                                                             | 4.5                    | ~600                                             | 46                                                                                  | 4,245.7              | 442.2    |
| 2                                                           | 2.0               | 110           | 4,000                                                             | 21.2                   | ~600                                             | 49                                                                                  | 4,245.7              | 442.2    |
| 5                                                           | 1.25              | 150           | 4,500                                                             | 61.1                   | ~600                                             | 85                                                                                  | 4,245.7              | 442.2    |
| 7B                                                          | 1.5               | 75            | 3,270                                                             | 30.8                   | ~600                                             | 75                                                                                  | 4,245.7              | 442.2    |
| 9A                                                          | 0.4               | 70            | 1,160                                                             | 66.3                   | ~600                                             | 1.25                                                                                | 4,245.7              | 442.2    |
| 9B                                                          | 1.0               | 70            | 1,160                                                             | 24.6                   | ~600                                             | 64                                                                                  | 4,245.7              | 442.2    |
| 13                                                          | 1.25              | Ambient       | 4,000                                                             | 54.3                   | ~600                                             | 85                                                                                  | 4,245.7              | 442.2    |
| 16                                                          | 1.17              | 100           | 4,500                                                             | 69.8                   | ~600                                             | 70                                                                                  | 4,245.7              | 442.2    |
| 17B                                                         | 1.67              | 75            | 3,270                                                             | 24.9                   | ~600                                             | 75                                                                                  | 4,245.7              | 442.2    |
| 17C                                                         | 1.67              | 75            | 3,270                                                             | 24.9                   | ~600                                             | 75                                                                                  | 4,245.7              | 442.2    |
| 007                                                         | 0.5               | 96            | 1,200                                                             | 102                    | ~600                                             | 39                                                                                  | 4,245.7              | 442.2    |
| 008                                                         | 0.5               | 06            | 1,200                                                             | 102                    | ~600                                             | 39                                                                                  | 4,245.7              | 442.2    |
| 600                                                         | 1.25              | Ambient       | 006                                                               | 54.3                   | ~600                                             | 85                                                                                  | 4,245.7              | 442.2    |
| 50                                                          | 1.67              | 75            | 3,270                                                             | 24.9                   | ~600                                             | 75                                                                                  | 4,245.7              | 442.2    |
| 40                                                          | NA                | Ambient       | 350                                                               | NA                     | ~600                                             | ~15                                                                                 | 4,245.7              | 442.2    |
| 41                                                          | NA                | 100           | 650                                                               | NA                     | ~600                                             | NN                                                                                  | 1 24 5 4             |          |

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|                                 | es (km)                       | Easting                                                                             | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   | 442.2   |
|---------------------------------|-------------------------------|-------------------------------------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                                 | UTM Coordinates (km)          | Northing                                                                            | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 | 4,245.7 |
|                                 | evation (ft)                  | Stack Height <sup>2</sup><br>(Release height of<br>emissions above<br>ground level) | NA      |
| er Data                         | Emission Point Elevation (ft) | Ground Level<br>(Height above<br>mean sea level)                                    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    | ~600    |
| ase Paramet                     |                               | Velocity<br>(fps)                                                                   | NA      |
| Table 2: Release Parameter Data | Exit Gas                      | Volumetric Flow <sup>1</sup><br>(acfm)<br>at operating conditions                   | 650     | 650     | 305     | 1,400   | 1,081   | 300     | 2,300   | 300     | 262     |
|                                 | -                             | Temp.<br>(°F)                                                                       | 100     | 100     | Ambient | Ambient | Ambient | Ambient | 100     | Ambient | Ambient |
|                                 | Inner<br>Diameter             | (H.)                                                                                | NA      |
|                                 | Emission<br>Point ID          | More Table)<br>(Must match<br>Emission<br>Units Table)                              | 42      | 43      | 44      | 45      | 46      | 47      | 49      | 20      | 51      |

<sup>1</sup> Give at operating conditions. Include inerts. <sup>2</sup> Release height of emissions above ground level. J10 of J10

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# ATTACHMENT K

# FUGITIVE EMISSIONS DATA SUMMARY SHEET

### Attachment K

# FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

|              | APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS                                                                                                                                                        |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.)          | Will there be haul road activities?                                                                                                                                                                     |
|              | Yes 🗌 No                                                                                                                                                                                                |
|              | ☐ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.                                                                                                                                        |
| 2.)          | Will there be Storage Piles?                                                                                                                                                                            |
|              | 🗌 Yes 🛛 No                                                                                                                                                                                              |
|              | If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.                                                                                                              |
| 3.)          | Will there be Liquid Loading/Unloading Operations?                                                                                                                                                      |
|              |                                                                                                                                                                                                         |
|              | ☐ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.                                                                                                                       |
| 4.)          | Will there be emissions of air pollutants from Wastewater Treatment Evaporation?                                                                                                                        |
|              |                                                                                                                                                                                                         |
|              | If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.                                                                                                                                                 |
| 5.)          | Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? |
|              | Yes No                                                                                                                                                                                                  |
|              | ☑ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS<br>UNIT DATA SHEET.                                                                                           |
| 6.)          | Will there be General Clean-up VOC Operations?                                                                                                                                                          |
|              | 🗌 Yes 🛛 No                                                                                                                                                                                              |
|              | If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.                                                                                                                                                 |
| 7.)          | Will there be any other activities that generate fugitive emissions?                                                                                                                                    |
|              | 🗌 Yes 🛛 No                                                                                                                                                                                              |
|              | ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.                                                                                                                  |
| lf yc<br>Sun | ou answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions<br>nmary."                                                                         |

| FUGITIVE EMISSIONS SUMMARY                                                                                                                                                                                                                                                                                                                                                                                 | All Regulated Pollutants <sup>-</sup><br>Chemical Name/CAS <sup>1</sup>                         | Maximum Potential<br>Uncontrolled Emissions <sup>2</sup> | Potential<br>Emissions <sup>2</sup> | Maximum Potential<br>Controlled Emissions <sup>3</sup> | otential<br>lissions <sup>3</sup> | Est.<br>Method       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------|--------------------------------------------------------|-----------------------------------|----------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                 | lb/hr                                                    | ton/yr                              | lb/hr                                                  | ton/yr                            | Used <sup>4</sup>    |
| Haul Road/Road Dust Emissions<br>Paved Haul Roads                                                                                                                                                                                                                                                                                                                                                          | PM<br>PM10<br>PM2.5                                                                             | 24.47<br>4.76<br>0.17                                    | 4.47<br>0.87<br>0.04                | 24.47<br>4.76<br>0.17                                  | 4.47<br>0.87<br>0.04              | EE                   |
| Unpaved Haul Roads                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                 |                                                          |                                     |                                                        |                                   |                      |
| Storage Pile Emissions                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                 |                                                          |                                     |                                                        |                                   |                      |
| Loading/Unloading Operations                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                 |                                                          |                                     |                                                        |                                   |                      |
| Wastewater Treatment Evaporation & Operations <sup>5</sup>                                                                                                                                                                                                                                                                                                                                                 | Volatile Organic Compounds<br>Methanol                                                          | 11.68<br>3.18                                            | 23.0<br>1.15                        | 11.68<br>3.18                                          | 23.0<br>1.15                      | 0                    |
| Equipment Leaks <sup>6</sup>                                                                                                                                                                                                                                                                                                                                                                               | Volatile Organic Compounds                                                                      | 3.82                                                     | 16.73                               | 3.82                                                   | 16.73                             | 0                    |
| General Clean-up VOC Emissions                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                 |                                                          |                                     |                                                        |                                   |                      |
| Other                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                 |                                                          |                                     |                                                        |                                   |                      |
| <sup>1</sup> List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS <sub>2</sub> , VOCs, H <sub>2</sub> S, Inorganics. Lead. Organics. O <sub>3</sub> . NO. NO. SO. SO. all applicable Greenhouse Gases (including CO, and mothom), and mothom (CO, DOMOT 105 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, | ing all HAPs. Follow chemical nar<br>SO <sup>5</sup> , SO <sup>5</sup> , all applicable Greenho | me with Chemical                                         | Abstracts Servic                    | e (CAS) number. I                                      | -IST Acids, C                     | 0, CS <sub>2</sub> , |

d, Organics, O<sub>3</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub>, SO<sub>3</sub>, all applicable Greenhouse Gases (including CO<sub>2</sub> and methane), etc. DO NOT LIST H<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>, O<sub>2</sub>, and Noble Gases.

<sup>3</sup> Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute <sup>2</sup> Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

<sup>4</sup> Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other

(specify). <sup>5</sup> US EPA WATER9 Version 2.0 used to model WWTP air emissions. <sup>6</sup> US EPA Protocol for Equipment Leak Estimates EPA-453/R-98-077 November 1995 Table 2-1 SOCMI Average Emission Factors

K2 of K2

# ATTACHMENT L

# **EMISSION UNIT DATA SHEETS**

# ATTACHMENT L INDEX

# EQUIPMENT

# PAGE

| Waste Water Treatment System                  | L1   |
|-----------------------------------------------|------|
| Pug Mill/51 Process                           | L5   |
| Flash Dryer System                            |      |
| Boiler 1                                      |      |
| Wheelbrator Oxidizer                          |      |
| Hot Water Heater                              |      |
| West 1 <sup>st</sup> Stage Fluid Bed Dryer    |      |
| West 2 <sup>nd</sup> Stage Fluid Bed Dryer    |      |
| East 1 <sup>st</sup> Stage Fluid Bed Dryer    |      |
| East 2 <sup>nd</sup> Stage Fluid Bed Dryer    |      |
| Pug Mill Feed Hopper                          |      |
| Clay Storage Silos A-F                        |      |
| Day Bin                                       |      |
| Straight Line Filter and Parkson A Vapor Hood |      |
| 2 Vacuum Pumps                                |      |
| Haver A Packer                                |      |
| Haver C Packer                                |      |
| Dispersion Batch Tanks (2)                    |      |
| Rx and Disp. Tanks (6)                        |      |
| ACM #2 Mill                                   |      |
| ACM #2 Mill.                                  |      |
| West Rotary Vacuum Filter Vent                |      |
| East Rotary Vacuum Filter Vent                |      |
| Einco B Filter and Parkson B Vapor Hood       |      |
| Eimeo B Filter Vapor Hood                     |      |
| Parkson C Vapor Hood                          |      |
| Bulk Sack Packer                              |      |
| ACM #1 Feed Bin                               |      |
| ACM #1 Feed Bin                               |      |
| 51 Mill Recycle                               |      |
|                                               |      |
| Haver A Packing Hopper                        |      |
| "A" Bag Dump Station                          |      |
| "C" Bag Dump Station                          |      |
| Haver C Packing Hopper                        |      |
| CO <sub>2</sub> Transfer System               |      |
| Anion Addition                                |      |
| Long Conveyor                                 |      |
| Soda Ash System                               |      |
| Equipment Leaks                               |      |
| B Tank                                        |      |
| C Tank                                        |      |
| D Tank                                        |      |
| S1 Tank                                       |      |
| S2 Tank                                       |      |
| S3 Tank                                       | L185 |

### Attachment L EMISSIONS UNIT DATA SHEET GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): WWTP

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wastewater Treatment Plant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 400 gallons per minute of wastewater                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <ol><li>Name(s) and maximum amount of proposed material(s) produced per hour:</li></ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 400 gallons per minute of effluent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| * The identification number which annual here as the second s |
| * The identification number which appears here must correspond to the air pollution control device identification number appearing on the <i>List Form</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| 6.       | Со    | mbustion Data (if applic        | able): Not Applica   | ble              |                |                           |
|----------|-------|---------------------------------|----------------------|------------------|----------------|---------------------------|
|          | (a)   | Type and amount in a            | propriate units of f | uel(s) to be bu  | urned;         |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       | <u></u>                         |                      |                  |                | ······                    |
|          | (b)   | Chemical analysis of p and ash: | roposed fuel(s), exe | cluding coal, i  | ncluding maxir | num percent sulfur        |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          | (c)   | Theoretical combustion          | n air requirement (A | CF/unit of fue   | el):           | ,,                        |
|          |       | @                               |                      | °F and           |                | psia.                     |
|          | (d)   | Percent excess air:             |                      |                  |                |                           |
| $\vdash$ | (e)   | Type and BTU/hr of bu           | rners and all other  | firing equipme   | ent planned to | be used:                  |
|          | (-)   |                                 |                      | ining oderbrine  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          | (f)   | If coal is proposed as a        | source of fuel, ide  | ntify supplier a | and seams and  | give sizing of the        |
|          |       | coal as it will be fired:       |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
|          |       |                                 |                      |                  |                |                           |
| <u> </u> |       |                                 |                      | <u> </u>         |                |                           |
|          | (g)   | Proposed maximum de             | sign heat input:     |                  |                | × 10 <sup>6</sup> BTU/hr. |
| 7.       | Proj  | ected operating schedu          | ıle:                 |                  |                |                           |
| Но       | urs/E | Day 24                          | Days/Week            | 7                | Weeks/Year     | 52                        |

| 8. | <ol> <li>Projected amount of pollutants that would be emitted from this affected source if no control<br/>devices were used:</li> </ol> |           |       |                  |            |  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|------------------|------------|--|
| @  | Ambient temperatur                                                                                                                      | re °F and |       | Ambient Pressure | psia       |  |
| a. | NO <sub>X</sub>                                                                                                                         | NA        | lb/hr | NA               | grains/ACF |  |
| b. | SO <sub>2</sub>                                                                                                                         | NA        | lb/hr | NA               | grains/ACF |  |
| c. | СО                                                                                                                                      | NA        | lb/hr | NA               | grains/ACF |  |
| d. | PM <sub>10</sub>                                                                                                                        | NA        | lb/hr | NA               | grains/ACF |  |
| e. | Hydrocarbons                                                                                                                            | NA        | lb/hr | NA               | grains/ACF |  |
| f. | VOCs                                                                                                                                    | 11.68     | lb/hr | NA               | grains/ACF |  |
| g. | Pb                                                                                                                                      | NA        | lb/hr | NA               | grains/ACF |  |
| h. | Specify other(s)                                                                                                                        |           |       |                  |            |  |
|    | Methanol                                                                                                                                | 3.18      | lb/hr | NA               | grains/ACF |  |
|    |                                                                                                                                         |           | lb/hr |                  | grains/ACF |  |
|    |                                                                                                                                         |           | lb/hr |                  | grains/ACF |  |
|    |                                                                                                                                         |           | lb/hr |                  | grains/ACF |  |

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

| with the proposed operating parameters. compliance with the proposed emissions lim | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| MONITORING                                                                         | RECORDKEEPING                                                                                      |
| • Incoming ethanol and methanol                                                    | • Incoming ethanol and methanol                                                                    |
| concentrations weekly                                                              | concentrations                                                                                     |
| • Wastewater outlet flow                                                           | Wastewater outlet flow                                                                             |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
| REPORTING                                                                          | TESTING                                                                                            |
| None                                                                               | None                                                                                               |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
| PROPOSED TO BE MONITORED IN ORDER TO DEMON                                         | E PROCESS PARAMETERS AND RANGES THAT ARE                                                           |
| PROCESS EQUIPMENT OPERATION/AIR POLLUTION (                                        |                                                                                                    |
|                                                                                    |                                                                                                    |
| MONITORING.                                                                        | OSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                         |
|                                                                                    |                                                                                                    |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                        | POSED FREQUENCY OF REPORTING OF THE                                                                |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMIS<br>POLLUTION CONTROL DEVICE.     | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                      |
| 10. Describe all operating ranges and mainten                                      | nance procedures required by Manufacturer to                                                       |
| maintain warranty                                                                  |                                                                                                    |
| NA                                                                                 |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |
|                                                                                    |                                                                                                    |

# Attachment L EMISSIONS UNIT DATA SHEET GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 10

1. Name or type and model of proposed affected source:

Pug Mill/51 Mill Process

 On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

The process charge rate is variable depending on the product being produced. Up to 4,410 lb/hr each Organo Clay Based Rhelogical Additive.

4. Name(s) and maximum amount of proposed material(s) produced per hour:

The production rate is variable depending on the product being produced. Up to 4,410 lb/hr each Organo Clay Based Rhelogical Additive.

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

None

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6        | . Combustion Data (if appli  | cable): Not Applicable                |                                  |
|----------|------------------------------|---------------------------------------|----------------------------------|
|          | (a) Type and amount in a     | ppropriate units of fuel(s) to be b   | urned:                           |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
| -        | (b) Chemical analysis of r   | proposed fuel(s) excluding coal i     | ncluding maximum percent sulfur  |
|          | and ash:                     |                                       | noidding maximum percent sulur   |
|          | ¥.                           |                                       |                                  |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
| $\vdash$ | (c) Theoretical combustio    | n air requirement (ACF/unit of fu     | el):                             |
|          | @                            | °F and                                |                                  |
|          |                              |                                       | psia.                            |
|          | (d) Percent excess air:      |                                       |                                  |
|          | (e) Type and BTU/hr of bu    | urners and all other firing equipme   | ent planned to be used:          |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
|          | (f) If coal is proposed as ( | a source of fuel identify our plier   |                                  |
|          | coal as it will be fired:    | a source of fuel, identity supplier a | and seams and give sizing of the |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
|          |                              |                                       |                                  |
|          | (g) Proposed maximum de      | esign heat input:                     | × 10 <sup>6</sup> BTU/hr.        |
| 7.       | Projected operating schedu   | ule:                                  |                                  |
| Но       | urs/Day                      | Days/Week                             | Weeks/Year                       |
|          |                              |                                       |                                  |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |       |       |      |            |  |
|----|-----------------------------------------------------------------------------------------------------------------|-------|-------|------|------------|--|
| @  | 220                                                                                                             | °F an | d     | 14.7 | psia       |  |
| a. | NO <sub>X</sub>                                                                                                 |       | lb/hr | NA   | grains/ACF |  |
| b. | SO <sub>2</sub>                                                                                                 |       | lb/hr | NA   | grains/ACF |  |
| c. | СО                                                                                                              |       | lb/hr | NA   | grains/ACF |  |
| d. | PM <sub>10</sub>                                                                                                | 13.85 | lb/hr | NA   | grains/ACF |  |
| e. | Hydrocarbons                                                                                                    | NA    | lb/hr | NA   | grains/ACF |  |
| f. | VOCs                                                                                                            |       | lb/hr | NA   | grains/ACF |  |
| g. | Pb                                                                                                              | NA    | lb/hr | NA   | grains/ACF |  |
| h. | Specify other(s)                                                                                                |       | 1     |      |            |  |
|    | HAPS VOC                                                                                                        |       | lb/hr | NA   | grains/ACF |  |
|    | HAP Metal                                                                                                       |       | lb/hr | NA   | grains/ACF |  |
|    |                                                                                                                 |       | lb/hr |      | grains/ACF |  |
|    |                                                                                                                 |       | lb/hr |      | grains/ACF |  |

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

| <ol> <li>Proposed Monitoring, Recordkeeping, Rep<br/>Please propose monitoring, recordkeeping,<br/>with the proposed operating parameters.<br/>compliance with the proposed emissions lin</li> </ol> | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| MONITORING                                                                                                                                                                                           | RECORDKEEPING                                                                                               |
| None                                                                                                                                                                                                 | None                                                                                                        |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
| REPORTING                                                                                                                                                                                            | TESTING                                                                                                     |
| None                                                                                                                                                                                                 | None                                                                                                        |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
| <b>MONITORING.</b> PLEASE LIST AND DESCRIBE TH<br>PROPOSED TO BE MONITORED IN ORDER TO DEMON<br>PROCESS EQUIPMENT OPERATION/AIR POLLUTION                                                            | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                                                                                                                                        | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                              | DPOSED FREQUENCY OF REPORTING OF THE                                                                        |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                        | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |
|                                                                                                                                                                                                      | nance procedures required by Manufacturer to                                                                |
| maintain warranty<br>NA                                                                                                                                                                              |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |

### Attachment L EMISSIONS UNIT DATA SHEET GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 3

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flash Dryer System                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. Up to 3,675 lb/hr Organo Clay Based Rhelogical Additive.                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
| <ol><li>Name(s) and maximum amount of proposed material(s) produced per hour:</li></ol>                                                                                                                                                                                                                      |
| The process charge rate is variable depending on the product being produced. Up to 3,675 lb/hr Organo Clay Based Rhelogical Additive.                                                                                                                                                                        |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
| None                                                                                                                                                                                                                                                                                                         |

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6. (  | 6. Combustion Data (if applicable):                                                                 |                                  |                             |                    |                |                         |  |
|-------|-----------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------|--------------------|----------------|-------------------------|--|
| (     | (a) Type and amount in appropriate units of fuel(s) to be burned:                                   |                                  |                             |                    |                |                         |  |
| Na    | tural Gas @                                                                                         | 10,000 scf/h                     | r                           |                    |                |                         |  |
| (     | b) Chemical<br>and ash:                                                                             | analysis of p                    | proposed fuel(s), e         | xcluding coal, ind | cluding maximu | m percent sulfur        |  |
| Pip   | eline quality                                                                                       | natural gas                      |                             |                    |                |                         |  |
| ((    | c) Theoretic                                                                                        | al combustio                     | n air requirement (         | ACF/unit of fuel   | ):             |                         |  |
|       | 9.9 acf/scf                                                                                         | @                                | 77                          | °F and             | 14.7           | psia.                   |  |
| (0    | d) Percent e                                                                                        | xcess air:                       | 4% to 7%                    |                    |                |                         |  |
| 10,0  | (e) Type and BTU/hr of burners and all other firing equipment planned to be used: 10,000,000 but/hr |                                  |                             |                    |                |                         |  |
| (f    | ) If coal is p<br>coal as it v                                                                      | roposed as a<br>will be fired: ] | a source of fuel, ide<br>NA | entify supplier ar | nd seams and g | ve sizing of the        |  |
| (g    | ) Proposed                                                                                          | maximum de                       | esign heat input:           | 10                 | ×              | 10 <sup>6</sup> BTU/hr. |  |
| 7. Pr | rojected ope                                                                                        | rating sched                     | ule:                        |                    |                |                         |  |
| Hours | s/Day                                                                                               | 24                               | Days/Week                   | 7 V                | Veeks/Year     | 52                      |  |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no condevices were used: |        |       |      |            |
|----|------------------------------------------------------------------------------------------------------------|--------|-------|------|------------|
| @  | 2 210                                                                                                      | °F and |       | 14.7 | psia       |
| a. | NO <sub>X</sub>                                                                                            | 0.98   | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>                                                                                            | 0.01   | lb/hr | NA   | grains/ACF |
| c. | со                                                                                                         | 0.82   | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub>                                                                                           | 3,675  | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons                                                                                               | NA     | lb/hr | NA   | grains/ACF |
| f. | VOCs                                                                                                       | 3.06   | lb/hr | NA   | grains/ACF |
| g. | Pb                                                                                                         | NA     | lb/hr | NA   | grains/ACF |
| h. | Specify other(s)                                                                                           |        | 1     |      |            |
|    | HAPS - VOC                                                                                                 | 0.02   | lb/hr | NA   | grains/ACF |
|    | HAPS-Metal                                                                                                 | 0.01   | lb/hr | NA   | grains/ACF |
|    |                                                                                                            |        | lb/hr |      | grains/ACF |
|    |                                                                                                            |        | lb/hr |      | grains/ACF |

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate complianc<br/>with the proposed operating parameters. Please propose testing in order to demonstrat<br/>compliance with the proposed emissions limits.</li> </ol> |                                                                                                             |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| MONITORING                                                                                                                                                                                                                                                                                                                | RECORDKEEPING                                                                                               |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                      | Natural Gas use for the site on a monthly basis.                                                            |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                                             |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                                             |  |  |  |  |  |
| REPORTING                                                                                                                                                                                                                                                                                                                 | TESTING                                                                                                     |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                      | None                                                                                                        |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                                             |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |  |  |  |  |  |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                                                                                                                                                                                                                                                             | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |  |  |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                                                                                                                                                                                                                                                               | DPOSED FREQUENCY OF REPORTING OF THE                                                                        |  |  |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                             | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |  |  |  |  |  |
| 10. Describe all operating ranges and mainter maintain warranty                                                                                                                                                                                                                                                           | nance procedures required by Manufacturer to                                                                |  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                                        |                                                                                                             |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                                             |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                                             |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                                             |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                                             |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                                             |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                                             |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                                             |  |  |  |  |  |

### Attachment L EMISSIONS UNIT DATA SHEET GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 18

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Boiler 1 (Kewanee Boiler Model H-3S-600-G02)                                                                                                                                                                                                                                                          |           |
|                                                                                                                                                                                                                                                                                                       |           |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to<br/>made to this source, clearly indicated the change(s). Provide a narrative description of<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> | be<br>all |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                       |           |
|                                                                                                                                                                                                                                                                                                       |           |
| NA                                                                                                                                                                                                                                                                                                    |           |
|                                                                                                                                                                                                                                                                                                       |           |
|                                                                                                                                                                                                                                                                                                       |           |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                              |           |
|                                                                                                                                                                                                                                                                                                       |           |
| 20,700 lb/hr steam                                                                                                                                                                                                                                                                                    |           |
|                                                                                                                                                                                                                                                                                                       |           |
|                                                                                                                                                                                                                                                                                                       |           |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutan                                                                                                                                                                                                    | ts:       |
|                                                                                                                                                                                                                                                                                                       |           |
|                                                                                                                                                                                                                                                                                                       |           |
| None                                                                                                                                                                                                                                                                                                  |           |
|                                                                                                                                                                                                                                                                                                       |           |
|                                                                                                                                                                                                                                                                                                       |           |

<sup>\*</sup> The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6  | 6. Combustion Data (if applicable):                               |                  |                     |                   |                  |                         |  |
|----|-------------------------------------------------------------------|------------------|---------------------|-------------------|------------------|-------------------------|--|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    | Natural Gas @                                                     | 20,085 scf/hr    |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    | (b) Chemica<br>and ash:                                           | l analysis of p  | roposed fuel(s), ex | xcluding coal, ir | ncluding maximun | n percent sulfur        |  |
|    | anu asn.                                                          |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    | Pipeline quality                                                  | natural gas      |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    | (c) Theoretic                                                     | al combustior    | n air requirement ( | ACF/unit of fue   | l):              |                         |  |
|    | 9.9 acf/scf                                                       | @                | 77                  | °F and            | 14.7             | psia.                   |  |
| -  |                                                                   |                  |                     |                   |                  |                         |  |
|    | (d) Percent e                                                     | excess air: 2    | % to 7%             |                   |                  |                         |  |
|    | (e) Type and                                                      | BTU/hr of bu     | rners and all other | r firing equipme  | nt planned to be | used:                   |  |
|    |                                                                   |                  |                     |                   | • •              |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
| 2  | 20,085,000 btu/                                                   | 'hr              |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    | (f) If coal is p                                                  | pronosed as a    | source of fuel, ide | antify symplion a | ind sooms and ai | o sizing of the         |  |
|    | coal as it                                                        | will be fired: N | IA                  |                   | ind seams and yn | e sizing of the         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    |                                                                   |                  |                     |                   |                  |                         |  |
|    | (g) Proposed                                                      | maximum des      | sign heat input:    | 25.1              | 06 ×             | 10 <sup>6</sup> BTU/hr. |  |
| 7. | Projected ope                                                     | erating schedu   | le:                 |                   |                  |                         |  |
|    |                                                                   | -                |                     | _                 |                  |                         |  |
| нс | ours/Day                                                          | 24               | Days/Week           | 7                 | Weeks/Year       | 52                      |  |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |      |       |      |            |  |
|----|-----------------------------------------------------------------------------------------------------------------|------|-------|------|------------|--|
| @  | 300 °F and                                                                                                      |      | 14.7  | psia |            |  |
| a. | NO <sub>X</sub>                                                                                                 | 1.97 | lb/hr | NA   | grains/ACF |  |
| b. | SO <sub>2</sub>                                                                                                 | 0.01 | lb/hr | NA   | grains/ACF |  |
| c. | СО                                                                                                              | 1.65 | lb/hr | NA   | grains/ACF |  |
| d. | PM <sub>10</sub>                                                                                                | 0.15 | lb/hr | NA   | grains/ACF |  |
| e. | Hydrocarbons                                                                                                    | NA   | lb/hr | NA   | grains/ACF |  |
| f. | VOCs                                                                                                            | 0.11 | lb/hr | NA   | grains/ACF |  |
| g. | Pb                                                                                                              | NA   | lb/hr | NA   | grains/ACF |  |
| h. | Specify other(s)                                                                                                |      |       |      |            |  |
|    | HAPS – VOC                                                                                                      | 0.04 | lb/hr | NA   | grains/ACF |  |
|    | HAPS - Metal                                                                                                    | 0.01 | lb/hr | NA   | grains/ACF |  |
|    |                                                                                                                 |      | lb/hr |      | grains/ACF |  |
|    |                                                                                                                 |      | lb/hr |      | grains/ACF |  |

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance<br/>with the proposed operating parameters. Please propose testing in order to demonstrate<br/>compliance with the proposed emissions limits.</li> <li>MONITORING</li> </ol> |                                                  |  |  |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--|--|--|--|--|--|
| None                                                                                                                                                                                                                                                                                                                                            | Natural Gas use for the site on a monthly basis. |  |  |  |  |  |  |
| REPORTING<br>None                                                                                                                                                                                                                                                                                                                               | TESTING<br>None                                  |  |  |  |  |  |  |
| PROPOSED TO BE MONITORED IN ORDER TO DEMON<br>PROCESS EQUIPMENT OPERATION/AIR POLLUTION                                                                                                                                                                                                                                                         |                                                  |  |  |  |  |  |  |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                                                                                                                                                                                                                                                                                   | POSED RECORDKEEPING THAT WILL ACCOMPANY THE      |  |  |  |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                                                                                                                                                                                                                                                                                     | DPOSED FREQUENCY OF REPORTING OF THE             |  |  |  |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                                                   | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR    |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 | nance procedures required by Manufacturer to     |  |  |  |  |  |  |

### Attachment L EMISSIONS UNIT DATA SHEET GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): CO-320001

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wheelbrator Clean Air Systems (ARI) ECON-ABATOR, Model # C-5000 PAB-G-60 TE Oxidizer                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| Oxidizer controls VOC emissions                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| <ol><li>Name(s) and maximum amount of proposed material(s) produced per hour:</li></ol>                                                                                                                                                                                                                      |
| Nous                                                                                                                                                                                                                                                                                                         |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
| Typical combustion products                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| * The identification number which appears here must correspond to the air pollution control device                                                                                                                                                                                                           |

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6. Combustion                                                                                      | 6. Combustion Data (if applicable): |                             |                  |                                       |                           |  |  |
|----------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------|------------------|---------------------------------------|---------------------------|--|--|
| (a) Type and amount in appropriate units of fuel(s) to be burned:                                  |                                     |                             |                  |                                       |                           |  |  |
| Natural Gas @                                                                                      | 3,000 scf/hr                        |                             |                  |                                       |                           |  |  |
| (b) Chemica<br>and ash:                                                                            | l analysis of p                     | proposed fuel(s), ex        | kcluding coal, i | ncluding maxim                        | num percent sulfur        |  |  |
| Pipeline quality                                                                                   | v natural gas                       |                             |                  |                                       |                           |  |  |
| (c) Theoretic                                                                                      | al combustio                        | n air requirement (         | ACF/unit of fue  | el):                                  |                           |  |  |
| 9.9 acf/scf                                                                                        | @                                   | 77                          | °F and           | 14.7                                  | psia.                     |  |  |
| (d) Percent e                                                                                      | xcess air:                          | 4% to 7%                    |                  | · · · · · · · · · · · · · · · · · · · |                           |  |  |
| (e) Type and BTU/hr of burners and all other firing equipment planned to be used: 3,000,000 btu/hr |                                     |                             |                  |                                       |                           |  |  |
| (f) If coal is p<br>coal as it                                                                     | oroposed as a will be fired:        | a source of fuel, ide<br>NA | entify supplier  | and seams and                         | give sizing of the        |  |  |
| (g) Proposed                                                                                       | maximum de                          | esign heat input:           |                  | 3                                     | × 10 <sup>6</sup> BTU/hr. |  |  |
| 7. Projected ope                                                                                   | rating sched                        | ule:                        |                  | · · · · · · · ·                       |                           |  |  |
| Hours/Day                                                                                          | 24                                  | Days/Week                   | 7                | Weeks/Year                            | 52                        |  |  |

| 8. | . Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |         |       |      |            |  |  |
|----|-------------------------------------------------------------------------------------------------------------------|---------|-------|------|------------|--|--|
| @  | 2 300                                                                                                             | °F and  |       | 14.7 | psia       |  |  |
| a. | NO <sub>X</sub>                                                                                                   | 0.29    | lb/hr | NA   | grains/ACF |  |  |
| b. | SO <sub>2</sub>                                                                                                   | 0.01    | lb/hr | NA   | grains/ACF |  |  |
| c. | СО                                                                                                                | 0.25    | lb/hr | NA   | grains/ACF |  |  |
| d. | PM <sub>10</sub>                                                                                                  | 13.87*  | lb/hr | NA   | grains/ACF |  |  |
| e. | Hydrocarbons                                                                                                      | NA      | lb/hr | NA   | grains/ACF |  |  |
| f. | VOCs                                                                                                              | 164.30* | lb/hr | NA   | grains/ACF |  |  |
| g. | Pb                                                                                                                | NA      | lb/hr | NA   | grains/ACF |  |  |
| h. | Specify other(s)                                                                                                  |         | /     |      |            |  |  |
|    | HAPS - VOC                                                                                                        | 0.02    | lb/hr | NA   | grains/ACF |  |  |
|    | HAPS – Metal                                                                                                      | 0.01    | lb/hr | NA   | grains/ACF |  |  |
|    | Methyl Chloride                                                                                                   | 1.30    | lb/hr |      | grains/ACF |  |  |
|    | HC1                                                                                                               | 0.65    | lb/hr |      | grains/ACF |  |  |

(2) Complete the Emission Points Data Sheet.

\*Includes equipment controlled by oxidizer.

| <ol> <li>Proposed Monitoring, Recordkeeping, Rep<br/>Please propose monitoring, recordkeeping,<br/>with the proposed operating parameters.<br/>compliance with the proposed emissions lin</li> </ol> | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| MONITORING                                                                                                                                                                                           | RECORDKEEPING                                                                                               |
| None                                                                                                                                                                                                 | Natural Gas use for the site on a monthly basis.                                                            |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
| REPORTING                                                                                                                                                                                            | TESTING                                                                                                     |
| None                                                                                                                                                                                                 | None                                                                                                        |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
| PROPOSED TO BE MONITORED IN ORDER TO DEMON<br>PROCESS EQUIPMENT OPERATION/AIR POLLUTION                                                                                                              | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
|                                                                                                                                                                                                      | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                              | POSED FREQUENCY OF REPORTING OF THE                                                                         |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMIS<br>POLLUTION CONTROL DEVICE.                                                                                                                       | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |
| 10. Describe all operating ranges and mainter maintain warranty                                                                                                                                      | nance procedures required by Manufacturer to                                                                |
| NA                                                                                                                                                                                                   |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |
|                                                                                                                                                                                                      |                                                                                                             |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 19

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hot Water Heater – Peerless: Model – 6-1161-WP                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| <ol><li>Name(s) and maximum amount of proposed material(s) produced per hour:</li></ol>                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                                                                                              |
| Not applicable                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |

<sup>\*</sup> The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6 Combustion Data                                                                                                            | /if on alie                  | able):               |                |            | ·····                     |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------|----------------|------------|---------------------------|--|--|--|--|
| 6. Combustion Data (if applicable):                                                                                          |                              |                      |                |            |                           |  |  |  |  |
| (a) Type and amount in appropriate units of fuel(s) to be burned:                                                            |                              |                      |                |            |                           |  |  |  |  |
| Natural Gas @ 400 scf/hr                                                                                                     |                              |                      |                |            |                           |  |  |  |  |
| (b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:                         |                              |                      |                |            |                           |  |  |  |  |
| Pipeline quality natu                                                                                                        | Pipeline quality natural gas |                      |                |            |                           |  |  |  |  |
| (c) Theoretical co                                                                                                           | mbustior                     | n air requirement (A | CF/unit of fue | l):        |                           |  |  |  |  |
| 9.9 acf/scf                                                                                                                  | @                            | 77                   | °F and         | 14.7       | psia.                     |  |  |  |  |
| (d) Percent exces                                                                                                            | s air: 4                     | 4% to 7%             |                |            |                           |  |  |  |  |
| 400,000 btu/hr                                                                                                               |                              | rners and all other  |                |            |                           |  |  |  |  |
| (f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired: NA |                              |                      |                |            |                           |  |  |  |  |
| (g) Proposed max                                                                                                             | imum de                      | sign heat input:     | 0.1            |            | × 10 <sup>6</sup> BTU/hr. |  |  |  |  |
| 7. Projected operatin                                                                                                        | g schedi                     | ule:                 |                |            |                           |  |  |  |  |
| Hours/Day 24                                                                                                                 | 4                            | Days/Week            | 7              | Weeks/Year | 52                        |  |  |  |  |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |      |       |      |            |  |  |
|----|-----------------------------------------------------------------------------------------------------------------|------|-------|------|------------|--|--|
| @  | 300 °F and                                                                                                      |      | d     | 14.7 | psia       |  |  |
| a. | NO <sub>X</sub>                                                                                                 | 0.04 | lb/hr | NA   | grains/ACF |  |  |
| b. | SO <sub>2</sub>                                                                                                 | 0.01 | lb/hr | NA   | grains/ACF |  |  |
| c. | СО                                                                                                              | 0.04 | lb/hr | NA   | grains/ACF |  |  |
| d. | PM <sub>10</sub>                                                                                                | 0.01 | lb/hr | NA   | grains/ACF |  |  |
| e. | Hydrocarbons                                                                                                    | NA   | lb/hr | NA   | grains/ACF |  |  |
| f. | VOCs                                                                                                            | 0.01 | lb/hr | NA   | grains/ACF |  |  |
| g. | Pb                                                                                                              | NA   | lb/hr | NA   | grains/ACF |  |  |
| h. | Specify other(s)                                                                                                |      | 1     |      |            |  |  |
|    | HAPS-VOC                                                                                                        | 0.01 | lb/hr | NA   | grains/ACF |  |  |
|    | HAPS-Metal                                                                                                      | 0.01 | lb/hr | NA   | grains/ACF |  |  |
|    |                                                                                                                 |      | lb/hr |      | grains/ACF |  |  |
|    |                                                                                                                 |      | lb/hr |      | grains/ACF |  |  |

- NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.
  - (2) Complete the Emission Points Data Sheet.

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance<br/>with the proposed operating parameters. Please propose testing in order to demonstrate<br/>compliance with the proposed emissions limits.</li> </ol> |                                                                                                             |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
| MONITORING                                                                                                                                                                                                                                                                                                                  | RECORDKEEPING                                                                                               |  |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                        | Natural Gas use for the site on a monthly basis.                                                            |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |  |  |  |
| REPORTING                                                                                                                                                                                                                                                                                                                   | TESTING                                                                                                     |  |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                        | None                                                                                                        |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |  |  |  |
| MONITORING. PLEASE LIST AND DESCRIBE THI<br>PROPOSED TO BE MONITORED IN ORDER TO DEMON<br>PROCESS EQUIPMENT OPERATION/AIR POLLUTION                                                                                                                                                                                         | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             | OSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |  |  |  |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                                                                                                                                                     | POSED FREQUENCY OF REPORTING OF THE                                                                         |  |  |  |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMIS<br>POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                              |                                                                                                             |  |  |  |  |  |  |
| 10. Describe all operating ranges and mainter<br>maintain warranty                                                                                                                                                                                                                                                          | ance procedures required by Manufacturer to                                                                 |  |  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                                          |                                                                                                             |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 017

1. Name or type and model of proposed affected source:

West 1<sup>st</sup> Stage Fluid Bed Dryer

 On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

The process charge rate is variable depending on the product being produced. 2,205 lb/hr Organo Clay Product

4. Name(s) and maximum amount of proposed material(s) produced per hour:

The process charge rate is variable depending on the product being produced. 2,205 lb/hr Organo Clay Product

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

NA

<sup>\*</sup> The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6. Combustion D                                                   | ata (if applicat                 | ole):             |                       |                 |                      |  |  |
|-------------------------------------------------------------------|----------------------------------|-------------------|-----------------------|-----------------|----------------------|--|--|
| (a) Type and amount in appropriate units of fuel(s) to be burned: |                                  |                   |                       |                 |                      |  |  |
| Natural Gas 5,25                                                  | 50 scf/hour                      |                   |                       |                 |                      |  |  |
| (b) Chemical a<br>and ash: N                                      | nalysis of prop<br>A             | posed fuel(s), e  | excluding coal, inclu | ıding maximum p | percent sulfur       |  |  |
| Pipeline quality n                                                | atural gas                       |                   |                       |                 |                      |  |  |
| (c) Theoretical                                                   | combustion a                     | ir requirement    | (ACF/unit of fuel):   |                 |                      |  |  |
| 9.9 acf/scf                                                       | @                                | 77                | °F and                | 14.7            | psia.                |  |  |
| (d) Percent exc                                                   | cess air: 4%                     | 5 to 7%           |                       |                 |                      |  |  |
| 5,250,000 btu/hr                                                  |                                  |                   | er firing equipment ( |                 |                      |  |  |
| (f) If coal is pro<br>coal as it wi                               | posed as a so<br>Il be fired: NA | ource of fuel, id | entify supplier and   | seams and give  | sizing of the        |  |  |
| (g) Proposed m                                                    | aximum desig                     | in heat input:    | 5.25                  | × 10            | <sup>6</sup> BTU/hr. |  |  |
| 7. Projected opera                                                | ting schedule:                   |                   | 1                     |                 |                      |  |  |
| Hours/Day                                                         | 24 Da                            | ays/Week          | 7 We                  | eks/Year        | 52                   |  |  |

| 8. | . Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |       |       |      |            |  |
|----|-------------------------------------------------------------------------------------------------------------------|-------|-------|------|------------|--|
| @  | 300                                                                                                               | °F an | d     | 14.7 | psia       |  |
| a. | NO <sub>X</sub>                                                                                                   | 0.51  | lb/hr | NA   | grains/ACF |  |
| b. | SO <sub>2</sub>                                                                                                   | 0.01  | lb/hr | NA   | grains/ACF |  |
| c. | со                                                                                                                | 0.43  | lb/hr | NA   | grains/ACF |  |
| d. | PM <sub>10</sub>                                                                                                  | 2,205 | lb/hr | NA   | grains/ACF |  |
| e. | Hydrocarbons                                                                                                      | NA    | lb/hr | NA   | grains/ACF |  |
| f. | VOCs                                                                                                              | 0.81  | lb/hr | NA   | grains/ACF |  |
| g. | Pb                                                                                                                | NA    | lb/hr | NA   | grains/ACF |  |
| h. | Specify other(s)                                                                                                  |       | I     |      |            |  |
|    | HAPS VOC                                                                                                          | 0.01  | lb/hr | NA   | grains/ACF |  |
|    | HAPS Metal                                                                                                        | 0.01  | lb/hr | NA   | grains/ACF |  |
|    |                                                                                                                   |       | lb/hr |      | grains/ACF |  |
|    |                                                                                                                   |       | lb/hr |      | grains/ACF |  |

(2) Complete the Emission Points Data Sheet.

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate complianc<br/>with the proposed operating parameters. Please propose testing in order to demonstrat<br/>compliance with the proposed emissions limits.</li> </ol> |                                                  |  |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--|--|--|--|--|--|
| MONITORING                                                                                                                                                                                                                                                                                                                | RECORDKEEPING                                    |  |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                      | Natural Gas use for the site on a monthly basis. |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
| DEDODTINO                                                                                                                                                                                                                                                                                                                 |                                                  |  |  |  |  |  |  |
| REPORTING                                                                                                                                                                                                                                                                                                                 | TESTING                                          |  |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                      | None                                             |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
| MONITORING PLEASE LIST AND DESCRIBE TH                                                                                                                                                                                                                                                                                    | E PROCESS PARAMETERS AND RANGES THAT ARE         |  |  |  |  |  |  |
| PROPOSED TO BE MONITORED IN ORDER TO DEMON                                                                                                                                                                                                                                                                                | STRATE COMPLIANCE WITH THE OPERATION OF THIS     |  |  |  |  |  |  |
| PROCESS EQUIPMENT OPERATION/AIR POLLUTION                                                                                                                                                                                                                                                                                 | CONTROL DEVICE                                   |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           | POSED RECORDKEEPING THAT WILL ACCOMPANY THE      |  |  |  |  |  |  |
| MONITORING.                                                                                                                                                                                                                                                                                                               | OSED RECORDREEPING THAT WILL ACCOMPANY THE       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           | POSED FREQUENCY OF REPORTING OF THE              |  |  |  |  |  |  |
| RECORDKEEPING.                                                                                                                                                                                                                                                                                                            |                                                  |  |  |  |  |  |  |
| <b>IESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI                                                                                                                                                                                                                                                                          | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR    |  |  |  |  |  |  |
| POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                                                                                 |                                                  |  |  |  |  |  |  |
| 10. Describe all operating ranges and mainter                                                                                                                                                                                                                                                                             | nance procedures required by Manufacturer to     |  |  |  |  |  |  |
| maintain warranty                                                                                                                                                                                                                                                                                                         |                                                  |  |  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                                        |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
| 2                                                                                                                                                                                                                                                                                                                         |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           | <u>я</u> ,                                       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 018

| <ol> <li>Name or type and model of proposed affected source:</li> </ol>                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| West 2 <sup>nd</sup> Stage Fluid Bed Dryer                                                                                                                                                                                                                                                                   |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 2,205 lb/hr Organo Clay Product                                                                                                                                                                                                 |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
| The process charge rate is variable depending on the number 1 in 1 a 2005 11 f                                                                                                                                                                                                                               |

The process charge rate is variable depending on the product being produced. 2,205 lb/hr Organo Clay Product

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

NA

<sup>\*</sup> The identification number which appears here must correspond to the air pollution control device identification number appearing on the List Form.

| 6. | Combustion I                                                                                            | Data (if applie                  | cable):                     |                    |                |                         |  |  |
|----|---------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------|--------------------|----------------|-------------------------|--|--|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned:                                       |                                  |                             |                    |                |                         |  |  |
| 1  | Natural Gas 5,250 scf/hour                                                                              |                                  |                             |                    |                |                         |  |  |
|    | (b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash: NA |                                  |                             |                    |                |                         |  |  |
| F  | Pipeline quality                                                                                        | natural gas                      |                             |                    |                |                         |  |  |
|    | (c) Theoretic                                                                                           | al combustio                     | n air requirement (         | ACF/unit of fuel   | ):             |                         |  |  |
|    | 9.9 acf/scf                                                                                             | @                                | 77                          | °F and             | 14.7           | psia.                   |  |  |
|    | (d) Percent e                                                                                           | xcess air:                       | 4% to 7%                    |                    |                |                         |  |  |
| 5  | (e) Type and BTU/hr of burners and all other firing equipment planned to be used: 5,250,000 btu/hr      |                                  |                             |                    |                |                         |  |  |
|    |                                                                                                         | roposed as a<br>will be fired: 1 | a source of fuel, ide<br>NA | entify supplier ar | nd seams and g | ive sizing of the       |  |  |
|    | (g) Proposed                                                                                            | maximum de                       | esign heat input:           | 5.25               | ×              | 10 <sup>6</sup> BTU/hr. |  |  |
| 7. | Projected ope                                                                                           | rating sched                     | ule:                        |                    |                |                         |  |  |
| Но | urs/Day                                                                                                 | 24                               | Days/Week                   | 7                  | Weeks/Year     | 52                      |  |  |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |        |        |    |            |  |  |
|----|-----------------------------------------------------------------------------------------------------------------|--------|--------|----|------------|--|--|
| a  | 2 300                                                                                                           | °F and | °F and |    | psia       |  |  |
| a. | NO <sub>X</sub>                                                                                                 | 0.51   | lb/hr  | NA | grains/ACF |  |  |
| b. | SO <sub>2</sub>                                                                                                 | 0.01   | lb/hr  | NA | grains/ACF |  |  |
| c. | СО                                                                                                              | 0.43   | lb/hr  | NA | grains/ACF |  |  |
| d. | PM <sub>10</sub>                                                                                                | 2,205  | lb/hr  | NA | grains/ACF |  |  |
| e. | Hydrocarbons                                                                                                    | NA     | lb/hr  | NA | grains/ACF |  |  |
| f. | VOCs                                                                                                            | 0.81   | lb/hr  | NA | grains/ACF |  |  |
| g. | Pb                                                                                                              | NA     | lb/hr  | NA | grains/ACF |  |  |
| h. | Specify other(s)                                                                                                |        |        |    |            |  |  |
|    | HAPS VOC                                                                                                        | 0.01   | lb/hr  | NA | grains/ACF |  |  |
|    | HAPS Metal                                                                                                      | 0.01   | lb/hr  | NA | grains/ACF |  |  |
|    |                                                                                                                 |        | lb/hr  |    | grains/ACF |  |  |
|    |                                                                                                                 |        | lb/hr  |    | grains/ACF |  |  |

|                                                                                                                                                 | nd reporting in order to demonstrate compliance<br>lease propose testing in order to demonstrate |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                                                                                                                                                 | RECORDKEEPING                                                                                    |
| None                                                                                                                                            | Natural Gas use for the site on a monthly basis.                                                 |
|                                                                                                                                                 |                                                                                                  |
|                                                                                                                                                 |                                                                                                  |
|                                                                                                                                                 | <b>FESTING</b>                                                                                   |
| None                                                                                                                                            | None                                                                                             |
|                                                                                                                                                 |                                                                                                  |
| <b>MONITORING.</b> PLEASE LIST AND DESCRIBE THE<br>PROPOSED TO BE MONITORED IN ORDER TO DEMONST<br>PROCESS EQUIPMENT OPERATION/AIR POLLUTION CO | TRATE COMPLIANCE WITH THE OPERATION OF THIS                                                      |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROPORTION MONITORING.                                                                                |                                                                                                  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PROP<br>RECORDKEEPING.                                                                                    | OSED FREQUENCY OF REPORTING OF THE                                                               |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMISS<br>POLLUTION CONTROL DEVICE.                                                                 | SIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                     |
| 10. Describe all operating ranges and maintena                                                                                                  | nce procedures required by Manufacturer to                                                       |
| maintain warranty                                                                                                                               |                                                                                                  |
| NA                                                                                                                                              |                                                                                                  |
|                                                                                                                                                 |                                                                                                  |
|                                                                                                                                                 |                                                                                                  |
|                                                                                                                                                 |                                                                                                  |
|                                                                                                                                                 |                                                                                                  |
|                                                                                                                                                 |                                                                                                  |
|                                                                                                                                                 |                                                                                                  |
|                                                                                                                                                 |                                                                                                  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 019

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| East 1 <sup>st</sup> Stage Fluid Bed Dryer                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 2,205 lb/hr Organo Clay Product                                                                                                                                                                                                 |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
| The process charge rate is variable depending on the product being produced. 2,205 lb/hr<br>Organo Clay Product                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:<br>None                                                                                                                                                                                                |
| * The identification number which appears here must correspond to the six pollution control device                                                                                                                                                                                                           |

The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6.  | Combustion                                                        | Data (if appli                    | cable):             |                   |                  |                           |
|-----|-------------------------------------------------------------------|-----------------------------------|---------------------|-------------------|------------------|---------------------------|
|     | (a) Type and amount in appropriate units of fuel(s) to be burned: |                                   |                     |                   |                  |                           |
| N   | atural Gas 5                                                      | ,250 scf/hour                     |                     |                   |                  |                           |
|     | (b) Chemica<br>and ash:                                           |                                   | proposed fuel(s), e | xcluding coal, ii | ncluding maxim   | num percent sulfur        |
| Pi  | peline qualit                                                     | y natural gas                     |                     |                   |                  |                           |
|     | (c) Theoretic                                                     | cal combustio                     | n air requirement   | (ACF/unit of fue  | el):             |                           |
|     | 9.9 acf/scf                                                       | @                                 | 77                  | °F and            | 14.7             | psia.                     |
|     | (d) Percent                                                       | excess air:                       | 4% to 7%            |                   |                  |                           |
|     | (e) Type and                                                      | d BTU/hr of bu                    | irners and all othe | r firing equipme  | ent planned to l | be used:                  |
|     |                                                                   | proposed as a<br>will be fired: ] |                     | entify supplier a | and seams and    | give sizing of the        |
|     | (g) Proposed                                                      | d maximum de                      | esign heat input:   | 5.25              |                  | × 10 <sup>6</sup> BTU/hr. |
| 7.  | Projected op                                                      | erating sched                     | ule:                |                   | 1                |                           |
| Hou | rs/Day                                                            | 24                                | Days/Week           | 7                 | Weeks/Year       | 52                        |

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

| 0  | 2 300            | °F and | d     | 14.7 | psia       |
|----|------------------|--------|-------|------|------------|
| a. | NO <sub>x</sub>  | 0.51   | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>  | 0.01   | lb/hr | NA   | grains/ACF |
| c. | СО               | 0.43   | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub> | 2,205  | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons     | NA     | lb/hr | NA   | grains/ACF |
| f. | VOCs             | 0.81   | lb/hr | NA   | grains/ACF |
| g. | Pb               | NA     | lb/hr | NA   | grains/ACF |
| h. | Specify other(s) |        |       |      |            |
|    | HAPS VOC         | 0.01   | lb/hr | NA   | grains/ACF |
|    | HAPS Metal       | 0.01   | lb/hr | NA   | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

| Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed emissions limits.         MONITORING       RECORDKEEPING         None       Natural Gas use for the site on a monthly | strate |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|                                                                                                                                                                                                                                    |        |
| REPORTING     TESTING       None     None                                                                                                                                                                                          |        |
|                                                                                                                                                                                                                                    |        |
|                                                                                                                                                                                                                                    |        |
| MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAP<br>PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF<br>PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.      |        |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPAN MONITORING.                                                                                                                                    | Y THE  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF RECORDKEEPING.                                                                                                                                            | THE    |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMEN<br>POLLUTION CONTROL DEVICE.                                                                                                              | t/air  |
| 10. Describe all operating ranges and maintenance procedures required by Manufactur maintain warranty NA                                                                                                                           | er to  |
|                                                                                                                                                                                                                                    |        |
|                                                                                                                                                                                                                                    |        |
|                                                                                                                                                                                                                                    |        |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 020

| 6. Comb   | ustion Dat                                                        | a (if applic           | able):              |                   |               |                           |
|-----------|-------------------------------------------------------------------|------------------------|---------------------|-------------------|---------------|---------------------------|
| (a) Ty    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                        |                     |                   |               |                           |
| Natural   | Natural Gas 5,250 scf/hour                                        |                        |                     |                   |               |                           |
|           | nemical an<br>Id ash: NA                                          |                        | roposed fuel(s), ex | cluding coal, inc | cluding maxim | um percent sulfur         |
| Pipeline  | quality na                                                        | tural gas              |                     |                   |               |                           |
| (c) Th    | eoretical o                                                       | combustior             | air requirement (A  | CF/unit of fuel)  | ):            |                           |
| 9.9 a     | cf/scf                                                            | @                      | 77                  | °F and            | 14.7          | psia.                     |
| (d) Pe    | ercent exce                                                       | ess air: 4             | 4% to 7%            |                   |               |                           |
| Gas Bur   | ner                                                               |                        | rners and all other |                   |               |                           |
|           |                                                                   | bosed as a be fired: N | source of fuel, ide | ntify supplier ar | nd seams and  | give sizing of the        |
|           |                                                                   |                        | sign heat input:    | 5.2               | 5             | × 10 <sup>6</sup> BTU/hr. |
| 7. Projec | ted operat                                                        | ing schedu             | ıle:                | I                 |               |                           |
| Hours/Day | /                                                                 | 24                     | Days/Week           | 7                 | Weeks/Year    | 52                        |

| 8. | <ol> <li>Projected amount of pollutants that would be emitted from this affected source if no control<br/>devices were used:</li> </ol> |        |       |      |            |  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|--------|-------|------|------------|--|
| @  | 2 300                                                                                                                                   | °F and |       | 14.7 | psia       |  |
| a. | NO <sub>X</sub>                                                                                                                         | 0.51   | lb/hr | NA   | grains/ACF |  |
| b. | SO <sub>2</sub>                                                                                                                         | 0.01   | lb/hr | NA   | grains/ACF |  |
| c. | СО                                                                                                                                      | 0.43   | lb/hr | NA   | grains/ACF |  |
| d. | PM <sub>10</sub>                                                                                                                        | 2,205  | lb/hr | NA   | grains/ACF |  |
| e. | Hydrocarbons                                                                                                                            | NA     | lb/hr | NA   | grains/ACF |  |
| f. | VOCs                                                                                                                                    | 0.81   | lb/hr | NA   | grains/ACF |  |
| g. | Pb                                                                                                                                      | NA     | lb/hr | NA   | grains/ACF |  |
| h. | Specify other(s)                                                                                                                        |        |       |      |            |  |
|    | HAPS VOC                                                                                                                                | 0.01   | lb/hr | NA   | grains/ACF |  |
|    | HAPS Metal                                                                                                                              | 0.01   | lb/hr | NA   | grains/ACF |  |
|    |                                                                                                                                         | *      | lb/hr |      | grains/ACF |  |
|    |                                                                                                                                         |        | lb/hr |      | grains/ACF |  |

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance<br/>with the proposed operating parameters. Please propose testing in order to demonstrate<br/>compliance with the proposed emissions limits.</li> </ol> |                                                                                                              |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--|--|--|
| MONITORING                                                                                                                                                                                                                                                                                                                  | RECORDKEEPING                                                                                                |  |  |  |
| None                                                                                                                                                                                                                                                                                                                        | Natural Gas use for the site on a monthly basis.                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |
| REPORTING                                                                                                                                                                                                                                                                                                                   | TESTING                                                                                                      |  |  |  |
| None                                                                                                                                                                                                                                                                                                                        | None                                                                                                         |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |
|                                                                                                                                                                                                                                                                                                                             | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |  |  |  |
|                                                                                                                                                                                                                                                                                                                             | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                                                                                                                                                     | DPOSED FREQUENCY OF REPORTING OF THE                                                                         |  |  |  |
| POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                                                                                   | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                |  |  |  |
|                                                                                                                                                                                                                                                                                                                             | nance procedures required by Manufacturer to                                                                 |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 9C

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pug Mill Feed Hopper                                                                                                                                                                                                                                                                                         |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 4,410 lb/hr – Rheological Additive                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
| N/A Storage and transfer and raw materials                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6.       | Combustion Data (if ap                                            | plicable): NA       |                     |                |                           |
|----------|-------------------------------------------------------------------|---------------------|---------------------|----------------|---------------------------|
|          | (a) Type and amount in appropriate units of fuel(s) to be burned: |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          | (b) Chemical analysis of<br>and ash:                              | of proposed fuel(s) | excluding coal, i   | ncluding maxir | num percent sulfur        |
|          | anu asn.                                                          |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
| <u> </u> |                                                                   |                     |                     |                |                           |
|          | (c) Theoretical combus                                            | tion air requiremer | it (ACF/unit of fue | el):           |                           |
|          | @                                                                 |                     | °F and              |                | psia.                     |
|          | (d) Percent excess air:                                           |                     |                     |                |                           |
| <u> </u> | (e) Type and BTU/hr of                                            | burners and all ot  | ner firing equipme  | ent planned to | be used:                  |
|          |                                                                   |                     | iei iiiig equipiin  |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
| <u> </u> | (f) If coal is proposed a                                         | s a source of fuel  | identify supplier : | and soams and  | l aivo aizing of the      |
|          | coal as it will be fired                                          | d:                  | identity supplier a | and seams and  | i give sizing of the      |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          |                                                                   |                     |                     |                |                           |
|          | (g) Proposed maximum                                              |                     |                     |                | × 10 <sup>6</sup> BTU/hr. |
| 7.       | Projected operating sche                                          | edule: 800 hours p  | er year             | 1              |                           |
| Ηοι      | urs/Day 24                                                        | Days/Week           | 7                   | Weeks/Year     | 52                        |

| 8. | <ol> <li>Projected amount of pollutants that would be emitted from this affected source if no control<br/>devices were used:</li> </ol> |       |       |      |            |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|-------|-------|------|------------|
| @  | 2 70                                                                                                                                    | °F an | ld    | 14.7 | psia       |
| a. | NO <sub>X</sub>                                                                                                                         | NA    | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>                                                                                                                         | NA    | lb/hr | NA   | grains/ACF |
| c. | со                                                                                                                                      | NA    | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub>                                                                                                                        | 6.92  | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons                                                                                                                            | NA    | lb/hr | NA   | grains/ACF |
| f. | VOCs                                                                                                                                    | NA    | lb/hr | NA   | grains/ACF |
| g. | Pb                                                                                                                                      | NA    | lb/hr | NA   | grains/ACF |
| h. | Specify other(s)                                                                                                                        |       | 1     |      |            |
|    |                                                                                                                                         |       | lb/hr |      | grains/ACF |
|    |                                                                                                                                         |       | lb/hr |      | grains/ACF |
|    |                                                                                                                                         |       | lb/hr |      | grains/ACF |
| -  |                                                                                                                                         |       | lb/hr |      | grains/ACF |

|                                                                               | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate          |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| MONITORING                                                                    | RECORDKEEPING                                                                                               |
| None                                                                          | None                                                                                                        |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
| DEDODTING                                                                     | TEATING                                                                                                     |
| REPORTING                                                                     | TESTING                                                                                                     |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
|                                                                               | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                   | DPOSED FREQUENCY OF REPORTING OF THE                                                                        |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE. | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |
|                                                                               | nance procedures required by Manufacturer to                                                                |
| maintain warranty<br>NA                                                       |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
|                                                                               |                                                                                                             |
| L                                                                             |                                                                                                             |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 9A

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Clay Storage Silos A-F (6)                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 50,000 lb/hr –                                                                                                                                                                                                                  |
| Clay                                                                                                                                                                                                                                                                                                         |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
| N/A Storage and transfer and raw materials                                                                                                                                                                                                                                                                   |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6. | 6. Combustion Data (if applicable): NA                            |                                        |                   |                |                           |
|----|-------------------------------------------------------------------|----------------------------------------|-------------------|----------------|---------------------------|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    | (b) Chemical analysis of p<br>and ash:                            | roposed fuel(s), ex                    | cluding coal, ir  | ncluding maxin | num percent sulfur        |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    | (c) Theoretical combustion                                        | n air requirement (                    | ACF/unit of fue   | el):           |                           |
|    | @                                                                 |                                        | °F and            |                | psia.                     |
|    | (d) Percent excess air:                                           |                                        |                   |                |                           |
|    | (e) Type and BTU/hr of bu                                         | Irners and all other                   | firina eauipme    | ent planned to | be used:                  |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    | (f) If coal is proposed as a                                      | a source of fuel, ide                  | entify supplier a | and seams and  | l give sizing of the      |
|    | coal as it will be fired:                                         |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   |                                        |                   |                |                           |
|    |                                                                   | ······································ |                   |                |                           |
|    | (g) Proposed maximum de                                           | esign heat input:                      |                   |                | × 10 <sup>6</sup> BTU/hr. |
| 7. | Projected operating sched                                         | ule: 800 hours per                     | year              |                |                           |
| Но | urs/Day 24                                                        | Days/Week                              | 7                 | Weeks/Year     | 52                        |

| 8. | <ol> <li>Projected amount of pollutants that would be emitted from this affected source if no control<br/>devices were used:</li> </ol> |        |        |    |            |  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|--------|--------|----|------------|--|
| @  | 2 70                                                                                                                                    | °F and | °F and |    | psia       |  |
| a. | NO <sub>X</sub>                                                                                                                         | NA     | lb/hr  | NA | grains/ACF |  |
| b. | SO <sub>2</sub>                                                                                                                         | NA     | lb/hr  | NA | grains/ACF |  |
| c. | СО                                                                                                                                      | NA     | lb/hr  | NA | grains/ACF |  |
| d. | PM <sub>10</sub>                                                                                                                        | 78.50  | lb/hr  | NA | grains/ACF |  |
| e. | Hydrocarbons                                                                                                                            | NA     | lb/hr  | NA | grains/ACF |  |
| f. | VOCs                                                                                                                                    | NA     | lb/hr  | NA | grains/ACF |  |
| g. | Pb                                                                                                                                      | NA     | lb/hr  | NA | grains/ACF |  |
| h. | Specify other(s)                                                                                                                        |        |        |    |            |  |
|    |                                                                                                                                         |        | lb/hr  |    | grains/ACF |  |
|    |                                                                                                                                         |        | lb/hr  |    | grains/ACF |  |
|    |                                                                                                                                         |        | lb/hr  |    | grains/ACF |  |
|    |                                                                                                                                         |        | lb/hr  |    | grains/ACF |  |

| with the proposed operating parameters.<br>compliance with the proposed emissions lin | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate          |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| MONITORING                                                                            | RECORDKEEPING                                                                                               |
| None                                                                                  | None                                                                                                        |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
| REPORTING                                                                             | TESTING                                                                                                     |
| None                                                                                  | None                                                                                                        |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                         | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                               | DPOSED FREQUENCY OF REPORTING OF THE                                                                        |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.         | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |
| maintain warranty                                                                     | nance procedures required by Manufacturer to                                                                |
| NA                                                                                    |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |
|                                                                                       |                                                                                                             |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 9B

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                              |
| Day Bin                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. $50,000 \text{ lb/hr} - \text{Clay}$                                                                                                                                                                                            |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| N/A Storage and transfer and raw materials                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6. | Co                                                                | mbustior                | n Data (if appli                  | cable): NA               |               |                |                           |
|----|-------------------------------------------------------------------|-------------------------|-----------------------------------|--------------------------|---------------|----------------|---------------------------|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    | (b)                                                               | Chemic and ash          | al analysis of p<br>1:            | proposed fuel(s), exclu  | ıding coal, i | ncluding maxir | num percent sulfur        |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    | (c)                                                               | Theoret                 | ical combustio                    | n air requirement (AC    | F/unit of fue | el):           |                           |
|    |                                                                   |                         | @                                 |                          | °F and        |                | psia.                     |
|    | (d)                                                               | Percent                 | excess air:                       |                          |               |                |                           |
|    | (e)                                                               | Type an                 | d BTLI/br of bi                   | irners and all other fir | na equipm     | ant planned to | ho upod:                  |
|    | (0)                                                               | i jpo an                |                                   |                          | ng equipin    |                | be used.                  |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    | (f)                                                               | lf coal is<br>coal as i | proposed as a<br>t will be fired: | a source of fuel, identi | fy supplier a | and seams and  | d give sizing of the      |
|    | ·                                                                 |                         | t win be med.                     |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    |                                                                   |                         |                                   |                          |               |                |                           |
|    | (g) I                                                             | Propose                 | d maximum de                      | sign heat input:         |               |                | × 10 <sup>6</sup> BTU/hr. |
| 7. | Proj                                                              | ected op                | erating schedu                    | ule: 800 hours per yea   | r             |                |                           |
| Ho | urs/D                                                             | ay                      | 24                                | Days/Week                | 7             | Weeks/Year     | 52                        |

| 8. | <ol> <li>Projected amount of pollutants that would be emitted from this affected source if no control<br/>devices were used:</li> </ol> |           |       |      |            |  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|------|------------|--|
| @  | 2 70                                                                                                                                    | 70 °F and |       | 14.7 | psia       |  |
| a. | NO <sub>X</sub>                                                                                                                         | NA        | lb/hr | NA   | grains/ACF |  |
| b. | SO <sub>2</sub>                                                                                                                         | NA        | lb/hr | NA   | grains/ACF |  |
| c. | со                                                                                                                                      | NA        | lb/hr | NA   | grains/ACF |  |
| d. | PM <sub>10</sub>                                                                                                                        | 78.50     | lb/hr | NA   | grains/ACF |  |
| e. | Hydrocarbons                                                                                                                            | NA        | lb/hr | NA   | grains/ACF |  |
| f. | VOCs                                                                                                                                    | NA        | lb/hr | NA   | grains/ACF |  |
| g. | Pb                                                                                                                                      | NA        | lb/hr | NA   | grains/ACF |  |
| h. | Specify other(s)                                                                                                                        |           | I     |      |            |  |
|    | 2                                                                                                                                       |           | lb/hr |      | grains/ACF |  |
|    |                                                                                                                                         |           | lb/hr |      | grains/ACF |  |
| :  |                                                                                                                                         |           | lb/hr |      | grains/ACF |  |
|    |                                                                                                                                         |           | lb/hr |      | grains/ACF |  |

|                                                                               | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate           |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
| REPORTING<br>None                                                             | TESTING<br>None                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
|                                                                               | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                   | DPOSED FREQUENCY OF REPORTING OF THE                                                                         |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE. | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                |
| 10. Describe all operating ranges and mainter maintain warranty               | nance procedures required by Manufacturer to                                                                 |
| NA                                                                            |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 7B

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Straight Line Filter and Parkson A Vapor Hood                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. Up to 3,675 lb/hr<br>– Rheological Additive                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
| N/A                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| <ul> <li>The identification number which appears here must correspond to the air pollution control device<br/>identification number appearing on the List Form.</li> </ul>                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                              |

| 6.       | 6. Combustion Data (if applicable): NA                            |                     |                      |                   |                 |                           |
|----------|-------------------------------------------------------------------|---------------------|----------------------|-------------------|-----------------|---------------------------|
|          | (a) Type and amount in appropriate units of fuel(s) to be burned: |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
| -        | (h) Oh and                                                        |                     |                      |                   |                 |                           |
|          | (b) Cherr<br>and a                                                | sh:                 | proposed fuel(s), e  | excluding coal, i | including maxir | num percent sulfur        |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          | (c) Theor                                                         | etical combustio    | n air requirement    | (ACF/unit of fue  | el):            |                           |
|          |                                                                   | @                   |                      | °F and            |                 | psia.                     |
|          | (d) Perce                                                         | nt excess air:      |                      |                   |                 |                           |
|          | (e) Type a                                                        | and BTU/hr of bu    | urners and all othe  | er firing equipmo | ent planned to  | be used:                  |
|          |                                                                   |                     |                      | 0 1 1             |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          | (f) If coal                                                       | is proposed as a    | a source of fuel, ic | lentify supplier  | and seams and   | give sizing of the        |
|          | coal as                                                           | s it will be fired: |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          |                                                                   |                     |                      |                   |                 |                           |
|          | (a) Propos                                                        | ed maximum de       | esign heat input:    |                   |                 |                           |
| <u> </u> |                                                                   |                     |                      |                   |                 | × 10 <sup>6</sup> BTU/hr. |
| 7.       | Projected                                                         | operating sched     | ule:                 |                   |                 |                           |
| Ηοι      | urs/Day                                                           | 24                  | Days/Week            | 7                 | Weeks/Year      | 52                        |

| 8. | B. Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |        |       |      |            |  |  |
|----|--------------------------------------------------------------------------------------------------------------------|--------|-------|------|------------|--|--|
| @  | 70                                                                                                                 | °F and |       | 14.7 | psia       |  |  |
| a. | NO <sub>X</sub>                                                                                                    | NA     | lb/hr | NA   | grains/ACF |  |  |
| b. | SO <sub>2</sub>                                                                                                    | NA     | lb/hr | NA   | grains/ACF |  |  |
| c. | СО                                                                                                                 | NA     | lb/hr | NA   | grains/ACF |  |  |
| d. | PM <sub>10</sub>                                                                                                   | 0.18   | lb/hr | NA   | grains/ACF |  |  |
| e. | Hydrocarbons                                                                                                       | NA     | lb/hr | NA   | grains/ACF |  |  |
| f. | VOCs                                                                                                               | NA     | lb/hr | NA   | grains/ACF |  |  |
| g. | Pb                                                                                                                 | NA     | lb/hr | NA   | grains/ACF |  |  |
| h. | Specify other(s)                                                                                                   |        | 1     |      |            |  |  |
|    |                                                                                                                    |        | lb/hr |      | grains/ACF |  |  |
|    |                                                                                                                    |        | lb/hr |      | grains/ACF |  |  |
|    |                                                                                                                    |        | lb/hr |      | grains/ACF |  |  |
|    |                                                                                                                    |        | lb/hr |      | grains/ACF |  |  |

| <ol> <li>Proposed Monitoring, Recordkeeping, Report<br/>Please propose monitoring, recordkeeping,<br/>with the proposed operating parameters.<br/>compliance with the proposed emissions line<br/>MONITORING</li> </ol> | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| None                                                                                                                                                                                                                    | None                                                                                                        |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
| REPORTING                                                                                                                                                                                                               | TESTING                                                                                                     |
| None                                                                                                                                                                                                                    | None                                                                                                        |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         | к.<br>-                                                                                                     |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                                                                                                                                                           | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                                                 | DPOSED FREQUENCY OF REPORTING OF THE                                                                        |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                           | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |
| 10. Describe all operating ranges and mainter maintain warranty                                                                                                                                                         | nance procedures required by Manufacturer to                                                                |
| NA                                                                                                                                                                                                                      | ×                                                                                                           |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |
|                                                                                                                                                                                                                         |                                                                                                             |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 7-17A

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                              |
| 2 Vacuum Pumps (A-Side and C-Side Vacuum Pumps)                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
| o. Rame(s) and maximum amount of proposed process material(s) charged per nour.                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. Up to 3,675 lb/hr                                                                                                                                                                                                               |
| each – Rheological Additive                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| N/A                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |

| 6. | Combustion Data (if applicable): NA                               |                    |                     |                |                            |  |  |
|----|-------------------------------------------------------------------|--------------------|---------------------|----------------|----------------------------|--|--|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    | (b) Chemical analysis of<br>and ash:                              | proposed fuel(s)   | excluding coal, i   | ncluding maxin | nu <b>m</b> percent sulfur |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
| -  | (c) Theoretical combusti                                          | on air requiremer  | nt (ACF/unit of fue | el):           |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    | @                                                                 |                    | °F and              |                | psia.                      |  |  |
|    | (d) Percent excess air:                                           |                    |                     |                |                            |  |  |
|    | (e) Type and BTU/hr of I                                          | ourners and all ot | ner firing equipme  | ent planned to | be used:                   |  |  |
|    |                                                                   |                    |                     | ·              | 25.9                       |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    | (f) If coal is proposed as                                        | a source of fuel,  | identify supplier a | and seams and  | give sizing of the         |  |  |
|    | coal as it will be fired                                          | :                  |                     |                | gg                         |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    |                                                                   |                    |                     |                |                            |  |  |
|    | (g) Proposed maximum of                                           | design heat input: |                     |                | × 10 <sup>6</sup> BTU/hr.  |  |  |
| 7. | 7. Projected operating schedule:                                  |                    |                     |                |                            |  |  |
|    | urs/Day 24                                                        | Days/Week          | 7                   | Weeks/Year     | 52                         |  |  |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |        |       |      |            |  |  |
|----|-----------------------------------------------------------------------------------------------------------------|--------|-------|------|------------|--|--|
| @  | 2 70                                                                                                            | °F and | b     | 14.7 | psia       |  |  |
| a. | NO <sub>X</sub>                                                                                                 | NA     | lb/hr | NA   | grains/ACF |  |  |
| b. | SO <sub>2</sub>                                                                                                 | NA     | lb/hr | NA   | grains/ACF |  |  |
| c. | СО                                                                                                              | NA     | lb/hr | NA   | grains/ACF |  |  |
| d. | PM <sub>10</sub>                                                                                                | NA     | lb/hr | NA   | grains/ACF |  |  |
| e. | Hydrocarbons                                                                                                    | NA     | lb/hr | NA   | grains/ACF |  |  |
| f. | VOCs                                                                                                            | 142.10 | lb/hr | NA   | grains/ACF |  |  |
| g. | Pb                                                                                                              | NA     | lb/hr | NA   | grains/ACF |  |  |
| h. | Specify other(s)                                                                                                | 1      | 1     |      |            |  |  |
|    | Methyl Chloride                                                                                                 | 1.30   | lb/hr | NA   | grains/ACF |  |  |
|    |                                                                                                                 |        | lb/hr |      | grains/ACF |  |  |
|    |                                                                                                                 |        | lb/hr |      | grains/ACF |  |  |
|    |                                                                                                                 |        | lb/hr |      | grains/ACF |  |  |

| with the proposed operating parameters.<br>compliance with the proposed emissions lin | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate           |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| MONITORING                                                                            | RECORDKEEPING                                                                                                |
| None                                                                                  | None                                                                                                         |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
| REPORTING                                                                             | TESTING                                                                                                      |
| None                                                                                  | None                                                                                                         |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
| MONITORING DISLOS HOT AND DECODER TH                                                  |                                                                                                              |
|                                                                                       | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                         | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                               | DPOSED FREQUENCY OF REPORTING OF THE                                                                         |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.         | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                |
| maintain warranty                                                                     | nance procedures required by Manufacturer to                                                                 |
| NA                                                                                    |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 13

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Haver A Packer                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. Up to 3,675 lb/hr – Rheological Additive                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| N/A                                                                                                                                                                                                                                                                                                          |
| N/A                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| * The identification number which appears here must correspond to the air pollution control device identification number appearing on the <i>List Form</i> .                                                                                                                                                 |

| 6. | Со                                                                | mbustion Data (if applic            | able): NA            |                  |                | ·                         |
|----|-------------------------------------------------------------------|-------------------------------------|----------------------|------------------|----------------|---------------------------|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    | (b)                                                               | Chemical analysis of pl<br>and ash: | roposed fuel(s), exc | cluding coal, ir | ncluding maxim | ium percent sulfur        |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    | (c)                                                               | Theoretical combustion              | n air requirement (A | CF/unit of fue   | el):           |                           |
|    |                                                                   | @                                   |                      | °F and           |                | psia.                     |
|    | (d)                                                               | Percent excess air:                 |                      |                  |                |                           |
|    | (e)                                                               | Type and BTU/hr of bu               | rners and all other  | firina equipme   | ent planned to | be used:                  |
|    | (0)                                                               |                                     |                      | ining oquipine   |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    | (f)                                                               | If coal is proposed as a            | source of fuel, ide  | ntify supplier a | and seams and  | give sizing of the        |
|    |                                                                   | coal as it will be fired:           |                      | • • • •          |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    | (g)                                                               | Proposed maximum de                 | sign heat input:     |                  |                | × 10 <sup>6</sup> BTU/hr. |
| 7. | Pro                                                               | jected operating schedu             | ıle:                 |                  |                |                           |
| Ho | urs/l                                                             | Day 24                              | Days/Week            | 7                | Weeks/Year     | 52                        |

| 8. | <ol> <li>Projected amount of pollutants that would be emitted from this affected source if no control<br/>devices were used:</li> </ol> |           |       |      |            |  |  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|------|------------|--|--|
| @  | 2 70                                                                                                                                    | 70 °F and |       | 14.7 | psia       |  |  |
| a. | NO <sub>X</sub>                                                                                                                         | NA        | lb/hr | NA   | grains/ACF |  |  |
| b. | SO <sub>2</sub>                                                                                                                         | NA        | lb/hr | NA   | grains/ACF |  |  |
| c. | СО                                                                                                                                      | NA        | lb/hr | NA   | grains/ACF |  |  |
| d. | PM <sub>10</sub>                                                                                                                        | 5.77      | lb/hr | NA   | grains/ACF |  |  |
| e. | Hydrocarbons                                                                                                                            | NA        | lb/hr | NA   | grains/ACF |  |  |
| f. | VOCs                                                                                                                                    | NA        | lb/hr | NA   | grains/ACF |  |  |
| g. | Pb                                                                                                                                      | NA        | lb/hr | NA   | grains/ACF |  |  |
| h. | Specify other(s)                                                                                                                        |           |       |      |            |  |  |
|    |                                                                                                                                         |           | lb/hr |      | grains/ACF |  |  |
|    |                                                                                                                                         |           | lb/hr |      | grains/ACF |  |  |
|    |                                                                                                                                         |           | lb/hr |      | grains/ACF |  |  |
|    |                                                                                                                                         |           | lb/hr |      | grains/ACF |  |  |

| <ol> <li>Proposed Monitoring, Recordkeeping, Report<br/>Please propose monitoring, recordkeeping,<br/>with the proposed operating parameters.<br/>compliance with the proposed emissions line<br/>MONITORING<br/>None</li> </ol> | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| REPORTING                                                                                                                                                                                                                        | TESTING                                                                                                     |
| None                                                                                                                                                                                                                             | None                                                                                                        |
|                                                                                                                                                                                                                                  | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                                                                                                                                                                    | OSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                                                                                                                                                                      | POSED FREQUENCY OF REPORTING OF THE                                                                         |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMIS<br>POLLUTION CONTROL DEVICE.                                                                                                                                                   |                                                                                                             |
| 10. Describe all operating ranges and mainter<br>maintain warranty<br>NA                                                                                                                                                         | nance procedures required by Manufacturer to                                                                |
|                                                                                                                                                                                                                                  |                                                                                                             |
|                                                                                                                                                                                                                                  |                                                                                                             |
|                                                                                                                                                                                                                                  |                                                                                                             |
|                                                                                                                                                                                                                                  |                                                                                                             |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 009

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Haver C Packer                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 4,410 lb/hr – Rheological Additive                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| N/A                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
| Neue                                                                                                                                                                                                                                                                                                         |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| * The identification number which appears here must correspond to the air pollution control device identification number appearing on the <i>List Form</i> .                                                                                                                                                 |

| 6.       | 6. Combustion Data (if applicable): NA                            |                   |                  |                      |                     |                |                           |
|----------|-------------------------------------------------------------------|-------------------|------------------|----------------------|---------------------|----------------|---------------------------|
|          | (a) Type and amount in appropriate units of fuel(s) to be burned: |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          | (b)                                                               | Chemic<br>and ash | al analysis of p | roposed fuel(s), e   | excluding coal, in  | ncluding maxin | num percent sulfur        |
|          |                                                                   | anu asi           |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          | (c) <sup>·</sup>                                                  | Theoret           | ical combustio   | n air requirement    | (ACF/unit of fue    | el):           |                           |
|          |                                                                   |                   | @                |                      | °F and              |                | psia.                     |
| $\vdash$ |                                                                   |                   |                  |                      |                     |                |                           |
|          | (d) I                                                             | Percent           | excess air:      |                      |                     |                |                           |
|          | (e)                                                               | Type an           | d BTU/hr of bu   | irners and all othe  | er firing equipme   | ent planned to | be used:                  |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
| ⊢        | (f)                                                               | foodio            | proposed as a    |                      | dontifi ou polion d |                |                           |
|          | (I) I<br>(I) I                                                    | coal as i         | t will be fired: | a source of fuel, in | dentity supplier a  | and seams and  | give sizing of the        |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          |                                                                   |                   |                  |                      |                     |                |                           |
|          | (g) F                                                             | Propose           | d maximum de     | sign heat input:     |                     |                | × 10 <sup>6</sup> BTU/hr. |
| 7.       | Proie                                                             | ected or          | perating sched   | ule:                 |                     | <u> </u>       |                           |
|          |                                                                   |                   |                  |                      | -                   |                | <i></i>                   |
|          | urs/D                                                             | ау                | 24               | Days/Week            | 7                   | Weeks/Year     | 52                        |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |        |       |      |            |
|----|-----------------------------------------------------------------------------------------------------------------|--------|-------|------|------------|
| @  | 2 70                                                                                                            | °F and |       | 14.7 | psia       |
| a. | NO <sub>X</sub>                                                                                                 | NA     | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>                                                                                                 | NA     | lb/hr | NA   | grains/ACF |
| c. | СО                                                                                                              | NA     | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub>                                                                                                | 6.92   | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons                                                                                                    | NA     | lb/hr | NA   | grains/ACF |
| f. | VOCs                                                                                                            | NA     | lb/hr | NA   | grains/ACF |
| g. | Pb                                                                                                              | NA     | lb/hr | NA   | grains/ACF |
| h. | Specify other(s)                                                                                                |        |       |      |            |
|    |                                                                                                                 |        | lb/hr |      | grains/ACF |
|    |                                                                                                                 |        | lb/hr |      | grains/ACF |
|    |                                                                                                                 |        | lb/hr |      | grains/ACF |
|    |                                                                                                                 |        | lb/hr |      | grains/ACF |

|                                                                               | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate          |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| REPORTING                                                                     | TESTING                                                                                                     |
| None                                                                          | None                                                                                                        |
|                                                                               |                                                                                                             |
|                                                                               | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                 | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                       | DPOSED FREQUENCY OF REPORTING OF THE                                                                        |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE. | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |
| 10. Describe all operating ranges and mainter<br>maintain warranty<br>NA      | nance procedures required by Manufacturer to                                                                |
|                                                                               |                                                                                                             |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 2A

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dispersion Batch Tanks (2)                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 84,000 lb/hr of clay slurry<br>@ 3,800 lb/hr clay                                                                                                                                                                                                                                                            |
| @ 80,200 lb/hr water                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| N/A                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| * The identification number which appears here must correspond to the air pollution control device                                                                                                                                                                                                           |

| 6. | Combustion Data (if applicable): NA                                 |                     |                   |                      |              |
|----|---------------------------------------------------------------------|---------------------|-------------------|----------------------|--------------|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned:   |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    | (b) Chemical analysis of pr                                         | onosed fuel(s) ex   | luding coal in    | cluding maximum per  | rcent sulfur |
|    | and ash:                                                            |                     | Juding ooul, in   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    | (c) Theoretical combustion                                          | air requirement (A  | CF/unit of fuel   | ):                   |              |
|    | @                                                                   |                     | °F and            |                      | psia.        |
|    | (d) Percent excess air:                                             |                     |                   |                      |              |
|    | (e) Type and BTU/hr of bu                                           | rners and all other | firing equipme    | nt planned to be use | d:           |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    | <li>(f) If coal is proposed as a<br/>coal as it will be fired:</li> | source of fuel, ide | entify supplier a | ind seams and give s | izing of the |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    |                                                                     |                     |                   |                      |              |
|    | (g) Proposed maximum de                                             | sign heat input:    |                   | × 10 <sup>6</sup>    | BTU/hr.      |
| 7. | Projected operating sched                                           | ule:                |                   |                      |              |
| Но | ours/Day 24                                                         | Days/Week           | 7                 | Weeks/Year           | 52           |

| 8. | <ol> <li>Projected amount of pollutants that would be emitted from this affected source if no control<br/>devices were used:</li> </ol> |       |       |      |            |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|-------|-------|------|------------|
| @  | 70                                                                                                                                      | °F an | d     | 14.7 | psia       |
| a. | NO <sub>X</sub>                                                                                                                         | NA    | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>                                                                                                                         | NA    | lb/hr | NA   | grains/ACF |
| c. | со                                                                                                                                      | NA    | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub>                                                                                                                        | 0.08  | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons                                                                                                                            | NA    | lb/hr | NA   | grains/ACF |
| f. | VOCs                                                                                                                                    | NA    | lb/hr | NA   | grains/ACF |
| g. | Pb                                                                                                                                      | NA    | lb/hr | NA   | grains/ACF |
| h. | Specify other(s)                                                                                                                        |       | 1     |      |            |
|    |                                                                                                                                         |       | lb/hr |      | grains/ACF |
|    |                                                                                                                                         |       | lb/hr |      | grains/ACF |
|    |                                                                                                                                         |       | lb/hr |      | grains/ACF |
|    |                                                                                                                                         | ÷     | lb/hr |      | grains/ACF |

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance<br/>with the proposed operating parameters. Please propose testing in order to demonstrate<br/>compliance with the proposed emissions limits.</li> </ol> |                                                                                                             |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--|--|--|
| MONITORING                                                                                                                                                                                                                                                                                                                  | RECORDKEEPING                                                                                               |  |  |  |
| None                                                                                                                                                                                                                                                                                                                        | None                                                                                                        |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
| REPORTING                                                                                                                                                                                                                                                                                                                   | TESTING                                                                                                     |  |  |  |
| None                                                                                                                                                                                                                                                                                                                        | None                                                                                                        |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |  |  |  |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                                                                                                                                                                                                                                                               | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                                                                                                                                                     | DPOSED FREQUENCY OF REPORTING OF THE                                                                        |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                               | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |  |  |  |
|                                                                                                                                                                                                                                                                                                                             | nance procedures required by Manufacturer to                                                                |  |  |  |
| maintain warranty<br>NA                                                                                                                                                                                                                                                                                                     |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
| L                                                                                                                                                                                                                                                                                                                           | · · · · · · · · · · · · · · · · · · ·                                                                       |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 2

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                              |
| Rx and Disp. Tanks (6)                                                                                                                                                                                                                                                                                       |
| Tex and Disp. Tanks (0)                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 84,000 lb/hr of clay slurry                                                                                                                                                                                                                                                                                  |
| @ 3,800 lb/hr clay<br>@ 80,200 lb/hr water                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| N/A                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The identification number which appears here must carrespond to the size allution sector law                                                                                                                                                                                                                 |

| 6.       | Combustion Data (i              | f applicable): NA       |                       |                  |                           |
|----------|---------------------------------|-------------------------|-----------------------|------------------|---------------------------|
|          | (a) Type and amou               | nt in appropriate units | s of fuel(s) to be bu | urned:           |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
| ļ        |                                 |                         |                       |                  |                           |
|          | (b) Chemical analys<br>and ash: | sis of proposed fuel(s  | ), excluding coal, i  | ncluding maxim   | num percent sulfur        |
|          | and asn.                        |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
| $\vdash$ | (a) The excited error           | husting signs suiters   |                       | . 1).            |                           |
|          | (c) i neoretical com            | bustion air requireme   | nt (ACF/unit of fue   | er <i>)</i> :    |                           |
|          |                                 | @                       | °F and                |                  | psia.                     |
|          | (d) Percent excess              | air:                    |                       |                  |                           |
|          | (e) Type and BTU/r              | nr of burners and all o | ther firing equipme   | ent planned to I | pe used:                  |
|          |                                 |                         | 5 1 1                 | 1                |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          | (f) If coal is propose          | ed as a source of fuel  | identify supplier :   | and seams and    | give sizing of the        |
|          | coal as it will be              |                         | , identity supplier ( |                  | give sizing of the        |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 |                         |                       |                  |                           |
|          |                                 | num design heat inpu    | L:                    |                  | × 10 <sup>6</sup> BTU/hr. |
| 7.       | Projected operating             | schedule:               |                       | I                |                           |
| Но       | urs/Day 24                      | Days/Week               | 7                     | Weeks/Year       | 52                        |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control |
|----|----------------------------------------------------------------------------------------------|
|    | devices were used:                                                                           |

| @  | 2 70             | °F and | l     | 14.7 | psia       |
|----|------------------|--------|-------|------|------------|
| a. | NO <sub>X</sub>  | NA     | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>  | NA     | lb/hr | NA   | grains/ACF |
| c. | СО               | NA     | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub> | 0.08   | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons     | NA     | lb/hr | NA   | grains/ACF |
| f. | VOCs             | NA     | lb/hr | NA   | grains/ACF |
| g. | Pb               | NA     | lb/hr | NA   | grains/ACF |
| h. | Specify other(s) |        |       |      |            |
|    | Methylchloride   | 0.03   | lb/hr | NA   | grains/ACF |
|    | Benzylchloride   | 0.05   | lb/hr | NA   | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |

| <ol> <li>Proposed Monitoring, Recordkeeping, Report<br/>Please propose monitoring, recordkeeping,<br/>with the proposed operating parameters.<br/>compliance with the proposed emissions line<br/>MONITORING<br/>None</li> </ol> | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                  |                                                                                                             |
| REPORTING<br>None                                                                                                                                                                                                                | TESTING<br>None                                                                                             |
|                                                                                                                                                                                                                                  |                                                                                                             |
|                                                                                                                                                                                                                                  |                                                                                                             |
|                                                                                                                                                                                                                                  |                                                                                                             |
|                                                                                                                                                                                                                                  | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                                                                                                                                                                    | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                                                                                                                                                                      | DPOSED FREQUENCY OF REPORTING OF THE                                                                        |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                                    | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |
| maintain warranty                                                                                                                                                                                                                | nance procedures required by Manufacturer to                                                                |
| NA                                                                                                                                                                                                                               |                                                                                                             |
|                                                                                                                                                                                                                                  |                                                                                                             |
|                                                                                                                                                                                                                                  |                                                                                                             |
|                                                                                                                                                                                                                                  |                                                                                                             |
|                                                                                                                                                                                                                                  |                                                                                                             |
|                                                                                                                                                                                                                                  |                                                                                                             |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 5

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACM #2 Mill                                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 3,675 lb/hr – Rheological Additive                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| N/A                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| <ul> <li>The identification number which appears here must correspond to the air pollution control device</li> </ul>                                                                                                                                                                                         |

| 6. | Combust               | on Data (if appli                       | cable): NA            |                   |                |                           |
|----|-----------------------|-----------------------------------------|-----------------------|-------------------|----------------|---------------------------|
|    | (a) Type              | and amount in a                         | opropriate units of t | fuel(s) to be bu  | urned:         |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    | (h) Cham              | ical analysis of n                      | roposed fuel(s), ex   |                   |                |                           |
|    | and a                 |                                         | roposed idei(s), ex   | ciduling coal, il |                | ium percent sului         |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    | ( ) <b>–</b>          |                                         |                       |                   |                |                           |
|    | (c) Theor             | etical combustio                        | n air requirement (A  | ACF/unit of fue   | el):           |                           |
|    |                       | @                                       |                       | °F and            |                | psia.                     |
|    | (d) Perce             | nt excess air:                          |                       |                   |                |                           |
|    | (e) Type a            | and BTU/hr of bu                        | rners and all other   | firing equipme    | ent planned to | be used:                  |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    | (†) If coal<br>coal a | is proposed as a<br>s it will be fired: | a source of fuel, ide | ntify supplier a  | and seams and  | give sizing of the        |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    |                       |                                         |                       |                   |                |                           |
|    | (g) Propo             | sed maximum de                          | sign heat input:      |                   |                | × 10 <sup>6</sup> BTU/hr. |
| 7. | Projected             | operating sched                         | ule:                  |                   |                |                           |
| Ho | urs/Day               | 24                                      | Days/Week             | 7                 | Weeks/Year     | 52                        |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control | ] |
|----|----------------------------------------------------------------------------------------------|---|
|    | devices were used:                                                                           |   |

| @  | 2 70             | °F and | °F and |    | psia       |
|----|------------------|--------|--------|----|------------|
| a. | NO <sub>X</sub>  | NA     | lb/hr  | NA | grains/ACF |
| b. | SO <sub>2</sub>  | NA     | lb/hr  | NA | grains/ACF |
| c. | СО               | NA     | lb/hr  | NA | grains/ACF |
| d. | PM <sub>10</sub> | 5.77   | lb/hr  | NA | grains/ACF |
| e. | Hydrocarbons     | NA     | lb/hr  | NA | grains/ACF |
| f. | VOCs             | NA     | lb/hr  | NA | grains/ACF |
| g. | Pb               | NA     | lb/hr  | NA | grains/ACF |
| h. | Specify other(s) |        |        |    |            |
|    |                  |        | lb/hr  |    | grains/ACF |
|    |                  |        | lb/hr  |    | grains/ACF |
|    |                  |        | lb/hr  |    | grains/ACF |
|    |                  |        | lb/hr  |    | grains/ACF |

| <ol> <li>Proposed Monitoring, Recordkeeping, Report<br/>Please propose monitoring, recordkeeping,<br/>with the proposed operating parameters.<br/>compliance with the proposed emissions line<br/>MONITORING<br/>None</li> </ol> | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| REPORTING<br>None                                                                                                                                                                                                                | TESTING<br>None                                                                                              |
|                                                                                                                                                                                                                                  | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROP<br>MONITORING.                                                                                                                                                                    | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                                                          | DPOSED FREQUENCY OF REPORTING OF THE                                                                         |
| POLLUTION CONTROL DEVICE.                                                                                                                                                                                                        | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                |
| 10. Describe all operating ranges and mainter<br>maintain warranty<br>NA                                                                                                                                                         | nance procedures required by Manufacturer to                                                                 |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 16

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACM #1 Mill                                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 3,675 lb/hr – Rheological Additive                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour.                                                                                                                                                                                                                                     |
| N/A                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| * The identification number which appears here must correspond to the air pollution control device                                                                                                                                                                                                           |

| 6. | Со    | mbustion D          | ata (if applic | able): NA          |                 |                 |                           |
|----|-------|---------------------|----------------|--------------------|-----------------|-----------------|---------------------------|
|    | (a)   | Type and a          | amount in ap   | propriate units of | fuel(s) to be b | ourned:         |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    | (b)   | Chemical a and ash: | analysis of p  | roposed fuel(s), e | xcluding coal,  | including maxim | num percent sulfur        |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    | (c)   | Theoretica          | I combustion   | n air requirement  | (ACF/unit of fu | el):            |                           |
|    |       |                     | @              |                    | °F and          |                 | psia.                     |
|    | (d)   | Percent ex          | cess air:      |                    |                 |                 |                           |
|    | (e)   | Type and E          | BTU/hr of bu   | rners and all othe | r firing equipm | ent planned to  | be used:                  |
|    |       |                     |                |                    |                 | -               |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    | (f)   | If coal is pr       | onosed as a    | source of fuel id  | entify supplier | and seams and   | give sizing of the        |
|    | (י)   | coal as it w        |                |                    | onary ouppilor  |                 | give sizing of the        |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    |       |                     |                |                    |                 |                 |                           |
|    | (g)   | Proposed r          | naximum de     | sign heat input:   |                 |                 | × 10 <sup>6</sup> BTU/hr. |
| 7. | Pro   | jected oper         | ating sched    | ule:               |                 |                 |                           |
| Ho | urs/l | Day                 | 24             | Days/Week          | 7               | Weeks/Year      | 52                        |

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

| @  | 70               | °F and |       | 14.7 | psia       |
|----|------------------|--------|-------|------|------------|
| a. | NO <sub>X</sub>  | NA     | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>  | NA     | lb/hr | NA   | grains/ACF |
| c. | со               | NA     | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub> | 5.77   | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons     | NA     | lb/hr | NA   | grains/ACF |
| f. | VOCs             | NA     | lb/hr | NA   | grains/ACF |
| g. | Pb               | NA     | lb/hr | NA   | grains/ACF |
| h. | Specify other(s) |        | }     |      |            |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

|                                                                               | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate          |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| REPORTING                                                                     | TESTING                                                                                                     |
| None                                                                          | TESTING                                                                                                     |
|                                                                               |                                                                                                             |
|                                                                               | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                 | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                   | DPOSED FREQUENCY OF REPORTING OF THE                                                                        |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE. | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |
|                                                                               | nance procedures required by Manufacturer to                                                                |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 007

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| West Rotary Vacuum Filter Vent                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of al<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                             |
| The process charge rate is variable depending on the product being produced. 2,205 lb/hr – Rheological Additive                                                                                                                                                                                             |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                                                                                                             |
| N/A                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                             |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                             |
| None                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                             |

| 6. | . Combustion Data (if applicable): NA                             |                  |                        |                  |                |                           |  |  |
|----|-------------------------------------------------------------------|------------------|------------------------|------------------|----------------|---------------------------|--|--|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    | (b) Chemic<br>and ash                                             |                  | proposed fuel(s), exc  | luding coal, ii  | ncluding maxim | num percent sulfur        |  |  |
|    |                                                                   | -                |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    | (c) Theoret                                                       | ical combustio   | n air requirement (A   | CF/unit of fue   | el):           |                           |  |  |
|    |                                                                   | @                |                        | °F and           |                | psia.                     |  |  |
|    | (d) Percent                                                       | excess air:      |                        |                  |                |                           |  |  |
| -  | (e) Type an                                                       | d BTU/hr of bu   | urners and all other f | iring equipme    | ent planned to | be used:                  |  |  |
|    | .,                                                                |                  |                        |                  | ·              |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    | (f) If coal is                                                    | proposed as      | a source of fuel, ider | ntify supplier a | and seams and  | give sizing of the        |  |  |
|    | coal as                                                           | t will be fired: |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
|    |                                                                   |                  |                        |                  |                |                           |  |  |
| ⊢  |                                                                   |                  | <u> </u>               |                  | ·              | <u></u>                   |  |  |
|    | (g) Propose                                                       | d maximum de     | esign heat input:      |                  |                | × 10 <sup>6</sup> BTU/hr. |  |  |
| 7. | Projected o                                                       | perating sched   | ule:                   |                  | I              |                           |  |  |
| Но | ours/Day                                                          | 24               | Days/Week              | 7                | Weeks/Year     | 52                        |  |  |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control |  |
|----|----------------------------------------------------------------------------------------------|--|
|    | devices were used:                                                                           |  |

| @  | 70               | °F and |       | 14.7 | psia       |
|----|------------------|--------|-------|------|------------|
| a. | NO <sub>X</sub>  | NA     | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>  | NA     | lb/hr | NA   | grains/ACF |
| c. | СО               | NA     | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub> | 0.10   | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons     | NA     | lb/hr | NA   | grains/ACF |
| f. | VOCs             | 0.78   | lb/hr | NA   | grains/ACF |
| g. | Pb               | NA     | lb/hr | NA   | grains/ACF |
| h. | Specify other(s) |        |       |      |            |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |

- NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.
  - (2) Complete the Emission Points Data Sheet.

| <ul> <li>Proposed Monitoring, Recordkeeping, Report<br/>Please propose monitoring, recordkeeping,<br/>with the proposed operating parameters.<br/>compliance with the proposed emissions lin<br/>MONITORING<br/>None</li> </ul>         | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
|                                                                                                                                                                                                                                         |                                                                                                    |  |  |  |  |  |  |
| REPORTING                                                                                                                                                                                                                               | TESTING                                                                                            |  |  |  |  |  |  |
| None                                                                                                                                                                                                                                    | None                                                                                               |  |  |  |  |  |  |
| <b>MONITORING.</b> PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE. |                                                                                                    |  |  |  |  |  |  |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROP<br>MONITORING.                                                                                                                                                                           | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                        |  |  |  |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                                                                 | DPOSED FREQUENCY OF REPORTING OF THE                                                               |  |  |  |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                                           | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                      |  |  |  |  |  |  |
| 10. Describe all operating ranges and mainter<br>maintain warranty<br>NA                                                                                                                                                                | nance procedures required by Manufacturer to                                                       |  |  |  |  |  |  |
|                                                                                                                                                                                                                                         |                                                                                                    |  |  |  |  |  |  |
|                                                                                                                                                                                                                                         |                                                                                                    |  |  |  |  |  |  |
|                                                                                                                                                                                                                                         |                                                                                                    |  |  |  |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 008

| 1. | 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                          |  |  |  |  |  |  |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
| E  | East Rotary Vacuum Filter Vent                                                                                                                                                                                                                                                  |  |  |  |  |  |  |
| 2. | On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of al features of the affected source which may affect the production of air pollutants. |  |  |  |  |  |  |
| 3. | Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                    |  |  |  |  |  |  |
|    |                                                                                                                                                                                                                                                                                 |  |  |  |  |  |  |
|    | The process charge rate is variable depending on the product being produced. 2,205 lb/hr – heological Additive                                                                                                                                                                  |  |  |  |  |  |  |
| 4. | Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                           |  |  |  |  |  |  |
|    |                                                                                                                                                                                                                                                                                 |  |  |  |  |  |  |
| N  | I/A                                                                                                                                                                                                                                                                             |  |  |  |  |  |  |
|    |                                                                                                                                                                                                                                                                                 |  |  |  |  |  |  |
| 5  | Cive eleminal respires if applicable, that will be involved in the generation of signally tests                                                                                                                                                                                 |  |  |  |  |  |  |
| 5. | Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                              |  |  |  |  |  |  |
|    |                                                                                                                                                                                                                                                                                 |  |  |  |  |  |  |

None

| 6.                                                           | Combustion Data (if applicable): NA                                                                     |               |              |                     |                 |               |                           |  |  |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------|--------------|---------------------|-----------------|---------------|---------------------------|--|--|
|                                                              | (a) Type and amount in appropriate units of fuel(s) to be burned:                                       |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              | (1)                                                                                                     | <u></u>       |              |                     |                 |               |                           |  |  |
|                                                              | (b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulful<br>and ash: |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              | (c) Theoretical combustion air requirement (ACF/unit of fuel):                                          |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               | @            |                     | °F and          |               | psia.                     |  |  |
|                                                              | (d) Percent excess air:                                                                                 |               |              |                     |                 |               |                           |  |  |
|                                                              | (e) Type and BTU/hr of burners and all other firing equipment planned to be used:                       |               |              |                     |                 |               |                           |  |  |
|                                                              | . ,                                                                                                     |               |              |                     |                 | ·             |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              | source of fuel, ide | entify supplier | and seams and | give sizing of the        |  |  |
|                                                              | (                                                                                                       | coal as it wi | II be fired: |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
|                                                              |                                                                                                         |               |              |                     |                 |               |                           |  |  |
| <b> </b>                                                     |                                                                                                         |               |              |                     |                 |               |                           |  |  |
| (g) Proposed maximum design heat input: × 10 <sup>6</sup> BT |                                                                                                         |               |              |                     |                 |               | × 10 <sup>6</sup> BTU/hr. |  |  |
| 7.                                                           | 7. Projected operating schedule:                                                                        |               |              |                     |                 |               |                           |  |  |
| Но                                                           | urs/D                                                                                                   | ay            | 24           | Days/Week           | 7               | Weeks/Year    | 52                        |  |  |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control |  |
|----|----------------------------------------------------------------------------------------------|--|
|    | devices were used:                                                                           |  |

| @  | . 70             | 70 °F and |       | 14.7 psia |            |
|----|------------------|-----------|-------|-----------|------------|
| a. | NO <sub>X</sub>  | NA        | lb/hr | NA        | grains/ACF |
| b. | SO <sub>2</sub>  | NA        | lb/hr | NA        | grains/ACF |
| c. | СО               | NA        | lb/hr | NA        | grains/ACF |
| d. | PM <sub>10</sub> | 0.10      | lb/hr | NA        | grains/ACF |
| e. | Hydrocarbons     | NA        | lb/hr | NA        | grains/ACF |
| f. | VOCs             | 1.78      | lb/hr | NA        | grains/ACF |
| g. | Pb               | NA        | lb/hr | NA        | grains/ACF |
| h. | Specify other(s) |           |       |           |            |
|    |                  |           | lb/hr |           | grains/ACF |
|    |                  |           | lb/hr |           | grains/ACF |
|    |                  |           | lb/hr |           | grains/ACF |
|    |                  |           | lb/hr |           | grains/ACF |

- NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.
  - (2) Complete the Emission Points Data Sheet.

|                                                                           | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate           |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| MONITORING                                                                | RECORDKEEPING                                                                                                |
| None                                                                      | None                                                                                                         |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
| REPORTING                                                                 | TESTING                                                                                                      |
| None                                                                      | None                                                                                                         |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
|                                                                           | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |
| REPORTING. PLEASE DESCRIBE THE PROPERTY RECORDING.                        | OPOSED FREQUENCY OF REPORTING OF THE                                                                         |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EM POLLUTION CONTROL DEVICE. | ISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |
|                                                                           | nance procedures required by Manufacturer to                                                                 |
| maintain warranty                                                         |                                                                                                              |
| NA                                                                        |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |
|                                                                           |                                                                                                              |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 17B

| 1. Name or type and model of proposed affected source:                                                       |
|--------------------------------------------------------------------------------------------------------------|
|                                                                                                              |
|                                                                                                              |
| Eimco B Filter and Parkson B Vapor Hood                                                                      |
|                                                                                                              |
|                                                                                                              |
|                                                                                                              |
| 2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be          |
| made to this source, clearly indicated the change(s). Provide a narrative description of all                 |
| features of the affected source which may affect the production of air pollutants.                           |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                              |
|                                                                                                              |
|                                                                                                              |
|                                                                                                              |
|                                                                                                              |
| The process charge rate is variable depending on the product being produced. 3,675 lb/hr –                   |
| Rheological Additive                                                                                         |
|                                                                                                              |
|                                                                                                              |
|                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                     |
|                                                                                                              |
|                                                                                                              |
|                                                                                                              |
|                                                                                                              |
|                                                                                                              |
|                                                                                                              |
| N/A                                                                                                          |
| N/A                                                                                                          |
| N/A                                                                                                          |
| N/A                                                                                                          |
|                                                                                                              |
| N/A<br>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: |
|                                                                                                              |
|                                                                                                              |
|                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:        |
|                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:        |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:        |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:        |

| 6. | Со                                                                | mbustion Da               | ata (if applic | able): NA           |                  |                   |                           |
|----|-------------------------------------------------------------------|---------------------------|----------------|---------------------|------------------|-------------------|---------------------------|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
| -  | (b)                                                               | Chemical a                | nalysis of n   | oposed fuel(s), exc | luding coal in   |                   | im percent sulfur         |
|    | (0)                                                               | and ash:                  |                |                     | naanig ooal, ii  |                   | in percent canar          |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    | (-)                                                               | <b>T</b> he second is a 1 |                |                     |                  | 1).               |                           |
|    | (c)                                                               | Ineoretical               | compustion     | air requirement (A  |                  | 1):               |                           |
|    |                                                                   |                           | @              |                     | °F and           |                   | psia.                     |
|    | (d)                                                               | Percent exc               | cess air:      |                     |                  |                   |                           |
|    | (e)                                                               | Type and B                | BTU/hr of bu   | rners and all other | firing equipme   | ent planned to be | e used:                   |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    | (†)                                                               | If coal is pro            |                | source of fuel, ide | ntify supplier a | and seams and g   | give sizing of the        |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  |                   |                           |
|    |                                                                   |                           |                |                     |                  | - 103             |                           |
|    | (g)                                                               | Proposed n                | naximum de     | sign heat input:    |                  |                   | × 10 <sup>6</sup> BTU/hr. |
| 7. | Pro                                                               | jected operation          | ating sched    | ule:                |                  |                   |                           |
| Ho | ours/                                                             | Day                       | 24             | Days/Week           | 7                | Weeks/Year        | 52                        |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control |  |
|----|----------------------------------------------------------------------------------------------|--|
|    | devices were used:                                                                           |  |

| @  | 70               | °F and |       | 14.7 | psia       |
|----|------------------|--------|-------|------|------------|
| a. | NO <sub>X</sub>  | NA     | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>  | NA     | lb/hr | NA   | grains/ACF |
| c. | со               | NA     | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub> | 0.18   | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons     | NA     | lb/hr | NA   | grains/ACF |
| f. | VOCs             | NA     | lb/hr | NA   | grains/ACF |
| g. | Pb               | NA     | lb/hr | NA   | grains/ACF |
| h. | Specify other(s) |        |       |      |            |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |

| <ol> <li>Proposed Monitoring, Recordkeeping, Report<br/>Please propose monitoring, recordkeeping,<br/>with the proposed operating parameters.<br/>compliance with the proposed emissions lin<br/>MONITORING<br/>None</li> </ol> | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| REPORTING<br>None                                                                                                                                                                                                               | TESTING<br>None                                                                                                                                             |
| PROPOSED TO BE MONITORED IN ORDER TO DEMON<br>PROCESS EQUIPMENT OPERATION/AIR POLLUTION<br><b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF                                                                                       | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE.<br>POSED RECORDKEEPING THAT WILL ACCOMPANY THE |
| MONITORING.<br><b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                                                                                                                                                      | DPOSED FREQUENCY OF REPORTING OF THE                                                                                                                        |
| POLLUTION CONTROL DEVICE.                                                                                                                                                                                                       | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                                                               |
|                                                                                                                                                                                                                                 |                                                                                                                                                             |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 17C

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Eimco C Filter Vapor Hood                                                                                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 4,410 lb/hr – Rheological Additive                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
| N/A                                                                                                                                                                                                                                                                                                          |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
| None                                                                                                                                                                                                                                                                                                         |
| <ul> <li>The identification number which appears here must correspond to the air pollution control device identification number appearing on the <i>List Form</i>.</li> </ul>                                                                                                                                |

| 6.       | Со   | mbustion Da  | ata (if applic | able): NA            |                 |                   |                           |
|----------|------|--------------|----------------|----------------------|-----------------|-------------------|---------------------------|
|          | (a)  | Type and a   | mount in ap    | propriate units of   | fuel(s) to be   | burned:           |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      | <u> </u>     |                |                      |                 |                   |                           |
|          | (b)  |              | nalysis of p   | roposed fuel(s), e   | xcluding coal   | , including maxim | num percent sulfur        |
|          |      | and ash:     |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          | (c)  | Theoretical  | combustion     | n air requirement (  | ACF/unit of f   | uel):             |                           |
|          |      |              | @              |                      | °F and          |                   | psia.                     |
|          |      |              |                |                      |                 |                   | porar                     |
|          | (d)  | Percent exe  | cess air:      |                      |                 |                   |                           |
| -        | (e)  | Type and E   | BTU/hr of bu   | rners and all othe   | r firing equipr | ment planned to   | be used:                  |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
| <u> </u> | (6)  | 10           |                |                      |                 |                   |                           |
|          | (1)  | coal as it w |                | i source of fuel, la | entity supplie  | r and seams and   | give sizing of the        |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          |      |              |                |                      |                 |                   |                           |
|          | (g)  | Proposed n   | naximum de     | sign heat input:     |                 |                   | × 10 <sup>6</sup> BTU/hr. |
| 7.       | Pro  | jected opera | ating sched    | ule:                 |                 |                   |                           |
| Но       | urs/ | Day          | 24             | Days/Week            | 7               | Weeks/Year        | 52                        |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control |  |
|----|----------------------------------------------------------------------------------------------|--|
|    | devices were used:                                                                           |  |

| @  | 2 70             | °F and |       | 14.7 | psia       |
|----|------------------|--------|-------|------|------------|
| a. | NO <sub>X</sub>  | NA     | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>  | NA     | lb/hr | NA   | grains/ACF |
| c. | СО               | NA     | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub> | 0.21   | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons     | NA     | lb/hr | NA   | grains/ACF |
| f. | VOCs             | NA     | lb/hr | NA   | grains/ACF |
| g. | Pb               | NA     | lb/hr | NA   | grains/ACF |
| h. | Specify other(s) |        |       |      |            |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr | 8    | grains/ACF |

- NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.
  - (2) Complete the Emission Points Data Sheet.

|                                                                                                       | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate                                                          |
|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| REPORTING                                                                                             | TESTING                                                                                                                                                     |
| None                                                                                                  | None                                                                                                                                                        |
| PROPOSED TO BE MONITORED IN ORDER TO DEMON<br>PROCESS EQUIPMENT OPERATION/AIR POLLUTION               | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE.<br>POSED RECORDKEEPING THAT WILL ACCOMPANY THE |
| RECORDKEEPING.<br>TESTING. PLEASE DESCRIBE ANY PROPOSED EMI                                           | DPOSED FREQUENCY OF REPORTING OF THE<br>SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                       |
| POLLUTION CONTROL DEVICE.<br>10. Describe all operating ranges and mainter<br>maintain warranty<br>NA | nance procedures required by Manufacturer to                                                                                                                |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 50

| <ol> <li>Name or type and model of proposed affected source:         Parkson C Vapor Hood         </li> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of al features of the affected source which may affect the production of air pollutants.     </li> <li>Name(s) and maximum amount of proposed process material(s) charged per hour:         The process charge rate is variable depending on the product being produced. 4,410 lb/hr – Rheological Additive     </li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:         N/A         </li> <li>Serve chemical reactions, if applicable, that will be involved in the generation of air pollutants:         <ul> <li>None</li> </ul> </li> </ol> |                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of al features of the affected source which may affect the production of air pollutants.</li> <li>Name(s) and maximum amount of proposed process material(s) charged per hour:         The process charge rate is variable depending on the product being produced. 4,410 lb/hr – Rheological Additive     </li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> </ol>                                | 1. Name or type and model of proposed affected source:                                             |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of al features of the affected source which may affect the production of air pollutants.</li> <li>Name(s) and maximum amount of proposed process material(s) charged per hour:         The process charge rate is variable depending on the product being produced. 4,410 lb/hr – Rheological Additive     </li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> </ol>                                |                                                                                                    |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of al features of the affected source which may affect the production of air pollutants.</li> <li>Name(s) and maximum amount of proposed process material(s) charged per hour:         The process charge rate is variable depending on the product being produced. 4,410 lb/hr – Rheological Additive     </li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> </ol>                                |                                                                                                    |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of al features of the affected source which may affect the production of air pollutants.</li> <li>Name(s) and maximum amount of proposed process material(s) charged per hour:         The process charge rate is variable depending on the product being produced. 4,410 lb/hr – Rheological Additive     </li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> </ol>                                | Parkson C Vapor Hood                                                                               |
| <ul> <li>made to this source, clearly indicated the change(s). Provide a narrative description of al features of the affected source which may affect the production of air pollutants.</li> <li>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</li> <li>The process charge rate is variable depending on the product being produced. 4,410 lb/hr – Rheological Additive</li> <li>4. Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>N/A</li> <li>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants</li> </ul>                                                                                                                                                                                                                                                 |                                                                                                    |
| <ul> <li>made to this source, clearly indicated the change(s). Provide a narrative description of al features of the affected source which may affect the production of air pollutants.</li> <li>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</li> <li>The process charge rate is variable depending on the product being produced. 4,410 lb/hr – Rheological Additive</li> <li>4. Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>N/A</li> <li>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants</li> </ul>                                                                                                                                                                                                                                                 |                                                                                                    |
| <ul> <li>made to this source, clearly indicated the change(s). Provide a narrative description of al features of the affected source which may affect the production of air pollutants.</li> <li>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</li> <li>The process charge rate is variable depending on the product being produced. 4,410 lb/hr – Rheological Additive</li> <li>4. Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>N/A</li> <li>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants</li> </ul>                                                                                                                                                                                                                                                 |                                                                                                    |
| The process charge rate is variable depending on the product being produced. 4,410 lb/hr –<br>Rheological Additive<br>4. Name(s) and maximum amount of proposed material(s) produced per hour:<br>N/A<br>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | made to this source, clearly indicated the change(s). Provide a narrative description of al        |
| The process charge rate is variable depending on the product being produced. 4,410 lb/hr –<br>Rheological Additive<br>4. Name(s) and maximum amount of proposed material(s) produced per hour:<br>N/A<br>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3 Name(s) and maximum amount of proposed process material(s) charged per hour:                     |
| Rheological Additive         4. Name(s) and maximum amount of proposed material(s) produced per hour:         N/A         5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5. Name(s) and maximum amount of proposed process material(s) charged per nour                     |
| Rheological Additive         4. Name(s) and maximum amount of proposed material(s) produced per hour:         N/A         5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                    |
| Rheological Additive         4. Name(s) and maximum amount of proposed material(s) produced per hour:         N/A         5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                    |
| Rheological Additive         4. Name(s) and maximum amount of proposed material(s) produced per hour:         N/A         5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                    |
| Rheological Additive         4. Name(s) and maximum amount of proposed material(s) produced per hour:         N/A         5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The process charge rate is variable depending on the product being produced. 4,410 lb/hr –         |
| <ul> <li>4. Name(s) and maximum amount of proposed material(s) produced per hour:</li> <li>N/A</li> <li>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                    |
| N/A<br>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                    |
| N/A<br>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                    |
| N/A<br>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                    |
| N/A<br>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                    |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4. Name(s) and maximum amount of proposed material(s) produced per hour:                           |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                    |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                    |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                    |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | N/A                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5 Give chemical reactions if applicable, that will be involved in the generation of air pollutants |
| None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | None                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                    |

| 6. | Со    | mbustion Da   | ata (if applic | able): NA          |                   |                   |                           |
|----|-------|---------------|----------------|--------------------|-------------------|-------------------|---------------------------|
|    | (a)   | Type and a    | imount in ap   | propriate units o  | f fuel(s) to be l | ourned:           |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
| -  | (b)   | Chemical a    | nalvsis of n   | roposed fuel(s) e  | xcluding coal     | including maxim   | num percent sulfur        |
|    | (0)   | and ash:      |                |                    | xoluding ooul,    |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
| ┝  | (c)   | Theoretical   | combustio      | n air requirement  | (ACE/unit of fi   | iel):             |                           |
|    | (0)   | Theoretical   |                | r an requirement   |                   |                   |                           |
|    |       |               | @              |                    | °F and            |                   | psia.                     |
|    | (d)   | Percent exc   | cess air:      |                    |                   |                   |                           |
|    | (e)   | Type and E    | STU/hr of bu   | rners and all othe | er firing equipr  | nent planned to l | be used:                  |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
| -  | (f)   | If coal is pr | nosed as a     | source of fuel in  | lentify supplie   | r and seams and   | I give sizing of the      |
|    | (1)   | coal as it w  | ill be fired:  |                    | chiny supplie     |                   | give sizing of the        |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       |               |                |                    |                   |                   |                           |
|    |       | - <u></u>     |                |                    |                   |                   |                           |
|    | (g)   | Proposed n    | naximum de     | sign heat input:   |                   |                   | × 10 <sup>6</sup> BTU/hr. |
| 7. | Pro   | jected opera  | ating sched    | ule:               |                   | 1                 |                           |
| Ho | urs/I | Day           | 24             | Days/Week          | 7                 | Weeks/Year        | 52                        |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control |  |
|----|----------------------------------------------------------------------------------------------|--|
|    | devices were used:                                                                           |  |

| @  | 70               | 70 °F and |       | 14.7 | psia       |
|----|------------------|-----------|-------|------|------------|
| a. | NO <sub>X</sub>  | NA        | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>  | NA        | lb/hr | NA   | grains/ACF |
| c. | со               | NA        | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub> | 0.21      | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons     | NA        | lb/hr | NA   | grains/ACF |
| f. | VOCs             | NA        | lb/hr | NA   | grains/ACF |
| g. | Pb               | NA        | lb/hr | NA   | grains/ACF |
| h. | Specify other(s) |           |       |      |            |
|    |                  |           | lb/hr |      | grains/ACF |
|    |                  |           | lb/hr |      | grains/ACF |
|    |                  |           | lb/hr |      | grains/ACF |
|    |                  |           | lb/hr |      | grains/ACF |

- NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.
  - (2) Complete the Emission Points Data Sheet.

| <ul> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate complian<br/>with the proposed operating parameters. Please propose testing in order to demonstr<br/>compliance with the proposed emissions limits.</li> <li>MONITORING<br/>None</li> </ul> |                                                                                                                                                             |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
|                                                                                                                                                                                                                                                                                                                                                     | TESTING                                                                                                                                                     |  |  |  |
| REPORTING<br>None                                                                                                                                                                                                                                                                                                                                   | None                                                                                                                                                        |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                             |  |  |  |
| PROPOSED TO BE MONITORED IN ORDER TO DEMON<br>PROCESS EQUIPMENT OPERATION/AIR POLLUTION                                                                                                                                                                                                                                                             | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE.<br>POSED RECORDKEEPING THAT WILL ACCOMPANY THE |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                                                                                                                                                                                                                                                                                         | DPOSED FREQUENCY OF REPORTING OF THE                                                                                                                        |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                                                       | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                                                               |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                     | nance procedures required by Manufacturer to                                                                                                                |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 40

| 1. | Name or type and model of proposed affected source:                                                                                                                                                                                                                              |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| В  | Bulk Sack Packer                                                                                                                                                                                                                                                                 |
| 2. | On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants. |

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

The process charge rate is variable depending on the product being produced. Rheological Additive Bulk Sack Packing at 3,000 lb/hr

4. Name(s) and maximum amount of proposed material(s) produced per hour:

The process charge rate is variable depending on the product being produced. Rheological Additive Bulk Sack Packing at 3,000 lb/hr

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

None

<sup>\*</sup> The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6. | Combustio                                                                                               | n Data (if appli  | cable): Not Applic   | able           | . <u></u>       |                           |
|----|---------------------------------------------------------------------------------------------------------|-------------------|----------------------|----------------|-----------------|---------------------------|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned:                                       |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      | · · · ·        |                 |                           |
|    | (b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulful<br>and ash: |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    | (c) Theore                                                                                              | tical combustic   | n air requirement (  | ACF/unit of f  | uel):           |                           |
|    |                                                                                                         | @                 |                      | °F and         |                 | psia.                     |
|    | (d) Percen                                                                                              | excess air:       |                      | <u></u>        |                 |                           |
|    | (e) Type ar                                                                                             | nd BTU/hr of b    | urners and all othe  | r firing equip | ment planned to | be used:                  |
|    | ( ) ).                                                                                                  |                   |                      | • • •          | ·               |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    | (f) If coal is                                                                                          | s proposed as     | a source of fuel, id | entify supplie | r and seams and | give sizing of the        |
|    | coal as                                                                                                 | it will be fired: |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
|    |                                                                                                         |                   |                      |                |                 |                           |
| ⊢  |                                                                                                         |                   |                      |                |                 |                           |
|    | (g) Propose                                                                                             | ed maximum d      | esign heat input:    |                |                 | × 10 <sup>6</sup> BTU/hr. |
| 7. | Projected o                                                                                             | perating scheo    | lule:                |                |                 |                           |
| Но | ours/Day                                                                                                | 24                | Days/Week            | 7              | Weeks/Year      | 52                        |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control |   |
|----|----------------------------------------------------------------------------------------------|---|
|    | devices were used:                                                                           | I |

| @  | 2 100            | °F and |       | 14.7 | psia       |
|----|------------------|--------|-------|------|------------|
| a. | NO <sub>X</sub>  | NA     | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>  | NA     | lb/hr | NA   | grains/ACF |
| c. | со               | NA     | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub> | 4.71   | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons     | NA     | lb/hr | NA   | grains/ACF |
| f. | VOCs             | NA     | lb/hr | NA   | grains/ACF |
| g. | Pb               | NA     | lb/hr | NA   | grains/ACF |
| h. | Specify other(s) |        | ]     |      |            |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |

|                                                                               | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate           |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                                                                               |                                                                                                              |
| REPORTING                                                                     | TESTING                                                                                                      |
| None                                                                          | None                                                                                                         |
|                                                                               |                                                                                                              |
| -U                                                                            |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
|                                                                               | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |
| MONITORING.                                                                   |                                                                                                              |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORD KEEPING.                      | OPOSED FREQUENCY OF REPORTING OF THE                                                                         |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE. | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                |
|                                                                               | nance procedures required by Manufacturer to                                                                 |
| maintain warranty                                                             |                                                                                                              |
| NA                                                                            |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
| L                                                                             |                                                                                                              |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 41

| 1. Na  | me or type and model of proposed affected source:                                                                                                                                                                                                |                 |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| ACM    | #1 Feed Bin                                                                                                                                                                                                                                      |                 |
| ma     | a separate sheet(s), furnish a sketch(es) of this affected source. If a modifie<br>de to this source, clearly indicated the change(s). Provide a narrative des<br>tures of the affected source which may affect the production of air pollutants | cription of al  |
| 3. Na  | me(s) and maximum amount of proposed process material(s) charged per h                                                                                                                                                                           | nour:           |
|        | process charge rate is variable depending on the product being produced.                                                                                                                                                                         | 3,675 lb/hr     |
| Organ  | no Clay Product                                                                                                                                                                                                                                  |                 |
|        |                                                                                                                                                                                                                                                  |                 |
| 4. Nai | me(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                              |                 |
|        |                                                                                                                                                                                                                                                  |                 |
|        |                                                                                                                                                                                                                                                  |                 |
| NA     |                                                                                                                                                                                                                                                  |                 |
|        |                                                                                                                                                                                                                                                  |                 |
| 5. Giv | e chemical reactions, if applicable, that will be involved in the generation of                                                                                                                                                                  | air pollutants: |
|        |                                                                                                                                                                                                                                                  |                 |
| N      |                                                                                                                                                                                                                                                  |                 |
| None   |                                                                                                                                                                                                                                                  |                 |
|        |                                                                                                                                                                                                                                                  |                 |
|        |                                                                                                                                                                                                                                                  |                 |

| 6.       | Combustion Data (if applic                                        | able): Not Applica  | ible              |                  |                           |
|----------|-------------------------------------------------------------------|---------------------|-------------------|------------------|---------------------------|
|          | (a) Type and amount in appropriate units of fuel(s) to be burned: |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          | (b) Chemical analysis of p<br>and ash:                            | roposed fuel(s), ex | cluding coal, ir  | cluding maxim    | um percent sulfur         |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          | (c) Theoretical combustion                                        | n air requirement ( | ACF/unit of fue   | I):              | <u>.</u>                  |
|          | @                                                                 |                     | °F and            |                  | psia.                     |
|          | (d) Percent excess air:                                           |                     |                   |                  |                           |
|          | (e) Type and BTU/hr of bu                                         | rners and all other | firing equipme    | ent planned to b | e used:                   |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
| $\vdash$ | (f) If coal is proposed as a                                      | source of fuel, ide | entify supplier a | and seams and    | give sizing of the        |
|          | coal as it will be fired:                                         | ·                   | <b>,</b>          |                  | •                         |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          |                                                                   |                     |                   |                  |                           |
|          | (g) Proposed maximum de                                           | sign heat input:    |                   |                  | × 10 <sup>6</sup> BTU/hr. |
| 7.       | Projected operating schedu                                        | ule:                | <u>-</u>          |                  |                           |
| Нс       | ours/Day 24                                                       | Days/Week           | 7                 | Weeks/Year       | 52                        |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control |  |
|----|----------------------------------------------------------------------------------------------|--|
|    | devices were used:                                                                           |  |

| @  | 100              | °F and |       | 14.7 | psia       |
|----|------------------|--------|-------|------|------------|
| a. | NO <sub>X</sub>  | NA     | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>  | NA     | lb/hr | NA   | grains/ACF |
| c. | со               | NA     | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub> | 5.77   | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons     | NA     | lb/hr | NA   | grains/ACF |
| f. | VOCs             | NA     | lb/hr | NA   | grains/ACF |
| g. | Pb               | NA     | lb/hr | NA   | grains/ACF |
| h. | Specify other(s) |        |       |      |            |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |

- NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.
  - (2) Complete the Emission Points Data Sheet.

| <ol> <li>Proposed Monitoring, Recordkeeping, Report<br/>Please propose monitoring, recordkeeping, a<br/>with the proposed operating parameters. I<br/>compliance with the proposed emissions lime<br/>MONITORING<br/>None</li> </ol> | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| REPORTING                                                                                                                                                                                                                            | TESTING                                                                                                      |
| None                                                                                                                                                                                                                                 | None                                                                                                         |
|                                                                                                                                                                                                                                      | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROP<br>MONITORING.                                                                                                                                                                        | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |
| RECORDKEEPING.                                                                                                                                                                                                                       | OPOSED FREQUENCY OF REPORTING OF THE                                                                         |
| POLLUTION CONTROL DEVICE.                                                                                                                                                                                                            | ISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |
| 10. Describe all operating ranges and mainter<br>maintain warranty<br>NA                                                                                                                                                             | nance procedures required by Manufacturer to                                                                 |
| Σ.                                                                                                                                                                                                                                   |                                                                                                              |
|                                                                                                                                                                                                                                      |                                                                                                              |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 42

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACM #2 Feed Bin                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 3,675 lb/hr Organo Clay Product                                                                                                                                                                                                 |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |

| 6. | Comb                                                              | ustion Data (if applic                          | able): Not Applicable     |                                         |                  |                           |
|----|-------------------------------------------------------------------|-------------------------------------------------|---------------------------|-----------------------------------------|------------------|---------------------------|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    | (b) Ch                                                            |                                                 | rapased fuel(s) exclus    | ling cool in                            |                  |                           |
|    |                                                                   | d ash:                                          | roposed fuel(s), exclud   | ing coal, ii                            |                  | ium percent sunur         |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    | (c) Th                                                            | eoretical combustior                            | n air requirement (ACF    | /unit of fue                            | el):             |                           |
|    |                                                                   | @                                               |                           | °F and                                  |                  | psia.                     |
|    | (d) Pe                                                            | rcent excess air:                               |                           |                                         |                  |                           |
|    | (e) Ty                                                            | pe and BTU/hr of bu                             | rners and all other firir | ng equipme                              | ent planned to t | be used:                  |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    | (f) If c                                                          | oal is proposed as a<br>al as it will be fired: | source of fuel, identif   | y supplier a                            | and seams and    | give sizing of the        |
|    | 00                                                                | al as it will be filled.                        |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    |                                                                   |                                                 |                           |                                         |                  |                           |
|    | (a) Pro                                                           | posed maximum de                                | sign heat input:          |                                         |                  | × 10 <sup>6</sup> BTU/hr. |
| 7. |                                                                   | ted operating schedu                            |                           | - · - · · · · · · · · · · · · · · · · · |                  |                           |
|    | -                                                                 |                                                 |                           | 7                                       | Weeks/Year       | 52                        |
|    | ours/Day                                                          | 24                                              | Days/Week                 | 1                                       | vvccks/16al      | 32                        |

| 8.  | Projected amount of pollutants that would be emitted from this affected source if no control | ] |
|-----|----------------------------------------------------------------------------------------------|---|
|     | devices were used:                                                                           |   |
| l I |                                                                                              |   |

| @  | 2 100            | °F and |       | 14.7 | psia       |
|----|------------------|--------|-------|------|------------|
| a. | NO <sub>X</sub>  | NA     | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>  | NA     | lb/hr | NA   | grains/ACF |
| c. | СО               | NA     | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub> | 5.77   | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons     | NA     | lb/hr | NA   | grains/ACF |
| f. | VOCs             | NA     | lb/hr | NA   | grains/ACF |
| g. | Pb               | NA     | lb/hr | NA   | grains/ACF |
| h. | Specify other(s) |        |       |      |            |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |
|    |                  |        | lb/hr |      | grains/ACF |

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance<br/>with the proposed operating parameters. Please propose testing in order to demonstrate<br/>compliance with the proposed emissions limits.</li> </ol> |                                                                                                              |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
| MONITORING                                                                                                                                                                                                                                                                                                                  | RECORDKEEPING                                                                                                |  |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                        | None                                                                                                         |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
| REPORTING                                                                                                                                                                                                                                                                                                                   | TESTING                                                                                                      |  |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                        | None                                                                                                         |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |  |  |  |  |  |  |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROP<br>MONITORING.                                                                                                                                                                                                                                                               | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |  |  |  |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                                                                                                                                                     | DPOSED FREQUENCY OF REPORTING OF THE                                                                         |  |  |  |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                               | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                |  |  |  |  |  |  |
| 10. Describe all operating ranges and mainter maintain warranty                                                                                                                                                                                                                                                             | nance procedures required by Manufacturer to                                                                 |  |  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 43

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 51 Mill Recycle                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 4,410 lb/hr Organo Clay Product                                                                                                                                                                                                 |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |

| 6.       | Combustio      | n Data (if applie | able): Not Applic   | able              |                |                           |
|----------|----------------|-------------------|---------------------|-------------------|----------------|---------------------------|
|          | (a) Type a     | nd amount in aj   | opropriate units of | fuel(s) to be bu  | urned:         |                           |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
| $\vdash$ | (b) Chemic     | al analysis of p  | roposed fuel(s), e  | xcluding coal, ir | ncluding maxin | num percent sulfur        |
|          | and asl        |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          | (c) Theore     | tical combustion  | n air requirement   | (ACF/unit of fue  | el):           |                           |
|          |                | @                 |                     | °F and            |                | psia.                     |
|          | (d) Percen     | t excess air:     |                     |                   |                |                           |
|          | (e) Type ar    | nd BTU/hr of bu   | rners and all othe  | r firing equipme  | ent planned to | be used:                  |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
| $\vdash$ | (f) If coal is | s proposed as a   | source of fuel id   | entify supplier a | and seams and  | give sizing of the        |
|          | coal as        | it will be fired: |                     | onary oupprior c  |                | give sizing of the        |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          |                |                   |                     |                   |                |                           |
|          | (a) Propose    | ed maximum de     | sign heat input:    |                   |                | × 10 <sup>6</sup> BTU/hr. |
| <u> </u> |                |                   |                     |                   |                |                           |
| 7.       | -              | perating sched    |                     |                   |                |                           |
| Но       | urs/Day        | 24                | Days/Week           | 7                 | Weeks/Year     | 52                        |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |        |       |      |            |  |
|----|-----------------------------------------------------------------------------------------------------------------|--------|-------|------|------------|--|
| @  | 2 100                                                                                                           | °F and |       | 14.7 | psia       |  |
| a. | NO <sub>X</sub>                                                                                                 | NA     | lb/hr | NA   | grains/ACF |  |
| b. | SO <sub>2</sub>                                                                                                 | NA     | lb/hr | NA   | grains/ACF |  |
| c. | СО                                                                                                              | NA     | lb/hr | NA   | grains/ACF |  |
| d. | PM <sub>10</sub>                                                                                                | 6.92   | lb/hr | NA   | grains/ACF |  |
| e. | Hydrocarbons                                                                                                    | NA     | lb/hr | NA   | grains/ACF |  |
| f. | VOCs                                                                                                            | NA     | lb/hr | NA   | grains/ACF |  |
| g. | Pb                                                                                                              | NA     | lb/hr | NA   | grains/ACF |  |
| h. | Specify other(s)                                                                                                |        |       |      |            |  |
|    |                                                                                                                 |        | lb/hr |      | grains/ACF |  |
|    |                                                                                                                 |        | lb/hr |      | grains/ACF |  |
|    |                                                                                                                 |        | lb/hr |      | grains/ACF |  |
|    |                                                                                                                 |        | lb/hr |      | grains/ACF |  |

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance<br/>with the proposed operating parameters. Please propose testing in order to demonstrate<br/>compliance with the proposed emissions limits.</li> </ol> |                                                                                                             |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--|--|--|
| MONITORING                                                                                                                                                                                                                                                                                                                  | RECORDKEEPING                                                                                               |  |  |  |
| None                                                                                                                                                                                                                                                                                                                        | None                                                                                                        |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
| REPORTING<br>None                                                                                                                                                                                                                                                                                                           | TESTING                                                                                                     |  |  |  |
| none                                                                                                                                                                                                                                                                                                                        | None                                                                                                        |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |  |  |  |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROP<br>MONITORING.                                                                                                                                                                                                                                                               | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                                                                                                                                                     | DPOSED FREQUENCY OF REPORTING OF THE                                                                        |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                               | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |  |  |  |
| 10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty                                                                                                                                                                                                                  |                                                                                                             |  |  |  |
| NA                                                                                                                                                                                                                                                                                                                          |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                             |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 44

| 1. Name or type and model of proposed affected source:                                                |
|-------------------------------------------------------------------------------------------------------|
|                                                                                                       |
|                                                                                                       |
| Haver A Packing Honner                                                                                |
| Haver A Packing Hopper                                                                                |
|                                                                                                       |
|                                                                                                       |
| 2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be   |
| made to this source, clearly indicated the change(s). Provide a narrative description of all          |
| features of the affected source which may affect the production of air pollutants.                    |
|                                                                                                       |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                       |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
| The process charge rate is variable depending on the product being produced. 3,675 lb/hr              |
| Organo Clay Product                                                                                   |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                              |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
| NA                                                                                                    |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants. |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
| None                                                                                                  |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
|                                                                                                       |
| * The identification number which appears here must correspond to the air pollution control device    |

identification number appearing on the List Form.

| 6.       | 6. Combustion Data (if applicable): Not Applicable                |                                             |                    |                   |                |                           |
|----------|-------------------------------------------------------------------|---------------------------------------------|--------------------|-------------------|----------------|---------------------------|
|          | (a) Type and amount in appropriate units of fuel(s) to be burned: |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          | (b) Che                                                           | emical analysis of p                        | roposed fuel(s) e  | xcluding coal i   | ncluding maxir | num percent sulfur        |
|          | and                                                               | l ash:                                      |                    | Xoluding coul, I  |                | num percent sunur         |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
| $\vdash$ | (c) The                                                           | oretical combustion                         | air requirement    | ACE/unit of fue   |                |                           |
|          | (0) 1110                                                          |                                             |                    |                   | <i></i>        |                           |
|          |                                                                   | @                                           |                    | °F and            |                | psia.                     |
|          | (d) Per                                                           | cent excess air:                            |                    |                   |                |                           |
|          | (e) Typ                                                           | e and BTU/hr of bu                          | rners and all othe | r firing equipme  | ent planned to | be used:                  |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
| ⊢        | (f) If an                                                         |                                             |                    |                   |                |                           |
|          | (f) If co<br>coal                                                 | al is proposed as a<br>as it will be fired: | source of fuel, la | entity supplier a | and seams and  | d give sizing of the      |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          |                                                                   |                                             |                    |                   |                |                           |
|          | (g) Prop                                                          | oosed maximum de                            | sign heat input:   |                   |                | × 10 <sup>6</sup> BTU/hr. |
| 7.       | Projecte                                                          | d operating schedu                          | ıle:               |                   |                |                           |
| Но       | urs/Day                                                           | 24                                          | Days/Week          | 7                 | Weeks/Year     | 52                        |
|          |                                                                   |                                             |                    |                   |                |                           |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control | 1 |
|----|----------------------------------------------------------------------------------------------|---|
|    | devices were used:                                                                           |   |

| @  | 2 100            | °F and |       | 14.7       | psia       |
|----|------------------|--------|-------|------------|------------|
| a. | NO <sub>X</sub>  | NA     | lb/hr | NA         | grains/ACF |
| b. | SO <sub>2</sub>  | NA     | lb/hr | NA         | grains/ACF |
| c. | со               | NA     | lb/hr | NA         | grains/ACF |
| d. | PM <sub>10</sub> | 5.77   | lb/hr | NA         | grains/ACF |
| e. | Hydrocarbons     | NA     | lb/hr | NA         | grains/ACF |
| f. | VOCs             | NA     | lb/hr | NA         | grains/ACF |
| g. | Pb               | NA     | lb/hr | NA         | grains/ACF |
| h. | Specify other(s) |        |       | - <u> </u> |            |
|    |                  |        | lb/hr |            | grains/ACF |
|    |                  |        | lb/hr |            | grains/ACF |
|    |                  |        | lb/hr |            | grains/ACF |
|    |                  |        | lb/hr |            | grains/ACF |

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance<br/>with the proposed operating parameters. Please propose testing in order to demonstrate<br/>compliance with the proposed emissions limits.</li> <li>MONITORING</li> </ol> |                                                                                                             |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--|--|--|
| None                                                                                                                                                                                                                                                                                                                                            | None                                                                                                        |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 | 2                                                                                                           |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
| REPORTING                                                                                                                                                                                                                                                                                                                                       | TESTING                                                                                                     |  |  |  |
| None                                                                                                                                                                                                                                                                                                                                            | None                                                                                                        |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
| PROPOSED TO BE MONITORED IN ORDER TO DEMON<br>PROCESS EQUIPMENT OPERATION/AIR POLLUTION                                                                                                                                                                                                                                                         | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |  |  |  |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROP<br>MONITORING.                                                                                                                                                                                                                                                                                   | OSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                                                                                                                                                                         | POSED FREQUENCY OF REPORTING OF THE                                                                         |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMIS<br>POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                                                  | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |  |  |  |
| 10. Describe all operating ranges and mainter maintain warranty                                                                                                                                                                                                                                                                                 | ance procedures required by Manufacturer to                                                                 |  |  |  |
| NA                                                                                                                                                                                                                                                                                                                                              |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                 |                                                                                                             |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 45

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "A" Bag Dump Station                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 3,675 lb/hr<br>Organo Clay Product                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>Name(s) and maximum amount of proposed material(s) produced per hour:</li> </ol>                                                                                                                                                                                                                    |
| 4. Name(s) and maximum amount of proposed material(s) produced per nour:                                                                                                                                                                                                                                     |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |

| 6. | . Combustion Data (if applicable): Not Applicable                 |                                     |                    |                    |                  |                    |
|----|-------------------------------------------------------------------|-------------------------------------|--------------------|--------------------|------------------|--------------------|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    | (h)                                                               | Chamical analysis of n              | encod fuel(c)      |                    |                  |                    |
|    | (0)                                                               | Chemical analysis of pr<br>and ash: | oposed fuei(s), e  | excluding coal, if | icluding maxin   | ium percent sullur |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    | (c)                                                               | Theoretical combustion              | air requirement    | (ACF/unit of fue   | l):              |                    |
|    |                                                                   | @                                   |                    | °F and             |                  | psia.              |
|    | (d)                                                               | Percent excess air:                 |                    |                    |                  |                    |
|    | (e)                                                               | Type and BTU/hr of bu               | rners and all othe | er firing equipme  | ent planned to I | be used:           |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    | (f)                                                               | If coal is proposed as a            | source of fuel, ic | dentify supplier a | and seams and    | give sizing of the |
|    |                                                                   | coal as it will be fired:           |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    |                                                                   |                                     |                    |                    |                  |                    |
|    | (g) Proposed maximum design heat input: × 10 <sup>6</sup> BTU/hr. |                                     |                    |                    |                  |                    |
| 7. | 7. Projected operating schedule:                                  |                                     |                    |                    |                  |                    |
| Ho | urs/[                                                             | Day 24                              | Days/Week          | 7                  | Weeks/Year       | 52                 |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |       |       |      |            |
|----|-----------------------------------------------------------------------------------------------------------------|-------|-------|------|------------|
| @  | 2 100                                                                                                           | °F an | d     | 14.7 | psia       |
| a. | NO <sub>X</sub>                                                                                                 | NA    | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>                                                                                                 | NA    | lb/hr | NA   | grains/ACF |
| c. | СО                                                                                                              | NA    | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub>                                                                                                | 5.77  | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons                                                                                                    | NA    | lb/hr | NA   | grains/ACF |
| f. | VOCs                                                                                                            | NA    | lb/hr | NA   | grains/ACF |
| g. | Pb                                                                                                              | NA    | lb/hr | NA   | grains/ACF |
| h. | Specify other(s)                                                                                                |       |       |      |            |
|    |                                                                                                                 |       | lb/hr |      | grains/ACF |
|    |                                                                                                                 |       | lb/hr |      | grains/ACF |
|    |                                                                                                                 |       | lb/hr |      | grains/ACF |
|    |                                                                                                                 |       | lb/hr |      | grains/ACF |

| <ol> <li>Proposed Monitoring, Recordkeeping, Report<br/>Please propose monitoring, recordkeeping, a<br/>with the proposed operating parameters.<br/>compliance with the proposed emissions lim<br/>MONITORING<br/>None</li> </ol> | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate                |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--|--|--|
|                                                                                                                                                                                                                                   | TEATING                                                                                                           |  |  |  |
| REPORTING                                                                                                                                                                                                                         | TESTING<br>None                                                                                                   |  |  |  |
|                                                                                                                                                                                                                                   |                                                                                                                   |  |  |  |
|                                                                                                                                                                                                                                   | ,<br>E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |  |  |  |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                                                                                                                                                                     | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                       |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                                                                                                                                                                       | DPOSED FREQUENCY OF REPORTING OF THE                                                                              |  |  |  |
| POLLUTION CONTROL DEVICE.                                                                                                                                                                                                         | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                     |  |  |  |
| POLLUTION CONTROL DEVICE.<br>10. Describe all operating ranges and maintenance procedures required by Manufacturer to<br>maintain warranty<br>NA                                                                                  |                                                                                                                   |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 46

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "C" Bag Dump Station                                                                                                                                                                                                                                                                                         |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 4,000 lb/hr Organo Clay Product                                                                                                                                                                                                 |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
| * The identification number which appears here must correspond to the air pollution control device                                                                                                                                                                                                           |

The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6.       | Combustion Data (if applicable): Not Applicable                   |                      |                    |                 |                           |  |
|----------|-------------------------------------------------------------------|----------------------|--------------------|-----------------|---------------------------|--|
|          | (a) Type and amount in appropriate units of fuel(s) to be burned: |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
| -        | (b) Chemical analysis of                                          |                      |                    |                 |                           |  |
|          | and ash:                                                          | n proposed idei(s),  | excluding coal, il | Iciuulity maxin | ium percent sului         |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          | (c) Theoretical combus                                            | tion air requiremen  | t (ACF/unit of fue | el):            |                           |  |
|          | @                                                                 |                      | °F and             |                 | psia.                     |  |
|          | (d) Percent excess air:                                           |                      |                    |                 |                           |  |
| $\vdash$ | (e) Type and BTU/hr of                                            | burners and all oth  | er firing equipme  | ent planned to  | be used:                  |  |
|          |                                                                   |                      | 5 1 1              |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
| ĺ        | (f) If coal is proposed a coal as it will be fired                | is a source of fuel, | dentify supplier a | and seams and   | l give sizing of the      |  |
|          | coar as it will be fire                                           | u.                   |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      |                    |                 |                           |  |
|          | (g) Proposed maximum                                              | design heat input:   |                    |                 | × 10 <sup>6</sup> BTU/hr. |  |
| 7.       |                                                                   |                      |                    |                 |                           |  |
|          |                                                                   |                      | _                  |                 |                           |  |
| Hc       | burs/Day 24                                                       | Days/Week            | 7                  | Weeks/Year      | 52                        |  |

| 8. | Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |       |       |      |            |
|----|-----------------------------------------------------------------------------------------------------------------|-------|-------|------|------------|
| @  | 2 100                                                                                                           | °F ar | ld    | 14.7 | psia       |
| a. | NO <sub>X</sub>                                                                                                 | NA    | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>                                                                                                 | NA    | lb/hr | NA   | grains/ACF |
| c. | со                                                                                                              | NA    | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub>                                                                                                | 6.28  | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons                                                                                                    | NA    | lb/hr | NA   | grains/ACF |
| f. | VOCs                                                                                                            | NA    | lb/hr | NA   | grains/ACF |
| g. | Pb                                                                                                              | NA    | lb/hr | NA   | grains/ACF |
| h. | Specify other(s)                                                                                                |       | 1     |      |            |
|    |                                                                                                                 |       | lb/hr |      | grains/ACF |
|    |                                                                                                                 |       | lb/hr |      | grains/ACF |
|    |                                                                                                                 |       | lb/hr |      | grains/ACF |
|    |                                                                                                                 |       | lb/hr |      | grains/ACF |

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance<br/>with the proposed operating parameters. Please propose testing in order to demonstrate<br/>compliance with the proposed emissions limits.</li> </ol> |                                                                                                              |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--|--|--|--|
| MONITORING                                                                                                                                                                                                                                                                                                                  | RECORDKEEPING                                                                                                |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                        | None                                                                                                         |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
| DEDODTINO                                                                                                                                                                                                                                                                                                                   | TEOTINO                                                                                                      |  |  |  |  |
| REPORTING                                                                                                                                                                                                                                                                                                                   | TESTING                                                                                                      |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                        | None                                                                                                         |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |  |  |  |  |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                                                                                                                                                                                                                                                               | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |  |  |  |  |
| REPORTING. PLEASE DESCRIBE THE PRORECORDKEEPING.                                                                                                                                                                                                                                                                            | DPOSED FREQUENCY OF REPORTING OF THE                                                                         |  |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                               | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                |  |  |  |  |
| 10. Describe all operating ranges and mainter maintain warranty                                                                                                                                                                                                                                                             | nance procedures required by Manufacturer to                                                                 |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                             |                                                                                                              |  |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 47

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Haver C Packing Hopper                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. 4,410 lb/hr Organo Clay Product                                                                                                                                                                                                 |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
| None                                                                                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6. | Co                                                                | mbustion Data (if applic            | able): Not Applica   | ble              |                |                           |
|----|-------------------------------------------------------------------|-------------------------------------|----------------------|------------------|----------------|---------------------------|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
| -  | (4)                                                               | Observiced eventuation of a         |                      | - l l            | - I I'         |                           |
|    | (D)                                                               | Chemical analysis of pl<br>and ash: | oposed fuel(s), exc  | cluding coal, ir | ncluding maxim | num percent sulfur        |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
| 8  |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    | (c)                                                               | Theoretical combustion              | n air requirement (A | CF/unit of fue   | el):           |                           |
|    |                                                                   | @                                   |                      | °F and           |                | psia.                     |
|    | (d)                                                               | Percent excess air:                 |                      |                  |                |                           |
| -  | (e)                                                               | Type and BTU/hr of bu               | rners and all other  | firing equipme   | ent planned to | be used:                  |
|    |                                                                   |                                     |                      |                  | ·              |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   | If coal is proposed as a            | source of fuel, ide  | ntify supplier a | and seams and  | give sizing of the        |
|    |                                                                   | coal as it will be fired:           |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    |                                                                   |                                     |                      |                  |                |                           |
|    | (g)                                                               | Proposed maximum de                 | sign heat input:     |                  |                | × 10 <sup>6</sup> BTU/hr. |
| 7. | Pro                                                               | jected operating schedu             | ıle:                 |                  |                |                           |
| Ho | urs/[                                                             | <b>Day</b> 24                       | Days/Week            | 7                | Weeks/Year     | 52                        |

| 8. | <ol> <li>Projected amount of pollutants that would be emitted from this affected source if no control<br/>devices were used:</li> </ol> |       |       |      |            |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|-------|-------|------|------------|
| @  | 100                                                                                                                                     | °F an | d     | 14.7 | psia       |
| a. | NO <sub>x</sub>                                                                                                                         | NA    | lb/hr | NA   | grains/ACF |
| b. | SO <sub>2</sub>                                                                                                                         | NA    | lb/hr | NA   | grains/ACF |
| c. | со                                                                                                                                      | NA    | lb/hr | NA   | grains/ACF |
| d. | PM <sub>10</sub>                                                                                                                        | 6.92  | lb/hr | NA   | grains/ACF |
| e. | Hydrocarbons                                                                                                                            | NA    | lb/hr | NA   | grains/ACF |
| f. | VOCs                                                                                                                                    | NA    | lb/hr | NA   | grains/ACF |
| g. | Pb                                                                                                                                      | NA    | lb/hr | NA   | grains/ACF |
| h. | Specify other(s)                                                                                                                        |       | 1     |      |            |
|    |                                                                                                                                         |       | lb/hr |      | grains/ACF |
|    |                                                                                                                                         |       | lb/hr |      | grains/ACF |
|    |                                                                                                                                         |       | lb/hr |      | grains/ACF |
|    |                                                                                                                                         |       | lb/hr |      | grains/ACF |

|                                                                               | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate           |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                                                                               |                                                                                                              |
| REPORTING                                                                     | TESTING                                                                                                      |
| None                                                                          | None                                                                                                         |
| None                                                                          | None                                                                                                         |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROP<br>MONITORING.                 | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                       | DPOSED FREQUENCY OF REPORTING OF THE                                                                         |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE. | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                |
| 10. Describe all operating ranges and mainter<br>maintain warranty<br>NA      | nance procedures required by Manufacturer to                                                                 |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |
|                                                                               |                                                                                                              |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 48

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| CO <sub>2</sub> Transfer System                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
| o. Warne(s) and maximum amount of proposed process material(s) charged per nour.                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| $CO_2$ is used for cooling                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| * The identification number which appears here must correspond to the air pollution control device                                                                                                                                                                                                           |

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6.                             | Combustion Data (if applicable): Not Applicable                                   |                                     |                                  |  |
|--------------------------------|-----------------------------------------------------------------------------------|-------------------------------------|----------------------------------|--|
|                                | (a) Type and amount in appropriate units of fuel(s) to be burned:                 |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
| $\vdash$                       | (b) Chemical analysis of p                                                        | roposed fuel(s), excluding coal, ir | ncluding maximum percent sulfur  |  |
|                                | and ash:                                                                          |                                     | -                                |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                | (c) Theoretical combustion                                                        | n air requirement (ACF/unit of fue  | el):                             |  |
|                                | @                                                                                 | °F and                              | psia.                            |  |
|                                | (d) Percent excess air:                                                           |                                     |                                  |  |
|                                | (e) Type and BTU/hr of burners and all other firing equipment planned to be used: |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                | (f) If coal is proposed as a                                                      | source of fuel, identify supplier a | and seams and give sizing of the |  |
|                                | coal as it will be fired:                                                         |                                     | 0 0                              |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                |                                                                                   |                                     |                                  |  |
|                                | (g) Proposed maximum de                                                           | sign heat input:                    | × 10 <sup>6</sup> BTU/hr.        |  |
| 7.                             | Projected operating schedu                                                        | ıle:                                |                                  |  |
| Hours/Day Days/Week Weeks/Year |                                                                                   |                                     | Weeks/Year                       |  |

| æ  |                  | ۹۲ and   |               |
|----|------------------|----------|---------------|
| @  | <u>,</u>         | °F and   | psia          |
| a. | NO <sub>X</sub>  | lb/hr    | grains/ACI    |
| b. | SO <sub>2</sub>  | lb/hr    | grains/ACF    |
| c. | со               | lb/hr    | grains/ACF    |
| d. | PM <sub>10</sub> | lb/hr    | grains/ACF    |
| e. | Hydrocarbons     | lb/hr    | grains/ACF    |
| f. | VOCs             | lb/hr    | grains/ACF    |
| g. | Pb               | lb/hr    | grains/ACF    |
| h. |                  | r i      |               |
|    | CO <sub>2</sub>  | NA lb/hr | NA grains/ACF |
|    |                  | lb/hr    | grains/ACF    |
|    |                  | lb/hr    | grains/ACF    |
|    |                  | lb/hr    | grains/ACF    |

|                                                                               | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate          |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| None                                                                          | None                                                                                                        |
|                                                                               |                                                                                                             |
| REPORTING<br>None                                                             | TESTING<br>None                                                                                             |
|                                                                               | E PROCESS PARAMETERS AND RANGES THAT ARE<br>STRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROP<br>MONITORING.                 | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                 |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                       | DPOSED FREQUENCY OF REPORTING OF THE                                                                        |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE. | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                               |
| 10. Describe all operating ranges and mainter<br>maintain warranty<br>NA      | nance procedures required by Manufacturer to                                                                |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 20

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| Anion Addition                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                              |
| 2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be                                                                                                                                                                                                          |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| The process charge rate is variable depending on the product being produced. Up to 4,000 lb/hr                                                                                                                                                                                                               |
| of Anion Addition will be used.                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |

<sup>\*</sup> The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6. | 6. Combustion Data (if applicable): Not Applicable                |                     |               |                          |               |                |                                                |
|----|-------------------------------------------------------------------|---------------------|---------------|--------------------------|---------------|----------------|------------------------------------------------|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
| -  |                                                                   |                     |               |                          |               |                |                                                |
|    | (b)                                                               | Chemical a and ash: | nalysis of p  | roposed fuel(s), exclu   | ding coal, ii | ncluding maxin | num percent sulfur                             |
|    |                                                                   | anu asri.           |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
| -  | $\langle \alpha \rangle$                                          | Theoretical         | ambuctio      | a air raquirament (AC    |               |                |                                                |
| 5  | (0)                                                               | medielica           | compustion    | n air requirement (AC    |               | <i></i>        | -                                              |
|    |                                                                   |                     | @             |                          | °F and        |                | psia.                                          |
|    | (d)                                                               | Percent ex          | cess air:     |                          |               |                |                                                |
|    | (e)                                                               | Type and E          | BTU/hr of bu  | rners and all other firi | ng equipme    | ent planned to | be used:                                       |
|    | . ,                                                               | •                   |               |                          | 0             | ·              |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    | (f)                                                               | If coal is pro      | oposed as a   | source of fuel, identi   | fy supplier a | and seams and  | aive sizina of the                             |
|    | ( )                                                               | coal as it w        | ill be fired: | ,                        | , II          |                | <b>3</b> • • • • • • • • • • • • • • • • • • • |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    |                                                                   |                     |               |                          |               |                |                                                |
|    | (g)                                                               | Proposed n          | naximum de    | sign heat input:         |               |                | × 10 <sup>6</sup> BTU/hr.                      |
| 7. | Pro                                                               | jected opera        | ating schedu  | ıle:                     |               |                |                                                |
| Но | urs/[                                                             | Day                 | 24            | Days/Week                | 7             | Weeks/Year     | 52                                             |

| 8. | <ol> <li>Projected amount of pollutants that would be emitted from this affected source if no control<br/>devices were used:</li> </ol> |            |       |    |            |  |  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|------------|-------|----|------------|--|--|
| @  | )                                                                                                                                       | psia       |       |    |            |  |  |
| a. | NO <sub>X</sub>                                                                                                                         | NA         | lb/hr | NA | grains/ACF |  |  |
| b. | SO <sub>2</sub>                                                                                                                         | NA         | lb/hr | NA | grains/ACF |  |  |
| c. | СО                                                                                                                                      | NA         | lb/hr | NA | grains/ACF |  |  |
| d. | PM <sub>10</sub>                                                                                                                        | 6.28       | lb/hr | NA | grains/ACF |  |  |
| e. | Hydrocarbons                                                                                                                            | NA         | lb/hr | NA | grains/ACF |  |  |
| f. | VOCs                                                                                                                                    | NA         | lb/hr | NA | grains/ACF |  |  |
| g. | Pb                                                                                                                                      | NA         | lb/hr | NA | grains/ACF |  |  |
| h. | Specify other(s)                                                                                                                        |            |       |    |            |  |  |
|    |                                                                                                                                         |            | lb/hr |    | grains/ACF |  |  |
|    |                                                                                                                                         |            | lb/hr |    | grains/ACF |  |  |
|    |                                                                                                                                         |            | lb/hr |    | grains/ACF |  |  |
|    |                                                                                                                                         | grains/ACF |       |    |            |  |  |

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate complianc<br/>with the proposed operating parameters. Please propose testing in order to demonstrat<br/>compliance with the proposed emissions limits.</li> </ol> |                                                                                           |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--|--|--|--|--|
| MONITORING                                                                                                                                                                                                                                                                                                                | RECORDKEEPING                                                                             |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                      | None                                                                                      |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
| REPORTING                                                                                                                                                                                                                                                                                                                 | TESTING                                                                                   |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                      | None                                                                                      |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS |  |  |  |  |  |
| PROCESS EQUIPMENT OPERATION/AIR POLLUTION                                                                                                                                                                                                                                                                                 |                                                                                           |  |  |  |  |  |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                                                                                                                                                                                                                                                             | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                               |  |  |  |  |  |
| REPORTING. PLEASE DESCRIBE THE PRO                                                                                                                                                                                                                                                                                        | DPOSED FREQUENCY OF REPORTING OF THE                                                      |  |  |  |  |  |
| RECORDKEEPING.                                                                                                                                                                                                                                                                                                            |                                                                                           |  |  |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                             | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                             |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           | nance procedures required by Manufacturer to                                              |  |  |  |  |  |
| maintain warranty                                                                                                                                                                                                                                                                                                         |                                                                                           |  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                                        |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                                                                           |  |  |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on Equipment List Form): 49

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Long Conveyor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| The process charge rate is variable depending on the product being produced. Up to 3,675 lb/hr will be transferred.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:<br>The process charge rate is variable depending on the product being produced. Up to 3,675 lb/hr will be transferred. 5. Obve observed in the product in the product in the product of size of size of the product of size of size of size of the product of the product of size of size of size of the product of size of si |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:<br>NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

| 6. | Со                                                                | mbustion Data (if a     | oplicable): Not Appl   | icable            |                |                           |  |
|----|-------------------------------------------------------------------|-------------------------|------------------------|-------------------|----------------|---------------------------|--|
|    | (a) Type and amount in appropriate units of fuel(s) to be burned: |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    | (b)                                                               | Chemical analysis       | of proposed fuel(s), e | excluding coal, i | ncluding maxin | num percent sulfur        |  |
|    |                                                                   | and ash:                |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
| F  | Pipel                                                             | ine quality natural g   | jas                    |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    | (c)                                                               | Theoretical combu       | stion air requirement  | (ACF/unit of fue  | el):           |                           |  |
|    |                                                                   | @                       |                        | °F and            |                | psia.                     |  |
|    | (d)                                                               | Percent excess air      | :                      |                   |                |                           |  |
|    | (e)                                                               | Type and BTU/hr o       | f burners and all oth  | er firing equipme | ent planned to | be used:                  |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    | (f)                                                               |                         | as a source of fuel, i | dentify supplier  | and seams and  | give sizing of the        |  |
|    |                                                                   | coal as it will be fire | ed: NA                 |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    |                                                                   |                         |                        |                   |                |                           |  |
|    | (g)                                                               | Proposed maximum        | n design heat input:   | 10                |                | × 10 <sup>6</sup> BTU/hr. |  |
| 7. | Pro                                                               | jected operating scl    | hedule:                |                   | <u>.</u>       |                           |  |
| Но | ours/l                                                            | Day 24                  | Days/Week              | 7                 | Weeks/Year     | 52                        |  |

| 8. | . Projected amount of pollutants that would be emitted from this affected source if no control devices were used: |       |       |      |            |  |
|----|-------------------------------------------------------------------------------------------------------------------|-------|-------|------|------------|--|
| @  |                                                                                                                   | °F an | d     | psia |            |  |
| a. | NO <sub>X</sub>                                                                                                   | NA    | lb/hr | NA   | grains/ACF |  |
| b. | SO <sub>2</sub>                                                                                                   | NA    | lb/hr | NA   | grains/ACF |  |
| c. | со                                                                                                                | NA    | lb/hr | NA   | grains/ACF |  |
| d. | PM <sub>10</sub>                                                                                                  | 5.77  | lb/hr | NA   | grains/ACF |  |
| e. | Hydrocarbons                                                                                                      | NA    | lb/hr | NA   | grains/ACF |  |
| f. | VOCs                                                                                                              | NA    | lb/hr | NA   | grains/ACF |  |
| g. | РЬ                                                                                                                | NA    | lb/hr | NA   | grains/ACF |  |
| h. |                                                                                                                   | I     |       |      |            |  |
|    |                                                                                                                   |       | lb/hr |      | grains/ACF |  |
|    |                                                                                                                   |       | lb/hr |      | grains/ACF |  |
|    |                                                                                                                   |       | lb/hr |      | grains/ACF |  |
|    |                                                                                                                   |       | lb/hr |      | grains/ACF |  |

| <ol> <li>Proposed Monitoring, Recordkeeping, Reporting, and Testing<br/>Please propose monitoring, recordkeeping, and reporting in order to demonstrate complian<br/>with the proposed operating parameters. Please propose testing in order to demonstrate<br/>compliance with the proposed emissions limits.</li> </ol> |                                               |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|--|--|--|--|--|
| MONITORING                                                                                                                                                                                                                                                                                                                | RECORDKEEPING                                 |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                      | None                                          |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
| REPORTING                                                                                                                                                                                                                                                                                                                 | TESTING                                       |  |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                                      | None                                          |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
| MONITORING PLEASE LIST AND DESCRIBE TH                                                                                                                                                                                                                                                                                    | E PROCESS PARAMETERS AND RANGES THAT ARE      |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           | ISTRATE COMPLIANCE WITH THE OPERATION OF THIS |  |  |  |  |  |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROP<br>MONITORING.                                                                                                                                                                                                                                                             | POSED RECORDKEEPING THAT WILL ACCOMPANY THE   |  |  |  |  |  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRO<br>RECORDKEEPING.                                                                                                                                                                                                                                                               | DPOSED FREQUENCY OF REPORTING OF THE          |  |  |  |  |  |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EMI<br>POLLUTION CONTROL DEVICE.                                                                                                                                                                                                                                             | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           | nance procedures required by Manufacturer to  |  |  |  |  |  |
| maintain warranty<br>NA                                                                                                                                                                                                                                                                                                   |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                           |                                               |  |  |  |  |  |
| L                                                                                                                                                                                                                                                                                                                         |                                               |  |  |  |  |  |

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 51

| 1. Name or type and model of proposed affected source:                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Soda Ash System                                                                                                                                                                                                                                                                                              |
| <ol> <li>On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be<br/>made to this source, clearly indicated the change(s). Provide a narrative description of all<br/>features of the affected source which may affect the production of air pollutants.</li> </ol> |
| 3. Name(s) and maximum amount of proposed process material(s) charged per hour:                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 3,000 pounds/hour of soda ash pneumatically transferred to receivers located in the wet area of the facility.                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| 4. Name(s) and maximum amount of proposed material(s) produced per hour:                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                              |
| DT 4                                                                                                                                                                                                                                                                                                         |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
| 5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| NA                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                              |
| * The identification number which appears here must correspond to the air pollution control device identification number appearing on the List Form.                                                                                                                                                         |

| 6.       | Со                                                                | mbustion Da     | ta (if applic | able): Not Appli                            | cable            |                 |                      |
|----------|-------------------------------------------------------------------|-----------------|---------------|---------------------------------------------|------------------|-----------------|----------------------|
|          | (a) Type and amount in appropriate units of fuel(s) to be burned: |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
| -        | (b)                                                               | Chemical an     | alvsis of p   | roposed fuel(s)                             | excluding coal   | including maxin | num percent sulfur   |
|          |                                                                   | and ash:        |               |                                             | xolualing ooal,  | moldaling maxin | nam percent sanar    |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          | (c)                                                               | Theoretical of  | combustion    | n air requirement                           | (ACF/unit of fu  | iel):           |                      |
|          |                                                                   |                 | @             | n - eenna - Lanna <b>-</b> eennaaanaanaanaa | °F and           |                 | psia.                |
|          |                                                                   |                 |               |                                             |                  |                 | psia.                |
|          | (d)                                                               | Percent exce    | ess air:      |                                             |                  |                 |                      |
|          | (e)                                                               | Type and BT     | U/hr of bu    | rners and all othe                          | er firing equipm | ent planned to  | be used:             |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
| $\vdash$ | (f)                                                               | If coal is pror | osed as a     | source of fuel in                           | lentify supplier | and seams and   | d give sizing of the |
|          | (')                                                               | coal as it will | be fired:     |                                             | continy supplier |                 | give sizing of the   |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          |                                                                   |                 |               |                                             |                  |                 |                      |
|          | (g) Proposed maximum design heat input: × 10 <sup>6</sup> BTU/hr. |                 |               |                                             |                  |                 |                      |
| 7.       | 7. Projected operating schedule:                                  |                 |               |                                             |                  |                 |                      |
| Но       | urs/E                                                             | Day             | 24            | Days/Week                                   | 7                | Weeks/Year      | 52                   |

| 8. | <ol> <li>Projected amount of pollutants that would be emitted from this affected source if no control<br/>devices were used:</li> </ol> |          |       |                  |            |  |  |  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|----------|-------|------------------|------------|--|--|--|
| @  | Ambient temperature                                                                                                                     | e °F and |       | Ambient Pressure | psia       |  |  |  |
| a. | NO <sub>X</sub>                                                                                                                         |          | lb/hr | NA               | grains/ACF |  |  |  |
| b. | SO <sub>2</sub>                                                                                                                         |          | lb/hr | NA               | grains/ACF |  |  |  |
| c. | со                                                                                                                                      |          | lb/hr | NA               | grains/ACF |  |  |  |
| d. | PM <sub>10</sub>                                                                                                                        | 4.71     | lb/hr | NA               | grains/ACF |  |  |  |
| e. | Hydrocarbons                                                                                                                            |          | lb/hr | NA               | grains/ACF |  |  |  |
| f. | VOCs                                                                                                                                    |          | lb/hr | NA               | grains/ACF |  |  |  |
| g. | Pb                                                                                                                                      |          | lb/hr | NA               | grains/ACF |  |  |  |
| h. | Specify other(s)                                                                                                                        |          | 1     |                  |            |  |  |  |
|    |                                                                                                                                         |          | lb/hr | NA               | grains/ACF |  |  |  |
|    |                                                                                                                                         |          | lb/hr |                  | grains/ACF |  |  |  |
|    |                                                                                                                                         |          | lb/hr |                  | grains/ACF |  |  |  |
|    |                                                                                                                                         |          | lb/hr |                  | grains/ACF |  |  |  |

| with the proposed operating parameters.<br>compliance with the proposed emissions lin | and reporting in order to demonstrate compliance<br>Please propose testing in order to demonstrate<br>nits.  |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| MONITORING                                                                            | RECORDKEEPING                                                                                                |
| None proposed.                                                                        | Total yearly throughput.                                                                                     |
|                                                                                       |                                                                                                              |
| DEDODTINO                                                                             | TEOTINO                                                                                                      |
| REPORTING                                                                             | TESTING                                                                                                      |
| None proposed.                                                                        | None proposed.                                                                                               |
|                                                                                       | E PROCESS PARAMETERS AND RANGES THAT ARE<br>ISTRATE COMPLIANCE WITH THE OPERATION OF THIS<br>CONTROL DEVICE. |
| <b>RECORDKEEPING.</b> PLEASE DESCRIBE THE PROF<br>MONITORING.                         | POSED RECORDKEEPING THAT WILL ACCOMPANY THE                                                                  |
| <b>REPORTING.</b> PLEASE DESCRIBE THE PRORECORDKEEPING.                               | OPOSED FREQUENCY OF REPORTING OF THE                                                                         |
| <b>TESTING.</b> PLEASE DESCRIBE ANY PROPOSED EM<br>POLLUTION CONTROL DEVICE.          | SSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR                                                                |
| 10. Describe all operating ranges and mainten<br>maintain warranty<br>NA              | nance procedures required by Manufacturer to                                                                 |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |
|                                                                                       |                                                                                                              |

# Attachment L EMISSIONS UNIT DATA SHEET CHEMICAL PROCESS

|          | r chemical processes please fill o<br>pplementary forms that have bee                                                                                                                                                                                                                                                                                                                               |                                  | r forms (see below) that apply. Please check all |  |  |  |  |  |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------|--|--|--|--|--|
|          | <ul> <li>Emergency Vent Summary Sheet</li> <li>Leak Sources Data Sheet</li> <li>Toxicology Data Sheet</li> <li>Reactor Data Sheet</li> <li>Distillation Column Data Sheet</li> </ul>                                                                                                                                                                                                                |                                  |                                                  |  |  |  |  |  |
| 1.       | <ol> <li>Chemical process area name and equipment ID number (as shown in Equipment List Form)<br/>Equipment Leaks</li> </ol>                                                                                                                                                                                                                                                                        |                                  |                                                  |  |  |  |  |  |
| 2.       | <ol> <li>Standard Industrial Classification Codes (SICs) for process(es)<br/>2899</li> </ol>                                                                                                                                                                                                                                                                                                        |                                  |                                                  |  |  |  |  |  |
| 3.       | 3. List raw materials and ⊠ attach MSDSs                                                                                                                                                                                                                                                                                                                                                            |                                  |                                                  |  |  |  |  |  |
|          | <ol> <li>List Products and Maximum Production and ⊠ attach MSDSs</li> </ol>                                                                                                                                                                                                                                                                                                                         |                                  |                                                  |  |  |  |  |  |
|          |                                                                                                                                                                                                                                                                                                                                                                                                     | Maximum Hourly (lb/hr)           | Maximum Annual (ton/year)                        |  |  |  |  |  |
|          |                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |                                                  |  |  |  |  |  |
|          | heological Additive 4,410 19,316                                                                                                                                                                                                                                                                                                                                                                    |                                  |                                                  |  |  |  |  |  |
| $\vdash$ |                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |                                                  |  |  |  |  |  |
| 5.       | Complete the Emergency Vent                                                                                                                                                                                                                                                                                                                                                                         | Summary Sheet for all emergency  | / relief devices.                                |  |  |  |  |  |
| 6.       | 6. Complete the Leak Source Data Sheet and describe below or attach to application the leak detection or maintenance program to minimize fugitive emissions. Include detection instruments, calibration gases or methods, planned inspection frequency, and record-keeping, and similar pertinent information. If subject to a rule requirement (e.g. 40CFR60, Subpart VV), please list those here. |                                  |                                                  |  |  |  |  |  |
| 7.       | Clearly describe below or attach spill or release.                                                                                                                                                                                                                                                                                                                                                  | to application Accident Procedur | es to be followed in the event of an accidental  |  |  |  |  |  |

| sheets (MSDS<br>chemical entity<br>sheet is not r<br>teratogenicity,<br>unknown, and<br>8B. Describe any f<br>conducted by t                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul> <li>BA. Complete the <i>Toxicology Data Sheet</i> or attach to application a toxicology report (an up-to-date material safety data sheets (MSDS) may be used) outlining the currently known acute and chronic health effects of each compound or chemical entity emitted to the air. If these compounds have already been listed in Item 3, then a duplicate MSDS sheet is not required. Include data such as the OSHA time weighted average (TWA) or mutagenicity, teratogenicity, irritation, and other known or suspected effects should be addressed. Indicate where these are unknown, and provide references.</li> <li>BB. Describe any health effects testing or epidemiological studies on these compounds that are being or may be conducted by the company or required under TSCA, RCRA or other federal regulations. Discuss the persistence in the environment of any emission (e.g. pesticides, etc.).</li> </ul> |                                      |  |  |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--|--|--|--|--|--|
| <ol> <li>Waste Products - Waste products status: (If source is subject to RCRA or 45CSR25, please contact the<br/>Hazardous Waste Section of WVDEP, OAQ at (304) 926-3647.)</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |  |  |  |  |  |  |
| 9A. Types and amounts of wastes to be disposed:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |  |  |  |  |  |  |
| 9B. Method of disposal and location of waste disposal facilities:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |  |  |  |  |  |  |
| Carrier:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Carrier: Phone:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |  |  |  |  |  |  |
| 9C. Check here if a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | pproved USEPA/State Haza                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ardous Waste Landfill will be used 🔲 |  |  |  |  |  |  |
| 10. Maximum and Projected Typical Operating Schedule for process or project as a whole (circle appropriate units)         circle units:       (firs/day) (hr/batch)         (days), (batches/day), (batches/week)       (days/yr), (weeks/year)                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |  |  |  |  |  |  |
| 10A. Maximum 24 7 52                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |  |  |  |  |  |  |
| 10B. Typical         24         7         50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |  |  |  |  |  |  |
| 11. Complete a Re                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | actor Data Sheet for each re                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | eactor in this chemical process.     |  |  |  |  |  |  |
| 12. Complete a Distillation Column Data Sheet for each distillation column in this chemical process.NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |  |  |  |  |  |  |
| Please propose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul> <li>13. Proposed Monitoring, Recordkeeping, Reporting, and Testing         Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.     MONITORING     RECORDKEEPING     </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                      |  |  |  |  |  |  |
| REPORTING<br>None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |  |  |  |  |  |  |
| MONITORING. Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment operation or air pollution control device.<br>RECORDKEEPING. Please describe the proposed recordkeeping that will accompany the monitoring.<br>REPORTING. Please describe the proposed frequency of reporting of the recordkeeping.<br>TESTING. Please describe any proposed emissions testing for this process equipment or air pollution control device.<br>14. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |  |  |  |  |  |  |

### INFORMATION REQUIRED FOR CHEMICAL PROCESSES

The notes listed below for chemical processes are intended to help the applicant submit a complete application to the OAQ; these notes are not intended to be all inclusive. The requirements for a complete application for a permit issued under 45CSR13 are designed to provided enough information for a permit reviewer to begin a technical review. Additional information beyond that identified may be required to complete the technical review of any individual application.

### Process Description

Please keep these points in mind when completing your process description as part of this permit application.

- Provide a general process overview. This brief, but complete, process description should include chemical or registered trademark names of chemical products, intermediates, and/or raw materials to be produced or consumed, and the ultimate use(s) of the product(s). A list of the various chemical compounds is helpful.
- 2. Describe <u>each process step</u>. Include the process chemistry and stoichiometrically balanced reaction equation or material mass balance on all components.
- 3. Describe the methods and equipment used to receive, store, handle, and charge raw materials.
- 4. Describe the methods and equipment used to handle, store, or package final products and intermediates.
- Provide process flow diagrams or equipment layout drawings which clearly show the process flow relationships among all pieces of process and control equipment. Identify all air emission discharge points. Discuss instrumentation and controls for the process.
- Discuss the possibilities of process upsets, the duration and frequency of upsets, and consequences (including air emissions) of these upsets. Include a description of rupture discs, pressure relief valves, and secondary containment systems.
- 7. Discuss any fugitive emissions and the methods used to minimize them.
- 8. Include the following plans for the process if available:
  - a. preventative maintenance and malfunction abatement plan (recommended for all control equipment).
  - b. continuous emissions (in-stack) monitoring plan
  - c. ambient monitoring plan
  - d. emergency response plan

### Regulatory Discussion

The following state and federal air pollution control regulations may be applicable to your chemical process. You should review these regulations carefully to determine if they apply to your process. Please summarize the results of your review in your permit application along with any other regulations you believe are applicable.

- Title 45 Legislative Rule Division of Environmental Protection, Office of Air Quality contains West Virginia's air pollution control regulations, including the following promulgated rules which may require emissions reductions or control technologies for your chemical process:
  - a. 45CSR27 Best Available Technology (BAT) for Toxic Air Pollutants (TAPs)
  - b. 45CSR21 VOC emissions controls for ozone maintenance in Kanawha, Cabell, Putnam, Wayne, and Wood counties.
  - c. 45CSR13 (Table 45-13A) plantwide emission thresholds for permitting for certain pollutants.
- Federal Guidelines for case-by-case MACT determinations under section 112(g) of the 1990 CAAA for individual and total HAPs greater than 10 and 25 tons per year, respectively.
- There are also subparts of the federal Standards of Performance for New Stationary Sources (NSPS), 40CFR60 60, and the National Emission Standards for Hazardous Air Pollutants (NESHAP) at 40CFR61 and 40CFR63, which apply to various chemical and nonchemical processes. These subparts are too numerous to list here, but these areas of the federal regulations should be consulted carefully to determine applicability to your process.

#### **Emissions Summary and Calculations**

Please keep these points in mind when submitting your emissions calculations as part of this permit application.

- 1. For each pollutant, provide the basis for the emissions estimate and for all emission reduction(s) or control efficiency(ies) claimed.
- 2. For all <u>batch</u> processes provide the following
  - a. Emissions of each pollutant in pound(s) per batch, from each process step
  - b. Annual emissions based on number of batches requested per year
  - c. The total time for each process step and the duration of the emissions during the process step
  - d. Total batch time, total emissions per batch (or per day), and annual emissions based on the number of batches requested per year.

# **EMERGENCY VENT SUMMARY SHEET**

List below all emergency relief devices, rupture disks, safety relief valves, and similar openings that will vent only under abnormal conditions.

| Emission Point ID <sup>1</sup> | Equipment to Relief<br>Vent (type, ID if<br>available) <sup>2</sup> | Relief Vents (type) &<br>Set Pressure (psig) | Name of Chemical(s)<br>or Pollutants<br>Controlled | Worst Case<br>Emission per<br>Release Event (lbs) |
|--------------------------------|---------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------|---------------------------------------------------|
|                                |                                                                     | Not Applicable                               |                                                    |                                                   |
|                                | 0                                                                   |                                              |                                                    |                                                   |
|                                |                                                                     |                                              |                                                    |                                                   |
|                                |                                                                     |                                              |                                                    |                                                   |
|                                |                                                                     |                                              |                                                    |                                                   |
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|                                | P                                                                   |                                              |                                                    |                                                   |
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|                                |                                                                     |                                              |                                                    |                                                   |
|                                |                                                                     |                                              |                                                    |                                                   |

All routine vents (non-emergency) should be listed on the Emission Points Data Summary Sheet.

<sup>1</sup> Indicate the emission point, if any, to which source equipment normally vents. Do not assign emission point ID numbers to each emergency relief vent or device. <sup>2</sup> List all emergency relief devices next to the piece of equipment from which they control releases.

|                                       |                                 | Number of Source        | Number of Components                | Average Time to            | Estimated Annual                   |
|---------------------------------------|---------------------------------|-------------------------|-------------------------------------|----------------------------|------------------------------------|
| source Category                       | Pollutant                       | Components <sup>1</sup> | Monitored by Frequency <sup>2</sup> | Repair (days) <sup>3</sup> | Emission Rate (Ib/yr) <sup>4</sup> |
| Pumps <sup>5</sup>                    | light liquid VOC <sup>6,7</sup> | 0                       |                                     |                            |                                    |
|                                       | heavy liquid VOC <sup>8</sup>   | 3                       | Visual Inspection                   | Within 7 days              | 499.4                              |
| ė                                     | Non-VOC <sup>9</sup>            | 0                       |                                     |                            |                                    |
| Valves <sup>10</sup>                  | Gas VOC                         | 0                       | :                                   |                            |                                    |
|                                       | Light Liquid VOC                | 0                       |                                     |                            |                                    |
|                                       | Heavy Liquid VOC                | 50                      | Visual Inspection                   | Within 7 days              | 222.1                              |
|                                       | Non-VOC                         | 0                       |                                     |                            |                                    |
| Safety Relief Valves <sup>11</sup>    | Gas VOC                         | 0                       |                                     |                            |                                    |
|                                       | Non VOC                         | 0                       |                                     |                            |                                    |
| Open-ended Lines <sup>12</sup>        | VOC                             | 0                       |                                     |                            |                                    |
|                                       | Non-VOC                         | 0                       |                                     |                            |                                    |
| Sampling<br>Connections <sup>13</sup> | voc                             | 9                       | Visual Inspection                   | Within 7 days              | 1,738                              |
|                                       | Non-VOC                         | 5                       |                                     |                            |                                    |
| Compressors                           | VOC                             | 0                       |                                     |                            |                                    |
|                                       | Non-VOC                         | 0                       |                                     |                            |                                    |
| Flanges                               | VOC                             | 877                     | Visual Inspection                   | Within 7 days              | 30,994                             |
|                                       | Non-VOC                         |                         |                                     |                            |                                    |
| Other                                 | VOC                             |                         |                                     |                            |                                    |
|                                       | Non-VOC                         |                         |                                     |                            |                                    |
|                                       |                                 |                         |                                     |                            |                                    |

LEAK SOURCE DATA SHEET

 $^{1-13}$  See notes on the following page.

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### Notes for Leak Source Data Sheet

- 1. For VOC sources include components on streams and equipment that contain greater than 10% w/w VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.
- By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in ppm. Do not include monitoring by visual or soap-bubble leak detection methods. "M/Q(M)/Q/SA/A/O" means the time period between inspections as follows:

Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/Other (specify time period)

If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with non checked at any other frequency, you would put in the category "valves, gas service:" 0/50/0/75/0/50 (bimonthly).

- 3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.
- 4. Note the method used: MB material balance; EE engineering estimate; EPA emission factors established by EPA (cite document used); O other method, such as in-house emission factor (specify).
- 5. Do not include in the equipment count sealless pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)
- 6. Volatile organic compounds (VOC) means the term as defined in 40 CFR D51.100 (s).
- A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a light liquid.
- 8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a heavy liquid.
- 9. LIST CO, H<sub>2</sub>S, mineral acids, NO, NO<sub>2</sub>, SO<sub>3</sub>, etc. DO NOT LIST CO<sub>2</sub>, H<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>, O<sub>2</sub>, and Noble Gases.
- 10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.
- 11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.
- 12 Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.
- 13. Do not include closed-purge sampling connections.

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|-------------------------------------------------|--------------------------------------------------------|----------|------|--|-------------|----|--|------------------|--|
| C                                               | Kerences                                               |          |      |  |             |    |  |                  |  |
|                                                 | плианол                                                |          |      |  |             |    |  |                  |  |
| 4                                               | CITONIC                                                |          |      |  |             |    |  |                  |  |
| Acute <sup>3</sup><br>TC <sub>L0</sub> - Animal | LC <sub>L0</sub> - Animal<br>LC <sub>50</sub> - Animal |          |      |  | -<br>-<br>- |    |  |                  |  |
| <b>OSHA</b> Limits <sup>2</sup>                 | С                                                      |          |      |  | 10 m        |    |  |                  |  |
| OSHA                                            | TWA                                                    |          |      |  |             |    |  | 10 - 100000 - 10 |  |
| Descriptor Name/CAS                             | Number                                                 | <u>5</u> |      |  |             | 33 |  |                  |  |

severe. moderate, or <sup>1</sup> Indicate by "ND" where no data exists, in company's knowledge. <sup>2</sup> Time Weighted Average, Ceiling Limit, or other, with units. <sup>3</sup> If inhalation data is not available, provide other data as available. <sup>4</sup> Relying on animal or human studies, indicate if any data suggests: C = carcinogenicity, M = mutagenicity, T = teratogenecity, O = oncogenicity. <sup>5</sup> Indicate if there are dermal or eye irritation effects and whether they are considered to be low, moderate, o

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# Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

Provide the following information for <u>each</u> new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT <u>www.epa.gov/tnn/tanks.html</u>), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<u>http://www.epa.gov/tnn/chief/</u>).

| 1.       | Bulk Storage Area Name                                                                                                                                                  | 2.    | Tank Name                                                                                  |  |  |  |  |  |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------------|--|--|--|--|--|
|          | Quat Storage                                                                                                                                                            |       | B Tank                                                                                     |  |  |  |  |  |
| 3.       | Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i> ) 30                                                                                       | 4.    | Emission Point Identification No. (as assigned on <i>Equipment List Form</i> )<br>7-17B/30 |  |  |  |  |  |
| <u> </u> |                                                                                                                                                                         |       |                                                                                            |  |  |  |  |  |
| 5.       | Date of Commencement of Construction (for existing tanks) 1984                                                                                                          |       |                                                                                            |  |  |  |  |  |
| 6.       | Type of change 🗌 New Construction 🛛 N                                                                                                                                   | lew   | Stored Material Other Tank Modification                                                    |  |  |  |  |  |
| 7.       | Description of Tank Modification (if applicable)<br>Quat amine now contains Ethanol instead of isopropanol                                                              |       |                                                                                            |  |  |  |  |  |
| 7A.      | 7A. Does the tank have more than one mode of operation?       I Yes       I No         (e.g. Is there more than one product stored in the tank?)       I Yes       I No |       |                                                                                            |  |  |  |  |  |
| 7B       | 7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).                                     |       |                                                                                            |  |  |  |  |  |
| 7C       | 7C.Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):                                      |       |                                                                                            |  |  |  |  |  |
|          | II. TANK INFORMATION (required)                                                                                                                                         |       |                                                                                            |  |  |  |  |  |
| 8.       | . Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.                                                    |       |                                                                                            |  |  |  |  |  |
|          | 11,37                                                                                                                                                                   | 74 ga | allons                                                                                     |  |  |  |  |  |
| 9A.      | Tank Internal Diameter (ft)                                                                                                                                             | 9B.   | . Tank Internal Height (or Length) (ft)                                                    |  |  |  |  |  |
|          | 11                                                                                                                                                                      |       | 16                                                                                         |  |  |  |  |  |
|          |                                                                                                                                                                         |       |                                                                                            |  |  |  |  |  |

#### I. GENERAL INFORMATION (required)

| 116    | eight.                                                                                             |           |                                             |
|--------|----------------------------------------------------------------------------------------------------|-----------|---------------------------------------------|
|        | 11,3                                                                                               | 74 gallor | 18                                          |
| 9A. Ta | ank Internal Diameter (ft)                                                                         | 9B. Ta    | nk Internal Height (or Length) (ft)         |
|        | 11                                                                                                 |           | 16                                          |
| 10A.   | Maximum Liquid Height (ft)                                                                         | 10B.      | Average Liquid Height (ft)                  |
|        | 16                                                                                                 |           | 8                                           |
| 11A.   | Maximum Vapor Space Height (ft)                                                                    | 11B.      | Average Vapor Space Height (ft)             |
|        | 8                                                                                                  |           | 8                                           |
|        | ominal Capacity (specify barrels or gallons). T<br>esign liquid levels and overflow valve heights. | his is a  | lso known as "working volume" and considers |
|        | 11,3                                                                                               | 74 gallor | ns                                          |
|        |                                                                                                    |           |                                             |

| 13A. Maximum annual throughput (gal/yr)                                                                                                                      | 13B. Maximum daily throughput (gal/day)       |  |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|--|--|--|--|--|
| 2,384,874                                                                                                                                                    | 6,533.9                                       |  |  |  |  |  |
| 14. Number of Turnovers per year (annual net thro                                                                                                            | ughput/maximum tank liquid volume)<br>209.6   |  |  |  |  |  |
| 15. Maximum tank fill rate (gal/min)                                                                                                                         |                                               |  |  |  |  |  |
| 16. Tank fill method Submerged                                                                                                                               | Splash Bottom Loading                         |  |  |  |  |  |
| 17. Complete 17A and 17B for Variable Vapor Space Ta                                                                                                         | ank Systems 🛛 Does Not Apply                  |  |  |  |  |  |
| 17A. Volume Expansion Capacity of System (gal)                                                                                                               | 17B. Number of transfers into system per year |  |  |  |  |  |
| other (describe)<br>Description External Floating Roof pontoon roof<br>Domed External (or Covered) Floating Roof<br>Internal Floating Roof vertical column s | upport self-supporting                        |  |  |  |  |  |
| <ul> <li>Variable Vapor Space lifter roof</li> <li>Pressurized spherical cylindrica</li> <li>Underground</li> <li>Other (describe)</li> </ul>                |                                               |  |  |  |  |  |
| III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)                                                                  |                                               |  |  |  |  |  |
| 19. Tank Shell Construction:                                                                                                                                 |                                               |  |  |  |  |  |
| Riveted Gunite lined Epoxy-coate                                                                                                                             |                                               |  |  |  |  |  |
| 20A. Shell Color 20B. Roof Col                                                                                                                               | or 20C. Year Last Painted                     |  |  |  |  |  |
| 21. Shell Condition (if metal and unlined):                                                                                                                  | Rust 🗌 Not applicable                         |  |  |  |  |  |
| 22A. Is the tank heated?  YES  NO                                                                                                                            |                                               |  |  |  |  |  |
| 22B. If YES, provide the operating temperature (°F)                                                                                                          | 67.                                           |  |  |  |  |  |
| 22C. If YES, please describe how heat is provided to                                                                                                         | tank.                                         |  |  |  |  |  |
| 23. Operating Pressure Range (psig): to                                                                                                                      |                                               |  |  |  |  |  |
| 24. Complete the following section for Vertical Fixed Re                                                                                                     | Does Not Apply                                |  |  |  |  |  |
| 24A. For dome roof, provide roof radius (ft)                                                                                                                 |                                               |  |  |  |  |  |
| 24B. For cone roof, provide slope (ft/ft)                                                                                                                    |                                               |  |  |  |  |  |
| 25. Complete the following section for Floating Roof Ta                                                                                                      | Inks Does Not Apply                           |  |  |  |  |  |
| 25A. Year Internal Floaters Installed:                                                                                                                       |                                               |  |  |  |  |  |
| 25B. Primary Seal Type:                                                                                                                                      |                                               |  |  |  |  |  |
| 25C. Is the Floating Roof equipped with a Secondary                                                                                                          | Seal? YES NO                                  |  |  |  |  |  |
| 25D. If YES, how is the secondary seal mounted? (ch                                                                                                          | eck one) 🗌 Shoe 🗌 Rim 🗌 Other (describe):     |  |  |  |  |  |
| 25E. Is the Floating Roof equipped with a weather shi                                                                                                        | eld? YES NO                                   |  |  |  |  |  |

| 25F. Describe deck fittings; indicat                                                                                                    | te the number of ea           | ch type of fitting:                                                        |                               |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------|-------------------------------|--|--|--|--|
| ACCESS HATCH                                                                                                                            |                               |                                                                            |                               |  |  |  |  |
| BOLT COVER, GASKETED: UNBOLTED COVER, GASKETED: UNBOLTED COVER, UNGASK                                                                  |                               |                                                                            |                               |  |  |  |  |
| BOLT COVER, GASKETED:                                                                                                                   | AUTOMATIC GAU<br>UNBOLTED COV | JGE FLOAT WELL<br>ER, GASKETED:                                            | UNBOLTED COVER, UNGASKETED:   |  |  |  |  |
| BUILT-UP COLUMN – SLIDING<br>COVER, GASKETED:                                                                                           |                               | IN WELL<br>UMN – SLIDING PIPE COLUMN – FLEXIBLE FAE<br>KETED: SLEEVE SEAL: |                               |  |  |  |  |
| LADDER WELL<br>PIP COLUMN – SLIDING COVER, GASKETED: PIPE COLUMN – SLIDING COVER, UNGASKETED:                                           |                               |                                                                            |                               |  |  |  |  |
| SLIDING COVER, GASKETED:                                                                                                                | GAUGE-HATCH                   | I/SAMPLE PORT<br>SLIDING COVER, UNGASKETED:                                |                               |  |  |  |  |
| ROOF LEG OR HANGER WELL<br>WEIGHTED MECHANICAL WEIGHTED MECHANICAL SAMPLE WELL-SLIT FABRIC SEAL<br>ACTUATION, GASKETED: (10% OPEN AREA) |                               |                                                                            |                               |  |  |  |  |
| WEIGHTED MECHANICAL ACTUAT                                                                                                              |                               | BREAKER<br>WEIGHTED MECHA                                                  | ANICAL ACTUATION, UNGASKETED: |  |  |  |  |
| WEIGHTED MECHANICAL<br>GASKETED:                                                                                                        |                               | VENT<br>WEIGHTED MECHA                                                     | ANICAL ACTUATION, UNGASKETED: |  |  |  |  |
| OPEN:                                                                                                                                   |                               |                                                                            |                               |  |  |  |  |
| STUB DRAIN<br>1-INCH DIAMETER:                                                                                                          |                               |                                                                            |                               |  |  |  |  |
| OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)                                                                                  |                               |                                                                            |                               |  |  |  |  |
|                                                                                                                                         |                               |                                                                            |                               |  |  |  |  |

| 26. Complete the following section for Internal Floating F                                                                                                                                                                                                                                                                              | Roof Tanks Does Not Apply                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| 26A. Deck Type:  Bolted  Welded                                                                                                                                                                                                                                                                                                         |                                                |
| 26B. For Bolted decks, provide deck construction:                                                                                                                                                                                                                                                                                       |                                                |
| <ul> <li>26C. Deck seam:</li> <li>Continuous sheet construction 5 feet wide</li> <li>Continuous sheet construction 6 feet wide</li> <li>Continuous sheet construction 7 feet wide</li> <li>Continuous sheet construction 5 × 7.5 feet wide</li> <li>Continuous sheet construction 5 × 12 feet wide</li> <li>Other (describe)</li> </ul> |                                                |
| 26D. Deck seam length (ft)                                                                                                                                                                                                                                                                                                              | 26E. Area of deck (ft <sup>2</sup> )           |
| For column supported tanks:                                                                                                                                                                                                                                                                                                             | 26G. Diameter of each column:                  |
| 26F. Number of columns:                                                                                                                                                                                                                                                                                                                 | if providing TANKS Summary Shoots)             |
| 27. Provide the city and state on which the data in t                                                                                                                                                                                                                                                                                   | if providing TANKS Summary Sheets)             |
|                                                                                                                                                                                                                                                                                                                                         |                                                |
| 28. Daily Average Ambient Temperature (°F)                                                                                                                                                                                                                                                                                              |                                                |
| 29. Annual Average Maximum Temperature (°F)                                                                                                                                                                                                                                                                                             |                                                |
| 30. Annual Average Minimum Temperature (°F)                                                                                                                                                                                                                                                                                             |                                                |
| 31. Average Wind Speed (miles/hr)                                                                                                                                                                                                                                                                                                       |                                                |
| 32. Annual Average Solar Insulation Factor (BTU/(ft <sup>2</sup> day                                                                                                                                                                                                                                                                    | y))                                            |
| 33. Atmospheric Pressure (psia)                                                                                                                                                                                                                                                                                                         |                                                |
| V. LIQUID INFORMATION (optional                                                                                                                                                                                                                                                                                                         | if providing TANKS Summary Sheets)             |
| 34. Average daily temperature range of bulk liquid:                                                                                                                                                                                                                                                                                     |                                                |
| 34A. Minimum (°F)                                                                                                                                                                                                                                                                                                                       | 34B. Maximum (°F)                              |
| 35. Average operating pressure range of tank:                                                                                                                                                                                                                                                                                           |                                                |
| 35A. Minimum (psig)                                                                                                                                                                                                                                                                                                                     | 35B. Maximum (psig)                            |
| 36A. Minimum Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 36B. Corresponding Vapor Pressure (psia)       |
| 37A. Average Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 37B. Corresponding Vapor Pressure (psia)       |
| 38A. Maximum Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 38B. Corresponding Vapor Pressure (psia)       |
| 39. Provide the following for <u>each</u> liquid or gas to be stor                                                                                                                                                                                                                                                                      | ed in tank. Add additional pages if necessary. |
| 39A. Material Name or Composition                                                                                                                                                                                                                                                                                                       |                                                |
| 39B. CAS Number                                                                                                                                                                                                                                                                                                                         |                                                |
| 39C. Liquid Density (lb/gal)                                                                                                                                                                                                                                                                                                            |                                                |
| 39D. Liquid Molecular Weight (lb/lb-mole)                                                                                                                                                                                                                                                                                               |                                                |
| 39E. Vapor Molecular Weight (lb/lb-mole)                                                                                                                                                                                                                                                                                                |                                                |

| 39F. True (psia)                                 | sure                        |                  |                 |                        |                                       |  |  |
|--------------------------------------------------|-----------------------------|------------------|-----------------|------------------------|---------------------------------------|--|--|
| 39F. True (psia)<br>39G. Reid (psia)             |                             |                  |                 |                        |                                       |  |  |
| Months Storage per Y                             | ear                         |                  |                 |                        |                                       |  |  |
| 39H. From                                        |                             |                  |                 |                        |                                       |  |  |
| 39I. To                                          |                             |                  |                 |                        |                                       |  |  |
| VI. EMISSIONS AND CONTROL DEVICE DATA (required) |                             |                  |                 |                        |                                       |  |  |
| 40. Emission Control                             | Devices (check as mai       | ny as apply):    | 🗌 Does No       | ot Apply               |                                       |  |  |
| Carbon Adsorp                                    | otion <sup>1</sup>          |                  |                 |                        |                                       |  |  |
| Condenser <sup>1</sup>                           |                             |                  |                 |                        |                                       |  |  |
| Conservation V                                   | /ent (psig)                 |                  |                 |                        |                                       |  |  |
| Vacuum S                                         | Setting                     |                  | Pressure Se     | etting                 |                                       |  |  |
| Emergency Re                                     | lief Valve (psig)           |                  |                 |                        |                                       |  |  |
| 🗌 Inert Gas Blan                                 | ket of                      |                  |                 |                        |                                       |  |  |
| Insulation of Ta                                 | ank with                    |                  |                 |                        |                                       |  |  |
| 🗌 Liquid Absorpti                                | ion (scrubber) <sup>1</sup> |                  |                 |                        |                                       |  |  |
| Refrigeration o                                  | f Tank                      |                  |                 |                        |                                       |  |  |
| Rupture Disc (                                   | psig)                       |                  |                 |                        |                                       |  |  |
| Vent to Incinera                                 |                             |                  |                 |                        |                                       |  |  |
| Other <sup>1</sup> (describ                      | e): Catalytic Oxidize       | r (only during   | filling)        |                        |                                       |  |  |
| <sup>1</sup> Complete approp                     | priate Air Pollution Con    |                  |                 |                        |                                       |  |  |
| 41. Expected Emissio                             |                             |                  |                 | or elsewhere in the ar | polication).                          |  |  |
| -                                                | 1                           | 1                | 1               | 1°                     | · · · · · /                           |  |  |
| 1 Matarial Nama 8                                | Broothing Loop              | Workin           | 22010           | Annual Loop            |                                       |  |  |
| Material Name &<br>CAS No.                       | Breathing Loss<br>(Ib/hr)   | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup>        |  |  |
|                                                  |                             |                  | -               |                        | Estimation Method <sup>1</sup><br>EPA |  |  |
| CAS No.                                          | (lb/hr)                     | Amount           | Units           | (lb/yr)                |                                       |  |  |
| CAS No.                                          | (lb/hr)                     | Amount           | Units           | (lb/yr)                |                                       |  |  |
| CAS No.                                          | (lb/hr)                     | Amount           | Units           | (lb/yr)                |                                       |  |  |
| CAS No.                                          | (lb/hr)                     | Amount           | Units           | (lb/yr)                |                                       |  |  |
| CAS No.                                          | (lb/hr)                     | Amount           | Units           | (lb/yr)                |                                       |  |  |
| CAS No.                                          | (lb/hr)                     | Amount           | Units           | (lb/yr)                |                                       |  |  |
| CAS No.                                          | (lb/hr)                     | Amount           | Units           | (lb/yr)                |                                       |  |  |
| CAS No.                                          | (lb/hr)                     | Amount           | Units           | (lb/yr)                |                                       |  |  |
| CAS No.                                          | (lb/hr)                     | Amount           | Units           | (lb/yr)                |                                       |  |  |

Provide the following information for <u>each</u> new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT <u>www.epa.gov/tnn/tanks.html</u>), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<u>http://www.epa.gov/tnn/chief/</u>).

| I. GENE | RAL INFOR | RMATION | (required | ) |
|---------|-----------|---------|-----------|---|
|         |           | 1       |           |   |

| 1. Bulk Storage Area Name                                                                                                                  | 2. Tank Name                                                                                                |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--|--|--|--|
| Quat Storage                                                                                                                               | C Tank                                                                                                      |  |  |  |  |
| <ol> <li>Tank Equipment Identification No. (as assigned on<br/>Equipment List Form)<br/>29</li> </ol>                                      | <ol> <li>Emission Point Identification No. (as assigned on<br/>Equipment List Form)<br/>7-17B/29</li> </ol> |  |  |  |  |
| Date of Commencement of Construction (for existing tanks) 1984                                                                             |                                                                                                             |  |  |  |  |
| 6. Type of change 🗌 New Construction 🛛                                                                                                     | New Stored Material                                                                                         |  |  |  |  |
| <ol> <li>Description of Tank Modification (if applicable)<br/>Quat amine now contains Ethanol instead of isoproponal</li> </ol>            |                                                                                                             |  |  |  |  |
| 7A. Does the tank have more than one mode of operation<br>(e.g. Is there more than one product stored in the tan                           |                                                                                                             |  |  |  |  |
| 7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).        |                                                                                                             |  |  |  |  |
| 7C.Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):         |                                                                                                             |  |  |  |  |
| II. TANK INFORMATION (required)                                                                                                            |                                                                                                             |  |  |  |  |
| <ol> <li>Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal<br/>height.</li> </ol> |                                                                                                             |  |  |  |  |
| 11,374 gallons                                                                                                                             |                                                                                                             |  |  |  |  |
| 9A. Tank Internal Diameter (ft)                                                                                                            | 9B. Tank Internal Height (or Length) (ft)                                                                   |  |  |  |  |
| 11                                                                                                                                         | 16                                                                                                          |  |  |  |  |
| 10A. Maximum Liquid Height (ft)                                                                                                            | 10B. Average Liquid Height (ft)                                                                             |  |  |  |  |
| 16                                                                                                                                         | 8                                                                                                           |  |  |  |  |
| 11A. Maximum Vapor Space Height (ft)                                                                                                       | 11B. Average Vapor Space Height (ft)                                                                        |  |  |  |  |

12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.

8

11,374 gallons

8

| 13A. Maximum annual throughput (gal/yr)                                                                                                                                               | 13B. Maximum daily throughput (gal/day)             |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--|--|--|
| 2,384,874                                                                                                                                                                             | 6,533.9                                             |  |  |  |
| 14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) 209.6                                                                                             |                                                     |  |  |  |
| 15. Maximum tank fill rate (gal/min)                                                                                                                                                  |                                                     |  |  |  |
| 16. Tank fill method Submerged                                                                                                                                                        | Splash Bottom Loading                               |  |  |  |
| 17. Complete 17A and 17B for Variable Vapor Space Ta                                                                                                                                  |                                                     |  |  |  |
| 17A. Volume Expansion Capacity of System (gal)                                                                                                                                        | 17B. Number of transfers into system per year       |  |  |  |
| other (describe)<br>External Floating Roof pontoon roof<br>Domed External (or Covered) Floating Roof<br>Internal Floating Roof vertical column su<br>Variable Vapor Space lifter roof | upport self-supporting<br>diaphragm                 |  |  |  |
| <ul> <li>Pressurized spherical cylindrica</li> <li>Underground</li> <li>Other (describe)</li> </ul>                                                                                   |                                                     |  |  |  |
|                                                                                                                                                                                       | IATION (optional if providing TANKS Summary Sheets) |  |  |  |
| 19. Tank Shell Construction:                                                                                                                                                          |                                                     |  |  |  |
| Riveted Gunite lined Epoxy-coate                                                                                                                                                      |                                                     |  |  |  |
| 20A. Shell Color 20B. Roof Colo                                                                                                                                                       | or 20C. Year Last Painted                           |  |  |  |
| 21. Shell Condition (if metal and unlined):<br>☐ No Rust ☐ Light Rust ☐ Dense R                                                                                                       | Rust 🔲 Not applicable                               |  |  |  |
| 22A. Is the tank heated?                                                                                                                                                              |                                                     |  |  |  |
| 22B. If YES, provide the operating temperature (°F)                                                                                                                                   |                                                     |  |  |  |
| 22C. If YES, please describe how heat is provided to t                                                                                                                                | ank.                                                |  |  |  |
| 23. Operating Pressure Range (psig): to                                                                                                                                               |                                                     |  |  |  |
| 24. Complete the following section for Vertical Fixed Ro                                                                                                                              | of Tanks Does Not Apply                             |  |  |  |
| 24A. For dome roof, provide roof radius (ft)                                                                                                                                          |                                                     |  |  |  |
| 24B. For cone roof, provide slope (ft/ft)                                                                                                                                             |                                                     |  |  |  |
| 25. Complete the following section for Floating Roof Ta                                                                                                                               | nks Does Not Apply                                  |  |  |  |
| 25A. Year Internal Floaters Installed:                                                                                                                                                |                                                     |  |  |  |
| 25B.    Primary Seal Type:          Metallic (Mechanical)       (check one)          Vapor Mounted Resil                                                                              |                                                     |  |  |  |
| 25C. Is the Floating Roof equipped with a Secondary S                                                                                                                                 | Seal? YES NO                                        |  |  |  |
| 25D. If YES, how is the secondary seal mounted? (che                                                                                                                                  | eck one) 🗌 Shoe 🗌 Rim 🔲 Other (describe):           |  |  |  |
| 25E. Is the Floating Roof equipped with a weather shie                                                                                                                                | eld?  YES NO                                        |  |  |  |

| 25F. Describe deck fittings; indicate the number of each type of fitting: |                           |                          |                                                 |  |  |
|---------------------------------------------------------------------------|---------------------------|--------------------------|-------------------------------------------------|--|--|
| BOLT COVER, GASKETED:                                                     |                           | S HATCH<br>ER, GASKETED: | UNBOLTED COVER, UNGASKETED:                     |  |  |
|                                                                           |                           |                          |                                                 |  |  |
|                                                                           |                           | JGE FLOAT WELL           |                                                 |  |  |
| BOLT COVER, GASKETED:                                                     | UNBOLTED COV              | ER, GASKETED:            | UNBOLTED COVER, UNGASKETED:                     |  |  |
| COLUMN WELL                                                               |                           |                          |                                                 |  |  |
| BUILT-UP COLUMN – SLIDING<br>COVER, GASKETED:                             |                           | JMN – SLIDING            | PIPE COLUMN – FLEXIBLE FABRIC<br>SLEEVE SEAL:   |  |  |
|                                                                           | LADDE                     | RWELL                    | · · · · · · · · · · · · · · · · · · ·           |  |  |
| PIP COLUMN – SLIDING COVER, G                                             | ASKETED:                  | PIPE COLUMN -            | SLIDING COVER, UNGASKETED:                      |  |  |
|                                                                           | GAUGE-HATCH               | SAMPLE PORT              |                                                 |  |  |
| SLIDING COVER, GASKETED:                                                  |                           | SLIDING COVER,           | UNGASKETED:                                     |  |  |
| · · · · · · · · · · · · · · · · · · ·                                     | ROOF LEG OR               | HANGER WELL              |                                                 |  |  |
| WEIGHTED MECHANICAL ACTUATION, GASKETED:                                  | WEIGHTED<br>ACTUATION, UN |                          | SAMPLE WELL-SLIT FABRIC SEAL<br>(10% OPEN AREA) |  |  |
|                                                                           |                           |                          |                                                 |  |  |
|                                                                           |                           |                          |                                                 |  |  |
| WEIGHTED MECHANICAL ACTUAT                                                | ION, GASKETED.            |                          | ANICAL ACTUATION, UNGASKETED.                   |  |  |
|                                                                           |                           | VENT                     |                                                 |  |  |
| WEIGHTED MECHANICAL<br>GASKETED:                                          | ACTUATION                 | WEIGHTED MECHA           | ANICAL ACTUATION, UNGASKETED:                   |  |  |
|                                                                           | DECK DRAIN (3-I           | NCH DIAMETER)            |                                                 |  |  |
| OPEN:                                                                     |                           | 90% CLOSED:              |                                                 |  |  |
| STUB DRAIN                                                                |                           |                          |                                                 |  |  |
| 1-INCH DIAMETER:                                                          |                           |                          |                                                 |  |  |
| OTHER (DESCF                                                              | RIBE, ATTACH ADE          | DITIONAL PAGES I         | F NECESSARY)                                    |  |  |
|                                                                           |                           |                          |                                                 |  |  |
|                                                                           |                           |                          |                                                 |  |  |
|                                                                           |                           |                          |                                                 |  |  |
|                                                                           |                           |                          |                                                 |  |  |

| 26. Complete the following section for Internal Floating                                                                                                                                                                                                                                                                                | Roof Tanks Does Not Apply                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| 26A. Deck Type: 🗌 Bolted 🗌 Welded                                                                                                                                                                                                                                                                                                       |                                                 |
| 26B. For Bolted decks, provide deck construction:                                                                                                                                                                                                                                                                                       |                                                 |
| <ul> <li>26C. Deck seam:</li> <li>Continuous sheet construction 5 feet wide</li> <li>Continuous sheet construction 6 feet wide</li> <li>Continuous sheet construction 7 feet wide</li> <li>Continuous sheet construction 5 × 7.5 feet wide</li> <li>Continuous sheet construction 5 × 12 feet wide</li> <li>Other (describe)</li> </ul> |                                                 |
| 26D. Deck seam length (ft)                                                                                                                                                                                                                                                                                                              | 26E. Area of deck (ft <sup>2</sup> )            |
| For column supported tanks:                                                                                                                                                                                                                                                                                                             | 26G. Diameter of each column:                   |
| 26F. Number of columns:                                                                                                                                                                                                                                                                                                                 |                                                 |
|                                                                                                                                                                                                                                                                                                                                         | if providing TANKS Summary Sheets)              |
| 27. Provide the city and state on which the data in t                                                                                                                                                                                                                                                                                   | inis section are based.                         |
| 28. Daily Average Ambient Temperature (°F)                                                                                                                                                                                                                                                                                              |                                                 |
| 29. Annual Average Maximum Temperature (°F)                                                                                                                                                                                                                                                                                             |                                                 |
| 30. Annual Average Minimum Temperature (°F)                                                                                                                                                                                                                                                                                             |                                                 |
| 31. Average Wind Speed (miles/hr)                                                                                                                                                                                                                                                                                                       |                                                 |
| 32. Annual Average Solar Insulation Factor (BTU/(ft <sup>2</sup> ·da                                                                                                                                                                                                                                                                    | y))                                             |
| 33. Atmospheric Pressure (psia)                                                                                                                                                                                                                                                                                                         |                                                 |
|                                                                                                                                                                                                                                                                                                                                         | l if providing TANKS Summary Sheets)            |
| 34. Average daily temperature range of bulk liquid:                                                                                                                                                                                                                                                                                     |                                                 |
| 34A. Minimum (°F)                                                                                                                                                                                                                                                                                                                       | 34B. Maximum (°F)                               |
| 35. Average operating pressure range of tank:                                                                                                                                                                                                                                                                                           |                                                 |
| 35A. Minimum (psig)                                                                                                                                                                                                                                                                                                                     | 35B. Maximum (psig)                             |
| 36A. Minimum Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 36B. Corresponding Vapor Pressure (psia)        |
| 37A. Average Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 37B. Corresponding Vapor Pressure (psia)        |
| 38A. Maximum Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 38B. Corresponding Vapor Pressure (psia)        |
| 39. Provide the following for <u>each</u> liquid or gas to be stor                                                                                                                                                                                                                                                                      | red in tank. Add additional pages if necessary. |
| 39A. Material Name or Composition                                                                                                                                                                                                                                                                                                       |                                                 |
| 39B. CAS Number                                                                                                                                                                                                                                                                                                                         |                                                 |
| 39C. Liquid Density (lb/gal)                                                                                                                                                                                                                                                                                                            |                                                 |
| 39D. Liquid Molecular Weight (lb/lb-mole)                                                                                                                                                                                                                                                                                               |                                                 |
| 39E. Vapor Molecular Weight (lb/lb-mole)                                                                                                                                                                                                                                                                                                |                                                 |

| Maximum Vapor Pres                                                                                  | sure                                                |                                    |                 |                                                  |                                |  |  |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------|------------------------------------|-----------------|--------------------------------------------------|--------------------------------|--|--|
| 39F. True (psia)                                                                                    |                                                     |                                    |                 |                                                  |                                |  |  |
| <u>39G.</u> Reid (psia)<br>Months Storage per Y                                                     | ear                                                 |                                    |                 |                                                  |                                |  |  |
| 39H. From                                                                                           |                                                     |                                    |                 |                                                  |                                |  |  |
| 39I. To                                                                                             |                                                     |                                    |                 |                                                  |                                |  |  |
| VI. EMISSIONS AND CONTROL DEVICE DATA (required)                                                    |                                                     |                                    |                 |                                                  |                                |  |  |
| 40. Emission Control                                                                                | Devices (check as mar                               | ny as apply):                      | 🗌 Does No       | t Apply                                          |                                |  |  |
| Carbon Adsorp                                                                                       | otion <sup>1</sup>                                  |                                    |                 |                                                  |                                |  |  |
| Condenser <sup>1</sup>                                                                              |                                                     |                                    |                 |                                                  |                                |  |  |
| Conservation V                                                                                      | /ent (psig)                                         |                                    |                 |                                                  |                                |  |  |
| Vacuum S                                                                                            | Setting                                             |                                    | Pressure Se     | etting                                           |                                |  |  |
| Emergency Re                                                                                        | lief Valve (psig)                                   |                                    |                 |                                                  |                                |  |  |
| 🗌 Inert Gas Blan                                                                                    | ket of                                              |                                    |                 |                                                  |                                |  |  |
| Insulation of Ta                                                                                    | ank with                                            |                                    |                 |                                                  |                                |  |  |
| Liquid Absorpti                                                                                     | on (scrubber) <sup>1</sup>                          |                                    |                 |                                                  |                                |  |  |
| Refrigeration o                                                                                     | f⊺ank                                               |                                    |                 |                                                  |                                |  |  |
| Rupture Disc (                                                                                      | osig)                                               |                                    |                 |                                                  |                                |  |  |
| Vent to Incinera                                                                                    | ator <sup>1</sup>                                   |                                    |                 |                                                  |                                |  |  |
| Other <sup>1</sup> (describ                                                                         | e): Catalytic Oxidizer                              | r                                  |                 |                                                  |                                |  |  |
| <sup>1</sup> Complete approp                                                                        | priate Air Pollution Con                            | trol Device S                      | heet.           |                                                  |                                |  |  |
| 41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application). |                                                     |                                    |                 |                                                  |                                |  |  |
| 141. Expected Emissio                                                                               | n Rate (submit Test Da                              | ata or Calcula                     | ations here d   | or elsewhere in the ap                           | oplication).                   |  |  |
|                                                                                                     | 1:                                                  | 1                                  | 1               |                                                  |                                |  |  |
| 41. Expected Emissio<br>Material Name &<br>CAS No.                                                  | n Rate (submit Test Da<br>Breathing Loss<br>(lb/hr) | ata or Calcula<br>Workin<br>Amount | 1               | or elsewhere in the ap<br>Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &                                                                                     | Breathing Loss                                      | Workin                             | g Loss          | Annual Loss                                      |                                |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(lb/hr)                           | Workin<br>Amount                   | g Loss<br>Units | Annual Loss<br>(lb/yr)                           | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(lb/hr)                           | Workin<br>Amount                   | g Loss<br>Units | Annual Loss<br>(lb/yr)                           | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(lb/hr)                           | Workin<br>Amount                   | g Loss<br>Units | Annual Loss<br>(lb/yr)                           | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(lb/hr)                           | Workin<br>Amount                   | g Loss<br>Units | Annual Loss<br>(lb/yr)                           | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(lb/hr)                           | Workin<br>Amount                   | g Loss<br>Units | Annual Loss<br>(lb/yr)                           | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(lb/hr)                           | Workin<br>Amount                   | g Loss<br>Units | Annual Loss<br>(lb/yr)                           | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(lb/hr)                           | Workin<br>Amount                   | g Loss<br>Units | Annual Loss<br>(lb/yr)                           | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(lb/hr)                           | Workin<br>Amount                   | g Loss<br>Units | Annual Loss<br>(lb/yr)                           | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(lb/hr)                           | Workin<br>Amount                   | g Loss<br>Units | Annual Loss<br>(lb/yr)                           | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(lb/hr)                           | Workin<br>Amount                   | g Loss<br>Units | Annual Loss<br>(lb/yr)                           | Estimation Method <sup>1</sup> |  |  |

Provide the following information for <u>each</u> new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT <u>www.epa.gov/tnn/tanks.html</u>), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<u>http://www.epa.gov/tnn/chief/</u>).

| 1.  | Bulk Storage Area Name                                                                                     | 2.   | Tank Name                                                                                  |  |  |
|-----|------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------|--|--|
|     | Quat Storage                                                                                               |      | D Tank                                                                                     |  |  |
| 3.  | Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i> ) 28                          | 4.   | Emission Point Identification No. (as assigned on <i>Equipment List Form</i> )<br>7-17B/28 |  |  |
| 5.  | Date of Commencement of Construction (for existing                                                         | tank | (s) 1974                                                                                   |  |  |
| 6.  | Type of change 🗌 New Construction 🖾 N                                                                      | lew  | Stored Material Other Tank Modification                                                    |  |  |
| 7.  | Description of Tank Modification (if applicable)                                                           |      |                                                                                            |  |  |
|     | Quat amine now contains Ethanol instead of isoproponal                                                     |      |                                                                                            |  |  |
| 7A. | Does the tank have more than one mode of operation (e.g. Is there more than one product stored in the tank |      | 🗌 Yes 🛛 No                                                                                 |  |  |
| 7B. | If YES, explain and identify which mode is covere<br>completed for each mode).                             | d by | y this application (Note: A separate form must be                                          |  |  |
| 7C. | Provide any limitations on source operation affe<br>production variation, etc.):                           | ctin | g emissions, any work practice standards (e.g.                                             |  |  |
|     | II. TANK INFORM                                                                                            | ΑΤΙΟ | ON (required)                                                                              |  |  |
| 8.  | Design Capacity (specify barrels or gallons). Use height.                                                  | the  | internal cross-sectional area multiplied by internal                                       |  |  |

I. GENERAL INFORMATION (required)

| 9,988 gallons<br>9A. Tank Internal Diameter (ft)<br>9B. Tank Internal Height (or Length) (ft) |                                      |  |  |
|-----------------------------------------------------------------------------------------------|--------------------------------------|--|--|
| 10                                                                                            | 17                                   |  |  |
| 10A. Maximum Liquid Height (ft)                                                               | 10B. Average Liquid Height (ft)      |  |  |
| 17                                                                                            | 8                                    |  |  |
| 11A. Maximum Vapor Space Height (ft)                                                          | 11B. Average Vapor Space Height (ft) |  |  |
| 9                                                                                             | 9                                    |  |  |

9,988 gallons

| 13A. Maximum annual throughput (gal/yr)                                                                                                                                                         | 13B. Maximum daily throughput (gal/day)             |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--|--|--|
| 2,384,874                                                                                                                                                                                       | 6,533.9                                             |  |  |  |
| 14. Number of Turnovers per year (annual net throu                                                                                                                                              |                                                     |  |  |  |
| 238.78                                                                                                                                                                                          |                                                     |  |  |  |
| 15. Maximum tank fill rate (gal/min)                                                                                                                                                            |                                                     |  |  |  |
| 16. Tank fill method Submerged                                                                                                                                                                  | Splash Bottom Loading                               |  |  |  |
| 17. Complete 17A and 17B for Variable Vapor Space Ta                                                                                                                                            | ank Systems 🛛 Does Not Apply                        |  |  |  |
| 17A. Volume Expansion Capacity of System (gal)                                                                                                                                                  | 17B. Number of transfers into system per year       |  |  |  |
| other (describe)<br>[] External Floating Roof pontoon roof<br>[] Domed External (or Covered) Floating Roof                                                                                      |                                                     |  |  |  |
| <ul> <li>Internal Floating Roof vertical column s</li> <li>Variable Vapor Space lifter roof</li> <li>Pressurized spherical cylindrica</li> <li>Underground</li> <li>Other (describe)</li> </ul> | diaphragm                                           |  |  |  |
|                                                                                                                                                                                                 | MATION (optional if providing TANKS Summary Sheets) |  |  |  |
| 19. Tank Shell Construction:                                                                                                                                                                    |                                                     |  |  |  |
| Riveted Gunite lined Epoxy-coate                                                                                                                                                                | ed rivets 🔄 Other (describe)                        |  |  |  |
| 20A. Shell Color 20B. Roof Colo                                                                                                                                                                 | or 20C. Year Last Painted                           |  |  |  |
| 21. Shell Condition (if metal and unlined):                                                                                                                                                     | Rust Not applicable                                 |  |  |  |
| 22A. Is the tank heated?                                                                                                                                                                        |                                                     |  |  |  |
| 22B. If YES, provide the operating temperature (°F)                                                                                                                                             |                                                     |  |  |  |
| 22C. If YES, please describe how heat is provided to                                                                                                                                            | tank.                                               |  |  |  |
| 23. Operating Pressure Range (psig): to                                                                                                                                                         |                                                     |  |  |  |
| 24. Complete the following section for Vertical Fixed Ro                                                                                                                                        | oof Tanks Does Not Apply                            |  |  |  |
| 24A. For dome roof, provide roof radius (ft)                                                                                                                                                    |                                                     |  |  |  |
| 24B. For cone roof, provide slope (ft/ft)                                                                                                                                                       |                                                     |  |  |  |
| 25. Complete the following section for Floating Roof Ta                                                                                                                                         | anks Does Not Apply                                 |  |  |  |
| 25A. Year Internal Floaters Installed:                                                                                                                                                          |                                                     |  |  |  |
| 25B. Primary Seal Type:                                                                                                                                                                         | ,                                                   |  |  |  |
| 25C. Is the Floating Roof equipped with a Secondary                                                                                                                                             | Seal? YES NO                                        |  |  |  |
| 25D. If YES, how is the secondary seal mounted? (ch                                                                                                                                             | eck one) 🗌 Shoe 🗌 Rim 🗌 Other (describe):           |  |  |  |
| 25E. Is the Floating Roof equipped with a weather shi                                                                                                                                           | ield? YES NO                                        |  |  |  |

| 25F. Describe deck fittings; indicate the number of each type of fitting: |                  |                  |                               |  |  |
|---------------------------------------------------------------------------|------------------|------------------|-------------------------------|--|--|
| ACCESS HATCH                                                              |                  |                  |                               |  |  |
| BOLT COVER, GASKETED:                                                     | UNBOLTED COV     | ER, GASKETED:    | UNBOLTED COVER, UNGASKETED:   |  |  |
|                                                                           |                  |                  |                               |  |  |
|                                                                           |                  |                  |                               |  |  |
|                                                                           |                  | JGE FLOAT WELL   |                               |  |  |
| BOLT COVER, GASKETED:                                                     |                  | ER, GASKETED:    | UNBOLTED COVER, UNGASKETED:   |  |  |
|                                                                           | 1<br>1<br>1      |                  |                               |  |  |
|                                                                           | COLUM            | IN WELL          | •                             |  |  |
|                                                                           | 1                |                  | PIPE COLUMN - FLEXIBLE FABRIC |  |  |
| COVER, GASKETED:                                                          | COVER, UNGASH    | KETED:           | SLEEVE SEAL:                  |  |  |
|                                                                           |                  |                  |                               |  |  |
| · · · · · · · · · · · · · · · · · · ·                                     |                  | R WELL           | 1                             |  |  |
| PIP COLUMN – SLIDING COVER, G                                             |                  |                  | SLIDING COVER, UNGASKETED:    |  |  |
|                                                                           |                  |                  | ·····                         |  |  |
|                                                                           |                  |                  |                               |  |  |
|                                                                           | GAUGE-HATCH      | SAMPLE PORT      |                               |  |  |
| SLIDING COVER, GASKETED:                                                  |                  | SLIDING COVER,   | UNGASKETED:                   |  |  |
|                                                                           |                  |                  |                               |  |  |
|                                                                           | ROOF LEG OR      | HANGER WELL      |                               |  |  |
| WEIGHTED MECHANICAL                                                       |                  |                  | SAMPLE WELL-SLIT FABRIC SEAL  |  |  |
|                                                                           | ACTUATION, UN    |                  | (10% OPEN AREA)               |  |  |
|                                                                           | 1<br>1<br>1      |                  |                               |  |  |
|                                                                           |                  |                  |                               |  |  |
| WEIGHTED MECHANICAL ACTUAT                                                |                  |                  |                               |  |  |
| WEIGHTED MECHANICAE ACTORT                                                | ION, GASKETED.   |                  | RNICAL ACTUATION, UNGASKETED. |  |  |
|                                                                           |                  |                  |                               |  |  |
|                                                                           | RIM              | VENT             |                               |  |  |
| WEIGHTED MECHANICAL                                                       | ACTUATION        | WEIGHTED MECHA   | NICAL ACTUATION, UNGASKETED:  |  |  |
| GASKETED:                                                                 |                  | i<br>1<br>1      |                               |  |  |
|                                                                           |                  |                  |                               |  |  |
|                                                                           | DECK DRAIN (3-I  | NCH DIAMETER)    |                               |  |  |
| OPEN:                                                                     |                  | 90% CLOSED:      |                               |  |  |
|                                                                           |                  |                  |                               |  |  |
| STUB DRAIN                                                                |                  |                  |                               |  |  |
| 1-INCH DIAMETER:                                                          |                  |                  |                               |  |  |
|                                                                           |                  |                  |                               |  |  |
|                                                                           |                  |                  |                               |  |  |
| OTHER (DESCF                                                              | RIBE, ATTACH ADI | DITIONAL PAGES I | F NECESSARY)                  |  |  |
|                                                                           |                  |                  |                               |  |  |
|                                                                           |                  |                  |                               |  |  |
|                                                                           |                  |                  |                               |  |  |
|                                                                           |                  |                  |                               |  |  |

| 26. Complete the following section for Internal Floa                                                                                                                                                                                                                                                                              | ating Roof Tanks Does Not Apply                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| 26A. Deck Type: Dolted Welded                                                                                                                                                                                                                                                                                                     | d                                                    |
| 26B. For Bolted decks, provide deck construction                                                                                                                                                                                                                                                                                  | n:                                                   |
| <ul> <li>26C. Deck seam:</li> <li>Continuous sheet construction 5 feet wide</li> <li>Continuous sheet construction 6 feet wide</li> <li>Continuous sheet construction 7 feet wide</li> <li>Continuous sheet construction 5 × 7.5 feet v</li> <li>Continuous sheet construction 5 × 12 feet w</li> <li>Other (describe)</li> </ul> |                                                      |
| 26D. Deck seam length (ft)                                                                                                                                                                                                                                                                                                        | 26E. Area of deck (ft <sup>2</sup> )                 |
| For column supported tanks:                                                                                                                                                                                                                                                                                                       | 26G. Diameter of each column:                        |
| 26F. Number of columns:                                                                                                                                                                                                                                                                                                           |                                                      |
| IV. SITE INFORMANTION (opt<br>27. Provide the city and state on which the data                                                                                                                                                                                                                                                    | tional if providing TANKS Summary Sheets)            |
| 27. Flovide the city and state of which the data                                                                                                                                                                                                                                                                                  | a in this section are based.                         |
| 28. Daily Average Ambient Temperature (°F)                                                                                                                                                                                                                                                                                        |                                                      |
| 29. Annual Average Maximum Temperature (°F)                                                                                                                                                                                                                                                                                       |                                                      |
| 30. Annual Average Minimum Temperature (°F)                                                                                                                                                                                                                                                                                       |                                                      |
| 31. Average Wind Speed (miles/hr)                                                                                                                                                                                                                                                                                                 |                                                      |
| 32. Annual Average Solar Insulation Factor (BTU/(f                                                                                                                                                                                                                                                                                | t <sup>2</sup> ·day))                                |
| 33. Atmospheric Pressure (psia)                                                                                                                                                                                                                                                                                                   |                                                      |
| V. LIQUID INFORMATION (opt                                                                                                                                                                                                                                                                                                        | tional if providing TANKS Summary Sheets)            |
| 34. Average daily temperature range of bulk liquid:                                                                                                                                                                                                                                                                               |                                                      |
| 34A. Minimum (°F)                                                                                                                                                                                                                                                                                                                 | 34B. Maximum (°F)                                    |
| 35. Average operating pressure range of tank:                                                                                                                                                                                                                                                                                     |                                                      |
| 35A. Minimum (psig)                                                                                                                                                                                                                                                                                                               | 35B. Maximum (psig)                                  |
| 36A. Minimum Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                      | 36B. Corresponding Vapor Pressure (psia)             |
| 37A. Average Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                      | 37B. Corresponding Vapor Pressure (psia)             |
| 38A. Maximum Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                      | 38B. Corresponding Vapor Pressure (psia)             |
| 39. Provide the following for each liquid or gas to be                                                                                                                                                                                                                                                                            | e stored in tank. Add additional pages if necessary. |
| 39A. Material Name or Composition                                                                                                                                                                                                                                                                                                 |                                                      |
| 39B. CAS Number                                                                                                                                                                                                                                                                                                                   |                                                      |
| 39C. Liquid Density (lb/gal)                                                                                                                                                                                                                                                                                                      |                                                      |
| 39D. Liquid Molecular Weight (lb/lb-mole)                                                                                                                                                                                                                                                                                         |                                                      |
| 39E. Vapor Molecular Weight (Ib/Ib-mole)                                                                                                                                                                                                                                                                                          |                                                      |

| Maximum Vapor Pres                      | SUITO                    | 1             |             |                        |                                |
|-----------------------------------------|--------------------------|---------------|-------------|------------------------|--------------------------------|
| 39F. True (psia)                        | Suic                     |               |             |                        |                                |
| 39G. Reid (psia)                        |                          |               |             |                        |                                |
| Months Storage per Y                    | ear                      |               |             |                        |                                |
| 39H. From                               |                          |               |             |                        |                                |
| 39I. To                                 |                          |               |             |                        |                                |
|                                         | VI. EMISSIONS            | AND CONTR     |             | E DATA (required)      |                                |
| 40. Emission Control                    | Devices (check as mai    | ny as apply): | Does No     | ot Apply               |                                |
| Carbon Adsorp                           | otion <sup>1</sup>       |               |             |                        |                                |
| Condenser <sup>1</sup>                  |                          |               |             |                        |                                |
| Conservation \                          | /ent (psig)              |               |             |                        |                                |
| Vacuum S                                |                          |               | Pressure Se | etting                 |                                |
|                                         | lief Valve (psig)        |               |             | 0                      |                                |
| Inert Gas Blan                          |                          |               |             |                        |                                |
| Insulation of Ta                        |                          |               |             |                        |                                |
| Liquid Absorpti                         |                          |               |             |                        |                                |
| Refrigeration o                         |                          |               |             |                        |                                |
| Rupture Disc (                          |                          |               |             |                        |                                |
| Vent to Incinera                        |                          |               |             |                        |                                |
| $\boxtimes$ Other <sup>1</sup> (describ |                          |               |             |                        |                                |
|                                         |                          |               | haat        |                        |                                |
|                                         | priate Air Pollution Con |               |             |                        |                                |
| 41. Expected Emissio                    | n Rate (submit Test Da   | 1             | 1           | or elsewhere in the ap | pplication).                   |
| Material Name &                         | Breathing Loss           | Workin        | g Loss      | Annual Loss            | Estimation Method <sup>1</sup> |
| CAS No.                                 | (lb/hr)                  | Amount        | Units       | (lb/yr)                | Estimation method              |
| Ethanol                                 | 105.56                   | 8,369.40      | lb/hr       | 8,474.96               | EPA                            |
|                                         |                          |               |             |                        |                                |
|                                         |                          |               |             |                        |                                |
| х                                       |                          |               |             |                        |                                |
|                                         |                          |               |             |                        |                                |
|                                         |                          |               |             |                        |                                |
|                                         |                          |               |             |                        |                                |
|                                         |                          |               |             |                        |                                |
|                                         |                          |               |             |                        |                                |
|                                         |                          |               |             |                        |                                |
|                                         |                          |               |             |                        |                                |
|                                         |                          |               |             |                        |                                |
| 1                                       |                          |               |             |                        |                                |
|                                         |                          |               |             |                        |                                |
|                                         |                          |               |             |                        |                                |

Provide the following information for each new or modified bulk liquid storage tank as shown on the Equipment List Form and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA's TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html). APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/tnn/chief/).

| 1. | Bulk Storage Area Name                             | 2.   | Tank Name                                                                                  |
|----|----------------------------------------------------|------|--------------------------------------------------------------------------------------------|
|    | Quat Storage                                       |      | S1 Tank                                                                                    |
| 3. |                                                    |      | Emission Point Identification No. (as assigned on <i>Equipment List Form</i> )<br>7-17B/33 |
| 5. | Date of Commencement of Construction (for existing | tanl |                                                                                            |
| 6. | Type of change 🗌 New Construction 🖾 N              | lew  | Stored Material Other Tank Modification                                                    |
| -  |                                                    |      |                                                                                            |

#### I GENERAL INFORMATION (required)

7. Description of Tank Modification (if applicable)

7A. Does the tank have more than one mode of operation? C Yes (e.g. Is there more than one product stored in the tank?)

🛛 No

7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).

7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):

### **II. TANK INFORMATION (required)**

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 20 305 gallons

| 9A. Tank Internal Diameter (ft)      | 9B. Tank Internal Height (or Length) (ft) |
|--------------------------------------|-------------------------------------------|
| 12                                   | 24                                        |
| 10A. Maximum Liquid Height (ft)      | 10B. Average Liquid Height (ft)           |
| 24                                   | 12                                        |
| 11A. Maximum Vapor Space Height (ft) | 11B. Average Vapor Space Height (ft)      |
| 12                                   | 12                                        |

12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.

20,305 gallons

| 13A. Maximum annual throughput (gal/yr)                                                                                     | 13B. Maximum daily throughput (gal/day)            |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|--|--|--|
| 2,384,874                                                                                                                   | 6,533.9                                            |  |  |  |
| 14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)<br>117.4                                |                                                    |  |  |  |
| 15. Maximum tank fill rate (gal/min)                                                                                        |                                                    |  |  |  |
| 16. Tank fill method Submerged                                                                                              | Splash Bottom Loading                              |  |  |  |
| 17. Complete 17A and 17B for Variable Vapor Space Tai                                                                       | nk Systems 🛛 Does Not Apply                        |  |  |  |
| 17A. Volume Expansion Capacity of System (gal)                                                                              | 17B. Number of transfers into system per year      |  |  |  |
| 18. Type of tank (check all that apply):                                                                                    |                                                    |  |  |  |
|                                                                                                                             | ATION (optional if providing TANKS Summary Shoots) |  |  |  |
| III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)<br>19. Tank Shell Construction: |                                                    |  |  |  |
| Riveted Gunite lined Epoxy-coated                                                                                           | d rivets 🗌 Other (describe)                        |  |  |  |
| 20A. Shell Color 20B. Roof Colo                                                                                             |                                                    |  |  |  |
| 21. Shell Condition (if metal and unlined):                                                                                 |                                                    |  |  |  |
| No Rust Light Rust Dense Ru                                                                                                 | ust 🗌 Not applicable                               |  |  |  |
| 22A. Is the tank heated? YES NO                                                                                             |                                                    |  |  |  |
| 22B. If YES, provide the operating temperature (°F)                                                                         |                                                    |  |  |  |
| 22C. If YES, please describe how heat is provided to tank.                                                                  |                                                    |  |  |  |
| 23. Operating Pressure Range (psig): to                                                                                     |                                                    |  |  |  |
| 24. Complete the following section for Vertical Fixed Room                                                                  | of Tanks Does Not Apply                            |  |  |  |
| 24A. For dome roof, provide roof radius (ft)                                                                                |                                                    |  |  |  |
| B. For cone roof, provide slope (ft/ft)                                                                                     |                                                    |  |  |  |
| 25. Complete the following section for Floating Roof Tar                                                                    | hks Does Not Apply                                 |  |  |  |
| 25A. Year Internal Floaters Installed:                                                                                      |                                                    |  |  |  |
| 25B.    Primary Seal Type:          Metallic (Mechanical)       (check one)          Vapor Mounted Resili                   |                                                    |  |  |  |
| 25C. Is the Floating Roof equipped with a Secondary S                                                                       | eal? 🗌 YES 🗌 NO                                    |  |  |  |
| 25D. If YES, how is the secondary seal mounted? (che                                                                        | ck one) 🗌 Shoe 🗌 Rim 🗌 Other (describe):           |  |  |  |
| 25E. Is the Floating Roof equipped with a weather shie                                                                      | Id? YES NO                                         |  |  |  |

| 25F. Describe deck fittings; indicate the number of each type of fitting: |                                |                                 |                                               |  |
|---------------------------------------------------------------------------|--------------------------------|---------------------------------|-----------------------------------------------|--|
|                                                                           | ACCES                          | 5 НАТСН                         |                                               |  |
| BOLT COVER, GASKETED:                                                     | UNBOLTED COV                   | ER, GASKETED:                   | UNBOLTED COVER, UNGASKETED:                   |  |
| · · · · · · · · · · · · · · · · · · ·                                     |                                |                                 |                                               |  |
| BOLT COVER, GASKETED:                                                     |                                | JGE FLOAT WELL<br>ER, GASKETED: | UNBOLTED COVER, UNGASKETED:                   |  |
| BOLT COVER, GASKETED.                                                     |                                | ER, GAGRETED.                   | UNBOLTED COVER, UNGASKETED.                   |  |
|                                                                           | COLUM                          | N WELL                          |                                               |  |
| BUILT-UP COLUMN – SLIDING<br>COVER, GASKETED:                             | BUILT-UP COLU<br>COVER, UNGASH |                                 | PIPE COLUMN – FLEXIBLE FABRIC<br>SLEEVE SEAL: |  |
|                                                                           |                                | R WELL                          | 1                                             |  |
| PIP COLUMN – SLIDING COVER, G                                             |                                |                                 | SLIDING COVER, UNGASKETED:                    |  |
|                                                                           | GAUGE-HATCH                    | /SAMPLE PORT                    |                                               |  |
| SLIDING COVER, GASKETED:                                                  |                                | SLIDING COVER,                  | UNGASKETED:                                   |  |
|                                                                           | ROOF LEG OR                    | :<br>HANGER WELL                |                                               |  |
| WEIGHTED MECHANICAL                                                       |                                |                                 | SAMPLE WELL-SLIT FABRIC SEAL                  |  |
| ACTUATION, GASKETED:                                                      | ACTUATION, UN                  | GASKETED:                       | (10% OPEN AREA)                               |  |
|                                                                           | VACUUM                         | BREAKER                         | L                                             |  |
| WEIGHTED MECHANICAL ACTUATI                                               | ION, GASKETED:                 | WEIGHTED MECHA                  | ANICAL ACTUATION, UNGASKETED:                 |  |
|                                                                           | RIM                            | ;<br>VENT                       |                                               |  |
| WEIGHTED MECHANICAL<br>GASKETED:                                          |                                |                                 | NICAL ACTUATION, UNGASKETED:                  |  |
|                                                                           | DECK DRAIN (3-I                | NCH DIAMETER)                   |                                               |  |
| OPEN:                                                                     |                                | 90% CLOSED:                     | 2                                             |  |
|                                                                           |                                | :<br>DRAIN                      |                                               |  |
| 1-INCH DIAMETER:                                                          |                                |                                 |                                               |  |
| OTHER (DESCR                                                              | RIBE, ATTACH ADI               | DITIONAL PAGES I                | F NECESSARY)                                  |  |
|                                                                           |                                |                                 |                                               |  |
|                                                                           |                                |                                 |                                               |  |
|                                                                           |                                |                                 |                                               |  |
|                                                                           |                                |                                 |                                               |  |

| 26. Complete the following section for Internal Floating                                                                                                                                                                                                                                                                                | Roof Tanks 🗌 Does Not Apply                      |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--|--|--|
| 26A. Deck Type:  Bolted  Welded                                                                                                                                                                                                                                                                                                         |                                                  |  |  |  |
| 26B. For Bolted decks, provide deck construction:                                                                                                                                                                                                                                                                                       |                                                  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                         |                                                  |  |  |  |
| <ul> <li>26C. Deck seam:</li> <li>Continuous sheet construction 5 feet wide</li> <li>Continuous sheet construction 6 feet wide</li> <li>Continuous sheet construction 7 feet wide</li> <li>Continuous sheet construction 5 × 7.5 feet wide</li> <li>Continuous sheet construction 5 × 12 feet wide</li> <li>Other (describe)</li> </ul> |                                                  |  |  |  |
| 26D. Deck seam length (ft)                                                                                                                                                                                                                                                                                                              | 26E. Area of deck (ft <sup>2</sup> )             |  |  |  |
| For column supported tanks:                                                                                                                                                                                                                                                                                                             | 26G. Diameter of each column:                    |  |  |  |
| 26F. Number of columns:                                                                                                                                                                                                                                                                                                                 | al if providing TANKS Summary Sheets)            |  |  |  |
| 27. Provide the city and state on which the data in                                                                                                                                                                                                                                                                                     |                                                  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                         |                                                  |  |  |  |
| 28. Daily Average Ambient Temperature (°F)                                                                                                                                                                                                                                                                                              |                                                  |  |  |  |
| 29. Annual Average Maximum Temperature (°F)                                                                                                                                                                                                                                                                                             |                                                  |  |  |  |
| 30. Annual Average Minimum Temperature (°F)                                                                                                                                                                                                                                                                                             |                                                  |  |  |  |
| 31. Average Wind Speed (miles/hr)                                                                                                                                                                                                                                                                                                       |                                                  |  |  |  |
| 32. Annual Average Solar Insulation Factor (BTU/(ft <sup>2</sup> d                                                                                                                                                                                                                                                                      | ay))                                             |  |  |  |
| 33. Atmospheric Pressure (psia)                                                                                                                                                                                                                                                                                                         |                                                  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                         | al if providing TANKS Summary Sheets)            |  |  |  |
| 34. Average daily temperature range of bulk liquid:                                                                                                                                                                                                                                                                                     |                                                  |  |  |  |
| 34A. Minimum (°F)                                                                                                                                                                                                                                                                                                                       | 34B. Maximum (°F)                                |  |  |  |
| 35. Average operating pressure range of tank:                                                                                                                                                                                                                                                                                           |                                                  |  |  |  |
| 35A. Minimum (psig)                                                                                                                                                                                                                                                                                                                     | 35B. Maximum (psig)                              |  |  |  |
| 36A. Minimum Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 36B. Corresponding Vapor Pressure (psia)         |  |  |  |
| 37A. Average Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 37B. Corresponding Vapor Pressure (psia)         |  |  |  |
| 38A. Maximum Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 38B. Corresponding Vapor Pressure (psia)         |  |  |  |
| 39. Provide the following for each liquid or gas to be st                                                                                                                                                                                                                                                                               | ored in tank. Add additional pages if necessary. |  |  |  |
| 39A. Material Name or Composition                                                                                                                                                                                                                                                                                                       |                                                  |  |  |  |
| 39B. CAS Number                                                                                                                                                                                                                                                                                                                         |                                                  |  |  |  |
| 39C. Liquid Density (lb/gal)                                                                                                                                                                                                                                                                                                            |                                                  |  |  |  |
| 39D. Liquid Molecular Weight (lb/lb-mole)                                                                                                                                                                                                                                                                                               |                                                  |  |  |  |
| 39E. Vapor Molecular Weight (lb/lb-mole)                                                                                                                                                                                                                                                                                                |                                                  |  |  |  |

| 1                                                                                                                                                                                                      |                           | 1                |                 |                        |                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------|-----------------|------------------------|--------------------------------|
| Maximum Vapor Pres<br>39F. True (psia)                                                                                                                                                                 | sure                      |                  |                 |                        |                                |
| 39F. True (psia)<br>39G. Reid (psia)                                                                                                                                                                   |                           |                  |                 |                        |                                |
| Months Storage per Y                                                                                                                                                                                   |                           |                  |                 |                        |                                |
| 39H. From                                                                                                                                                                                              |                           |                  |                 |                        |                                |
| 39I. To                                                                                                                                                                                                |                           |                  |                 |                        |                                |
|                                                                                                                                                                                                        | VI. EMISSIONS A           | ND CONTR         |                 | E DATA (required)      |                                |
| 40. Emission Control                                                                                                                                                                                   | Devices (check as mar     | y as apply):     | Does No         | t Apply                |                                |
| Carbon Adsorp                                                                                                                                                                                          | otion <sup>1</sup>        |                  |                 |                        |                                |
| Condenser <sup>1</sup>                                                                                                                                                                                 |                           |                  |                 |                        |                                |
| Conservation \                                                                                                                                                                                         | /ent (psig)               |                  |                 |                        |                                |
| Vacuum S                                                                                                                                                                                               | Setting                   |                  | Pressure Se     | etting                 |                                |
| Emergency Re                                                                                                                                                                                           | elief Valve (psig)        |                  |                 |                        |                                |
| Inert Gas Blan                                                                                                                                                                                         | ket of                    |                  |                 |                        |                                |
| Insulation of Ta                                                                                                                                                                                       | ank with                  |                  |                 |                        |                                |
| Liquid Absorpti                                                                                                                                                                                        | 2                         |                  |                 |                        |                                |
| Refrigeration o                                                                                                                                                                                        | • •                       |                  |                 |                        |                                |
| Rupture Disc (                                                                                                                                                                                         |                           |                  |                 |                        |                                |
| Vent to Inciner                                                                                                                                                                                        |                           |                  |                 |                        |                                |
| Other <sup>1</sup> (describ                                                                                                                                                                            |                           |                  |                 |                        |                                |
|                                                                                                                                                                                                        |                           |                  | heet.           |                        |                                |
| <ul> <li><sup>1</sup> Complete appropriate Air Pollution Control Device Sheet.</li> <li>41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).</li> </ul> |                           |                  |                 |                        |                                |
| 41. Expected Emissio                                                                                                                                                                                   | n Rate (submit Test Da    | ita or Calcula   | ations here o   | or elsewhere in the ar | polication).                   |
|                                                                                                                                                                                                        |                           | 1                | 1               |                        | pplication).                   |
| Material Name &                                                                                                                                                                                        | Breathing Loss            | Workin           | g Loss          | Annual Loss            | pplication).                   |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &                                                                                                                                                                                        | Breathing Loss            | Workin           | g Loss          | Annual Loss            |                                |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |
| Material Name &<br>CAS No.                                                                                                                                                                             | Breathing Loss<br>(Ib/hr) | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(Ib/yr) | Estimation Method <sup>1</sup> |

Provide the following information for <u>each</u> new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT <u>www.epa.gov/tnn/tanks.html</u>), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<u>http://www.epa.gov/tnn/chief/</u>).

| 1.    | Duik Storage Area Name                                                                                     | ۷.       |                                                                                |  |  |
|-------|------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------|--|--|
|       | Quat Storage                                                                                               |          | S2 Tank                                                                        |  |  |
| 3.    | Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i> )                             | 4.       | Emission Point Identification No. (as assigned on <i>Equipment List Form</i> ) |  |  |
|       | 34                                                                                                         |          | 7-17B                                                                          |  |  |
| 5.    | 5. Date of Commencement of Construction (for existing tanks) 1980                                          |          |                                                                                |  |  |
| 6.    | Type of change 🗌 New Construction 🛛 🕅                                                                      | lew      | Stored Material Other Tank Modification                                        |  |  |
| 7.    | Description of Tank Modification (if applicable)                                                           |          |                                                                                |  |  |
|       | Quat amine now contains Ethanol instead of isoproponal                                                     |          |                                                                                |  |  |
| 7A.   | Does the tank have more than one mode of operation (e.g. Is there more than one product stored in the tank |          | 🗌 Yes 🛛 No                                                                     |  |  |
| 7B.   | If YES, explain and identify which mode is covere completed for each mode).                                | ed by    | this application (Note: A separate form must be                                |  |  |
| 7C.   | Provide any limitations on source operation affered production variation, etc.):                           | ectin    | g emissions, any work practice standards (e.g.                                 |  |  |
|       | II. TANK INFORM                                                                                            | ΑΤΙΟ     | N (required)                                                                   |  |  |
| 8.    | Design Capacity (specify barrels or gallons). Use height. 20,30                                            |          |                                                                                |  |  |
| 9A    | Tank Internal Diameter (ft)                                                                                |          | Tank Internal Height (or Length) (ft)                                          |  |  |
| J. 1. |                                                                                                            | <i>.</i> | 24                                                                             |  |  |
| 10A   |                                                                                                            | 10B      |                                                                                |  |  |
|       | 24                                                                                                         |          | 12                                                                             |  |  |
| 11A   |                                                                                                            | 11B      |                                                                                |  |  |
|       | 12                                                                                                         |          | 12                                                                             |  |  |
| 12.   | Nominal Capacity (specify barrels or gallons). The design liquid levels and overflow valve heights.        | nis is   |                                                                                |  |  |

I. GENERAL INFORMATION (required)

Dull Charges Area Marea

D Tank Nama

20,305 gallons

| 13A. Maximum annual throughput (gal/yr)                                                                                                                                                                                                                                                                                | 13B. Maximum daily throughput (gal/day)             |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--|--|--|
| 2,384,874                                                                                                                                                                                                                                                                                                              | 6,533.9                                             |  |  |  |
| 14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)                                                                                                                                                                                                                                    |                                                     |  |  |  |
| 15. Maximum tank fill rate (gal/min)                                                                                                                                                                                                                                                                                   |                                                     |  |  |  |
| 16. Tank fill method Submerged                                                                                                                                                                                                                                                                                         | Splash Bottom Loading                               |  |  |  |
| 17. Complete 17A and 17B for Variable Vapor Space T                                                                                                                                                                                                                                                                    | ank Systems 🛛 Does Not Apply                        |  |  |  |
| 17A. Volume Expansion Capacity of System (gal)                                                                                                                                                                                                                                                                         | 17B. Number of transfers into system per year       |  |  |  |
| <ul> <li>18. Type of tank (check all that apply):</li> <li> ∑ Fixed Roof X vertical horizontal other (describe) </li> <li> ☐ External Floating Roof pontoon roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof vertical column solution </li> <li> ☐ Variable Vapor Space lifter roof</li></ul> | support self-supporting                             |  |  |  |
| <ul> <li>Variable Vapor Opace</li> <li>Pressurized</li> <li>Spherical</li> <li>Cylindrid</li> <li>Underground</li> <li>Other (describe)</li> </ul>                                                                                                                                                                     |                                                     |  |  |  |
| III. TANK CONSTRUCTION & OPERATION INFOR                                                                                                                                                                                                                                                                               | MATION (optional if providing TANKS Summary Sheets) |  |  |  |
| 19. Tank Shell Construction:                                                                                                                                                                                                                                                                                           |                                                     |  |  |  |
| Riveted Gunite lined Epoxy-coat 20A. Shell Color 20B. Roof Co                                                                                                                                                                                                                                                          |                                                     |  |  |  |
| 21. Shell Condition (if metal and unlined):                                                                                                                                                                                                                                                                            |                                                     |  |  |  |
| No Rust Light Rust Dense                                                                                                                                                                                                                                                                                               | Rust 🔲 Not applicable                               |  |  |  |
| 22A. Is the tank heated?                                                                                                                                                                                                                                                                                               |                                                     |  |  |  |
| 22B. If YES, provide the operating temperature (°F)                                                                                                                                                                                                                                                                    |                                                     |  |  |  |
| 22C. If YES, please describe how heat is provided to                                                                                                                                                                                                                                                                   | tank.                                               |  |  |  |
| 23. Operating Pressure Range (psig): to                                                                                                                                                                                                                                                                                |                                                     |  |  |  |
| 24. Complete the following section for Vertical Fixed R                                                                                                                                                                                                                                                                | oof Tanks Does Not Apply                            |  |  |  |
| 24A. For dome roof, provide roof radius (ft)                                                                                                                                                                                                                                                                           |                                                     |  |  |  |
| 24B. For cone roof, provide slope (ft/ft)                                                                                                                                                                                                                                                                              |                                                     |  |  |  |
| 25. Complete the following section for Floating Roof T                                                                                                                                                                                                                                                                 | anks Does Not Apply                                 |  |  |  |
| 25A. Year Internal Floaters Installed:                                                                                                                                                                                                                                                                                 |                                                     |  |  |  |
| 25B. Primary Seal Type:<br>(check one)<br>Vapor Mounted Res                                                                                                                                                                                                                                                            |                                                     |  |  |  |
| 25C. Is the Floating Roof equipped with a Secondary                                                                                                                                                                                                                                                                    | Seal? YES NO                                        |  |  |  |
| 25D. If YES, how is the secondary seal mounted? (cl                                                                                                                                                                                                                                                                    | neck one) 🗌 Shoe 🗌 Rim 🗌 Other (describe):          |  |  |  |
| 25E. Is the Floating Roof equipped with a weather sh                                                                                                                                                                                                                                                                   | ield?  YES  NO                                      |  |  |  |

| 25F. Describe deck fittings; indicate the number of each type of fitting: |                                |                  |                                               |  |
|---------------------------------------------------------------------------|--------------------------------|------------------|-----------------------------------------------|--|
|                                                                           | ACCES                          | S HATCH          |                                               |  |
| BOLT COVER, GASKETED:                                                     | UNBOLTED COV                   | ER, GASKETED:    | UNBOLTED COVER, UNGASKETED:                   |  |
|                                                                           |                                |                  |                                               |  |
|                                                                           |                                | JGE FLOAT WELL   |                                               |  |
| BOLT COVER, GASKETED:                                                     |                                |                  | UNBOLTED COVER, UNGASKETED:                   |  |
|                                                                           |                                |                  | CREATER COVER, SHOKEREP.                      |  |
|                                                                           |                                |                  |                                               |  |
|                                                                           |                                | IN WELL          |                                               |  |
| BUILT-UP COLUMN - SLIDING<br>COVER, GASKETED:                             | BUILT-UP COLU<br>COVER, UNGASH |                  | PIPE COLUMN – FLEXIBLE FABRIC<br>SLEEVE SEAL: |  |
| COVER, CASRETED.                                                          |                                |                  | SLLVE SEAL.                                   |  |
|                                                                           |                                |                  |                                               |  |
|                                                                           |                                | RWELL            |                                               |  |
| PIP COLUMN – SLIDING COVER, G                                             | ASKETED:                       | PIPE COLUMN -    | SLIDING COVER, UNGASKETED:                    |  |
|                                                                           |                                |                  |                                               |  |
|                                                                           | GAUGE-HATCH                    | /SAMPLE PORT     |                                               |  |
| SLIDING COVER, GASKETED:                                                  |                                | SLIDING COVER,   | UNGASKETED:                                   |  |
|                                                                           |                                |                  |                                               |  |
|                                                                           |                                | HANGER WELL      |                                               |  |
| WEIGHTED MECHANICAL                                                       |                                |                  | SAMPLE WELL-SLIT FABRIC SEAL                  |  |
| ACTUATION, GASKETED:                                                      | ACTUATION, UN                  |                  | (10% OPEN AREA)                               |  |
|                                                                           |                                |                  |                                               |  |
|                                                                           |                                | BREAKER          |                                               |  |
| WEIGHTED MECHANICAL ACTUAT                                                |                                |                  | NICAL ACTUATION UNGASKETED                    |  |
|                                                                           | ,                              |                  |                                               |  |
|                                                                           |                                | 1                |                                               |  |
|                                                                           |                                |                  |                                               |  |
| WEIGHTED MECHANICAL<br>GASKETED:                                          | ACTUATION                      | WEIGHTED MECHA   | ANICAL ACTUATION, UNGASKETED:                 |  |
| GASKETED.                                                                 |                                | -<br>F<br>K<br>T |                                               |  |
|                                                                           | DECK DRAIN (3-I                | NCH DIAMETER)    |                                               |  |
| OPEN:                                                                     |                                | 90% CLOSED:      |                                               |  |
|                                                                           |                                |                  |                                               |  |
|                                                                           | STUB                           |                  |                                               |  |
| 1-INCH DIAMETER:                                                          | 5106                           |                  |                                               |  |
|                                                                           |                                |                  |                                               |  |
|                                                                           |                                |                  |                                               |  |
| OTHER (DESCF                                                              | RIBE, ATTACH ADE               | DITIONAL PAGES I | F NECESSARY)                                  |  |
|                                                                           |                                |                  |                                               |  |
|                                                                           |                                |                  |                                               |  |
|                                                                           |                                |                  |                                               |  |
|                                                                           |                                |                  |                                               |  |

| 26. Complete the following section for Internal Floating I                                                                                                                                                                                                                                                                              | Roof Tanks Does Not Apply                      |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--|--|--|
| 26A. Deck Type:  Bolted  Welded                                                                                                                                                                                                                                                                                                         |                                                |  |  |  |
| 26B. For Bolted decks, provide deck construction:                                                                                                                                                                                                                                                                                       |                                                |  |  |  |
| <ul> <li>26C. Deck seam:</li> <li>Continuous sheet construction 5 feet wide</li> <li>Continuous sheet construction 6 feet wide</li> <li>Continuous sheet construction 7 feet wide</li> <li>Continuous sheet construction 5 × 7.5 feet wide</li> <li>Continuous sheet construction 5 × 12 feet wide</li> <li>Other (describe)</li> </ul> |                                                |  |  |  |
| 26D. Deck seam length (ft)                                                                                                                                                                                                                                                                                                              | 26E. Area of deck (ft <sup>2</sup> )           |  |  |  |
| For column supported tanks:                                                                                                                                                                                                                                                                                                             | 26G. Diameter of each column:                  |  |  |  |
| 26F. Number of columns:                                                                                                                                                                                                                                                                                                                 |                                                |  |  |  |
| IV. SITE INFORMANTION (optional 27. Provide the city and state on which the data in t                                                                                                                                                                                                                                                   | if providing TANKS Summary Sheets)             |  |  |  |
| 127. Fromde the dity and state of which the data in t                                                                                                                                                                                                                                                                                   | nis section are based.                         |  |  |  |
| 28. Daily Average Ambient Temperature (°F)                                                                                                                                                                                                                                                                                              |                                                |  |  |  |
| 29. Annual Average Maximum Temperature (°F)                                                                                                                                                                                                                                                                                             |                                                |  |  |  |
| 30. Annual Average Minimum Temperature (°F)                                                                                                                                                                                                                                                                                             |                                                |  |  |  |
| 31. Average Wind Speed (miles/hr)                                                                                                                                                                                                                                                                                                       |                                                |  |  |  |
| 32. Annual Average Solar Insulation Factor (BTU/(ft <sup>2</sup> ·da                                                                                                                                                                                                                                                                    | y))                                            |  |  |  |
| 33. Atmospheric Pressure (psia)                                                                                                                                                                                                                                                                                                         |                                                |  |  |  |
| V. LIQUID INFORMATION (optional                                                                                                                                                                                                                                                                                                         | if providing TANKS Summary Sheets)             |  |  |  |
| 34. Average daily temperature range of bulk liquid:                                                                                                                                                                                                                                                                                     |                                                |  |  |  |
| 34A. Minimum (°F)                                                                                                                                                                                                                                                                                                                       | 34B. Maximum (°F)                              |  |  |  |
| 35. Average operating pressure range of tank:                                                                                                                                                                                                                                                                                           |                                                |  |  |  |
| 35A. Minimum (psig)                                                                                                                                                                                                                                                                                                                     | 35B. Maximum (psig)                            |  |  |  |
| 36A. Minimum Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 36B. Corresponding Vapor Pressure (psia)       |  |  |  |
| 37A. Average Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 37B. Corresponding Vapor Pressure (psia)       |  |  |  |
| 38A. Maximum Liquid Surface Temperature (°F)                                                                                                                                                                                                                                                                                            | 38B. Corresponding Vapor Pressure (psia)       |  |  |  |
| 39. Provide the following for <u>each</u> liquid or gas to be stor                                                                                                                                                                                                                                                                      | ed in tank. Add additional pages if necessary. |  |  |  |
| 39A. Material Name or Composition                                                                                                                                                                                                                                                                                                       |                                                |  |  |  |
| 39B. CAS Number                                                                                                                                                                                                                                                                                                                         |                                                |  |  |  |
| 39C. Liquid Density (lb/gal)                                                                                                                                                                                                                                                                                                            |                                                |  |  |  |
| 39D. Liquid Molecular Weight (lb/lb-mole)                                                                                                                                                                                                                                                                                               |                                                |  |  |  |
| 39E. Vapor Molecular Weight (lb/lb-mole)                                                                                                                                                                                                                                                                                                |                                                |  |  |  |

| Maximum Vapor Press<br>39F. True (psia)                                                             | sure                           |                  |                 |                        |                                |  |  |
|-----------------------------------------------------------------------------------------------------|--------------------------------|------------------|-----------------|------------------------|--------------------------------|--|--|
| 39G. Reid (psia)                                                                                    |                                |                  |                 |                        |                                |  |  |
| Months Storage per Y                                                                                | ear                            |                  |                 |                        |                                |  |  |
| 39H. From                                                                                           |                                |                  |                 |                        |                                |  |  |
| 39I To                                                                                              |                                |                  |                 |                        |                                |  |  |
|                                                                                                     |                                |                  |                 | E DATA (required)      |                                |  |  |
| 40. Emission Control I                                                                              |                                | ny as apply):    | Does No         | ot Apply               |                                |  |  |
|                                                                                                     | Carbon Adsorption <sup>1</sup> |                  |                 |                        |                                |  |  |
| Condenser <sup>1</sup>                                                                              |                                |                  |                 |                        |                                |  |  |
| Conservation V                                                                                      | /ent (psig)                    |                  |                 |                        |                                |  |  |
| Vacuum S                                                                                            | Setting                        |                  | Pressure Se     | etting                 |                                |  |  |
| Emergency Re                                                                                        | lief Valve (psig)              |                  |                 |                        |                                |  |  |
| Inert Gas Blank                                                                                     | ket of                         |                  |                 |                        |                                |  |  |
| Insulation of Ta                                                                                    | ank with                       |                  |                 |                        |                                |  |  |
| Liquid Absorpti                                                                                     | on (scrubber) <sup>1</sup>     |                  |                 |                        |                                |  |  |
| Refrigeration of                                                                                    | fTank                          |                  |                 |                        |                                |  |  |
| Rupture Disc (p                                                                                     | osig)                          |                  |                 |                        |                                |  |  |
| Vent to Incinera                                                                                    |                                |                  |                 |                        |                                |  |  |
| Other <sup>1</sup> (describ                                                                         |                                | r                |                 |                        |                                |  |  |
|                                                                                                     | priate Air Pollution Con       |                  | heet            |                        |                                |  |  |
|                                                                                                     |                                |                  |                 | ar alaawhara in tha ar | unligation)                    |  |  |
| 41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application). |                                |                  |                 |                        |                                |  |  |
|                                                                                                     |                                | 1                | 1               |                        | plication).                    |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(lb/hr)      | Workin<br>Amount | 1               | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &                                                                                     | Breathing Loss                 | Workin           | g Loss          | Annual Loss            |                                |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |
| Material Name &<br>CAS No.                                                                          | Breathing Loss<br>(Ib/hr)      | Workin<br>Amount | g Loss<br>Units | Annual Loss<br>(lb/yr) | Estimation Method <sup>1</sup> |  |  |

Provide the following information for <u>each</u> new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT <u>www.epa.gov/tnn/tanks.html</u>), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<u>http://www.epa.gov/tnn/chief/</u>).

| 1.  | Bulk Storage Area Name                                                                                                               | 2.    | Tank Name                                                                               |  |  |
|-----|--------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------------|--|--|
|     | Quat Storage                                                                                                                         |       | S3 Tank                                                                                 |  |  |
| 3.  | Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i> ) 32                                                    | 4.    | Emission Point Identification No. (as assigned on <i>Equipment List Form</i> )<br>7-17B |  |  |
| 5.  |                                                                                                                                      |       |                                                                                         |  |  |
| 6.  | Type of change 🗌 New Construction 🛛 New Stored Material 🗌 Other Tank Modification                                                    |       |                                                                                         |  |  |
| 7.  | <ul> <li>Description of Tank Modification (if applicable)</li> <li>Quat amine now contains Ethanol instead of isoproponal</li> </ul> |       |                                                                                         |  |  |
| 7A. | Does the tank have more than one mode of operation (e.g. Is there more than one product stored in the tank                           |       | 🗌 Yes 🛛 No                                                                              |  |  |
| 7B. | 7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).  |       |                                                                                         |  |  |
| 7C. | 7C.Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):   |       |                                                                                         |  |  |
|     | II. TANK INFORMATION (required)                                                                                                      |       |                                                                                         |  |  |
| 8.  | 8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.                |       |                                                                                         |  |  |
|     | 9,98                                                                                                                                 | 8 gal | llons                                                                                   |  |  |
| 9A. | Tank Internal Diameter (ft)                                                                                                          | 9B.   | . Tank Internal Height (or Length) (ft)                                                 |  |  |
|     | 10                                                                                                                                   |       | 17                                                                                      |  |  |
| 10A | Maximum Liquid Height (ft)                                                                                                           | 10E   | B. Average Liquid Height (ft)                                                           |  |  |

#### I. GENERAL INFORMATION (required)

12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.

17

9

Maximum Vapor Space Height (ft)

11A.

9,988 gallons

11B.

8

9

Average Vapor Space Height (ft)

| 13A. Maximum annual throughput (gal/yr)                                                                                                                                                                                       | 13B. Maximum daily throughput (gal/day)                                                    |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--|--|--|--|
| 2,384,874                                                                                                                                                                                                                     | 6,533.9                                                                                    |  |  |  |  |
|                                                                                                                                                                                                                               | 14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) 238.78 |  |  |  |  |
| 15. Maximum tank fill rate (gal/min)                                                                                                                                                                                          |                                                                                            |  |  |  |  |
| 16. Tank fill method Submerged                                                                                                                                                                                                | Splash Bottom Loading                                                                      |  |  |  |  |
| 17. Complete 17A and 17B for Variable Vapor Space Ta                                                                                                                                                                          |                                                                                            |  |  |  |  |
| 17A. Volume Expansion Capacity of System (gal)                                                                                                                                                                                | 17B. Number of transfers into system per year                                              |  |  |  |  |
| <ul> <li>18. Type of tank (check all that apply):</li> <li>□ Fixed Roof X vertical horizontal other (describe)</li> <li>□ External Floating Roof pontoon roof</li> <li>□ Domed External (or Covered) Floating Roof</li> </ul> | flat roof cone roof dome roof<br>double deck roof                                          |  |  |  |  |
| <ul> <li>Internal Floating Roof vertical column st</li> <li>Variable Vapor Space lifter roof</li> <li>Pressurized spherical cylindrica</li> <li>Underground</li> <li>Other (describe)</li> </ul>                              | diaphragm                                                                                  |  |  |  |  |
| III. TANK CONSTRUCTION & OPERATION INFORM                                                                                                                                                                                     | IATION (optional if providing TANKS Summary Sheets)                                        |  |  |  |  |
| 19. Tank Shell Construction:                                                                                                                                                                                                  |                                                                                            |  |  |  |  |
| Riveted Gunite lined Epoxy-coate                                                                                                                                                                                              | d rivets 🔲 Other (describe)                                                                |  |  |  |  |
| 20A. Shell Color 20B. Roof Colo                                                                                                                                                                                               | or 20C. Year Last Painted                                                                  |  |  |  |  |
| 21. Shell Condition (if metal and unlined):<br>☐ No Rust ☐ Light Rust ☐ Dense R                                                                                                                                               | Rust 🔲 Not applicable                                                                      |  |  |  |  |
| 22A. Is the tank heated?                                                                                                                                                                                                      |                                                                                            |  |  |  |  |
| 22B. If YES, provide the operating temperature (°F)                                                                                                                                                                           | 3. If YES, provide the operating temperature (°F)                                          |  |  |  |  |
| 22C. If YES, please describe how heat is provided to t                                                                                                                                                                        | C. If YES, please describe how heat is provided to tank.                                   |  |  |  |  |
| 23. Operating Pressure Range (psig): to                                                                                                                                                                                       |                                                                                            |  |  |  |  |
| 24. Complete the following section for Vertical Fixed Ro                                                                                                                                                                      | of Tanks Does Not Apply                                                                    |  |  |  |  |
| 24A. For dome roof, provide roof radius (ft)                                                                                                                                                                                  |                                                                                            |  |  |  |  |
| 24B. For cone roof, provide slope (ft/ft)                                                                                                                                                                                     |                                                                                            |  |  |  |  |
| 25. Complete the following section for Floating Roof Ta                                                                                                                                                                       | nks Does Not Apply                                                                         |  |  |  |  |
| 25A. Year Internal Floaters Installed:                                                                                                                                                                                        |                                                                                            |  |  |  |  |
| 25B. Primary Seal Type:                                                                                                                                                                                                       |                                                                                            |  |  |  |  |
| 25C. Is the Floating Roof equipped with a Secondary S                                                                                                                                                                         | Seal? YES NO                                                                               |  |  |  |  |
| 25D. If YES, how is the secondary seal mounted? (che                                                                                                                                                                          | eck one) 🗌 Shoe 🗌 Rim 🗌 Other (describe):                                                  |  |  |  |  |
| 25E. Is the Floating Roof equipped with a weather shie                                                                                                                                                                        |                                                                                            |  |  |  |  |

| 25F. Describe deck fittings; indicate the number of each type of fitting:                                                               |                                                                                                       |                                 |                                               |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------|--|--|
| BOLT COVER, GASKETED:                                                                                                                   |                                                                                                       | S HATCH<br>ER, GASKETED:        | UNBOLTED COVER, UNGASKETED:                   |  |  |
| BOLT COVER, GASKETED:                                                                                                                   |                                                                                                       | JGE FLOAT WELL<br>ER, GASKETED: | UNBOLTED COVER, UNGASKETED:                   |  |  |
| BUILT-UP COLUMN - SLIDING<br>COVER, GASKETED:                                                                                           |                                                                                                       |                                 | PIPE COLUMN – FLEXIBLE FABRIC<br>SLEEVE SEAL: |  |  |
| PIP COLUMN – SLIDING COVER, G                                                                                                           |                                                                                                       | R WELL<br>PIPE COLUMN – S       | SLIDING COVER, UNGASKETED:                    |  |  |
| SLIDING COVER, GASKETED:                                                                                                                | GAUGE-HATCH                                                                                           | /SAMPLE PORT<br>SLIDING COVER,  | UNGASKETED:                                   |  |  |
| ROOF LEG OR HANGER WELL<br>WEIGHTED MECHANICAL WEIGHTED MECHANICAL SAMPLE WELL-SLIT FABRIC SEAL<br>ACTUATION, GASKETED: (10% OPEN AREA) |                                                                                                       |                                 |                                               |  |  |
| WEIGHTED MECHANICAL ACTUAT                                                                                                              | VACUUM BREAKER<br>WEIGHTED MECHANICAL ACTUATION, GASKETED: WEIGHTED MECHANICAL ACTUATION, UNGASKETED: |                                 |                                               |  |  |
| WEIGHTED MECHANICAL<br>GASKETED:                                                                                                        |                                                                                                       | VENT<br>WEIGHTED MECHA          | NICAL ACTUATION, UNGASKETED:                  |  |  |
| OPEN:                                                                                                                                   | DECK DRAIN (3-I                                                                                       | NCH DIAMETER)<br>90% CLOSED:    |                                               |  |  |
| STUB DRAIN<br>1-INCH DIAMETER:                                                                                                          |                                                                                                       |                                 |                                               |  |  |
| OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)                                                                                  |                                                                                                       |                                 |                                               |  |  |

| oof Tanks 🗌 Does Not Apply                                                                     |  |  |  |  |
|------------------------------------------------------------------------------------------------|--|--|--|--|
|                                                                                                |  |  |  |  |
|                                                                                                |  |  |  |  |
|                                                                                                |  |  |  |  |
|                                                                                                |  |  |  |  |
| Continuous sheet construction 5 feet wide                                                      |  |  |  |  |
| Continuous sheet construction 7 feet wide                                                      |  |  |  |  |
| Continuous sheet construction 5 × 7.5 feet wide Continuous sheet construction 5 × 12 feet wide |  |  |  |  |
|                                                                                                |  |  |  |  |
| 26E. Area of deck (ft <sup>2</sup> )                                                           |  |  |  |  |
| 26G. Diameter of each column:                                                                  |  |  |  |  |
|                                                                                                |  |  |  |  |
| f providing TANKS Summary Sheets)                                                              |  |  |  |  |
| is section are based.                                                                          |  |  |  |  |
|                                                                                                |  |  |  |  |
|                                                                                                |  |  |  |  |
|                                                                                                |  |  |  |  |
|                                                                                                |  |  |  |  |
|                                                                                                |  |  |  |  |
| ))                                                                                             |  |  |  |  |
|                                                                                                |  |  |  |  |
| f providing TANKS Summary Sheets)                                                              |  |  |  |  |
|                                                                                                |  |  |  |  |
| 34B. Maximum (°F)                                                                              |  |  |  |  |
|                                                                                                |  |  |  |  |
| 35B. Maximum (psig)                                                                            |  |  |  |  |
| 36B. Corresponding Vapor Pressure (psia)                                                       |  |  |  |  |
| 37B. Corresponding Vapor Pressure (psia)                                                       |  |  |  |  |
| 38B. Corresponding Vapor Pressure (psia)                                                       |  |  |  |  |
| d in tank. Add additional pages if necessary.                                                  |  |  |  |  |
|                                                                                                |  |  |  |  |
|                                                                                                |  |  |  |  |
|                                                                                                |  |  |  |  |
|                                                                                                |  |  |  |  |
| N                                                                                              |  |  |  |  |
|                                                                                                |  |  |  |  |

| 39F.       True (psia)         39G.       Reid (psia)         Months Storage per Year       39H.         From       1 |                        |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------|------------------------|--|--|--|--|--|
| Months Storage per Year<br>39H. From                                                                                  |                        |  |  |  |  |  |
| 39H. From                                                                                                             |                        |  |  |  |  |  |
|                                                                                                                       |                        |  |  |  |  |  |
| 39I. To                                                                                                               |                        |  |  |  |  |  |
| VI. EMISSIONS AND CONTROL DEVICE DATA (required)                                                                      |                        |  |  |  |  |  |
| 40. Emission Control Devices (check as many as apply):  Does Not Apply                                                |                        |  |  |  |  |  |
| Carbon Adsorption <sup>1</sup>                                                                                        |                        |  |  |  |  |  |
| Condenser <sup>1</sup>                                                                                                |                        |  |  |  |  |  |
| Conservation Vent (psig)                                                                                              |                        |  |  |  |  |  |
| Vacuum Setting Pressure Setting                                                                                       |                        |  |  |  |  |  |
| Emergency Relief Valve (psig)                                                                                         |                        |  |  |  |  |  |
| Inert Gas Blanket of                                                                                                  |                        |  |  |  |  |  |
| Insulation of Tank with                                                                                               |                        |  |  |  |  |  |
| Liquid Absorption (scrubber) <sup>1</sup>                                                                             |                        |  |  |  |  |  |
| Refrigeration of Tank                                                                                                 |                        |  |  |  |  |  |
| Rupture Disc (psig)                                                                                                   |                        |  |  |  |  |  |
| Vent to Incinerator <sup>1</sup>                                                                                      |                        |  |  |  |  |  |
| Other <sup>1</sup> (describe): Catalytic Oxidizer                                                                     |                        |  |  |  |  |  |
| <sup>1</sup> Complete appropriate Air Pollution Control Device Sheet.                                                 |                        |  |  |  |  |  |
| 41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).                   |                        |  |  |  |  |  |
| Material Name & Breathing Loss Working Loss Annual Loss Estimation                                                    | on Method <sup>1</sup> |  |  |  |  |  |
| CAS No. (lb/hr) Amount Units (lb/yr)                                                                                  |                        |  |  |  |  |  |
|                                                                                                                       |                        |  |  |  |  |  |
| Ethanol 105.56 8,388.04 lb/hr 8,493.60 E                                                                              | PA                     |  |  |  |  |  |
| Ethanol 105.56 8,388.04 lb/hr 8,493.60 E                                                                              | PA                     |  |  |  |  |  |
| Ethanol         105.56         8,388.04         lb/hr         8,493.60         E                                      | PA                     |  |  |  |  |  |
| Ethanol         105.56         8,388.04         lb/hr         8,493.60         E                                      | PA                     |  |  |  |  |  |
| Ethanol         105.56         8,388.04         lb/hr         8,493.60         E                                      | PA                     |  |  |  |  |  |
| Ethanol       105.56       8,388.04       lb/hr       8,493.60       E                                                | PA                     |  |  |  |  |  |
| Ethanol       105.56       8,388.04       lb/hr       8,493.60       E                                                | PA                     |  |  |  |  |  |
| Ethanol       105.56       8,388.04       lb/hr       8,493.60       E                                                | PA                     |  |  |  |  |  |
| Ethanol       105.56       8,388.04       lb/hr       8,493.60       E                                                | PA                     |  |  |  |  |  |

# ATTACHMENT M

# **AIR POLLUTION CONTROL DEVICE SHEETS**

# **ATTACHMENT M INDEX**

# **CONTROL DEVICE**

## PAGE

| DC-770001 – "A" Bag Dump Station                       | M1   |
|--------------------------------------------------------|------|
| DC-701300 – Clay Storage Silos – A-F                   |      |
| DC-720100 – Day Bin                                    | M9   |
| HP-780304 – 51 Mill Recycle (Bin Vent)                 | M13  |
| DF-760018 – West 2 <sup>nd</sup> Stage FBD             | M17  |
| DF-760017 – West 1 <sup>st</sup> Stage FBD             |      |
| DF-760019 – East 1 <sup>st</sup> Stage FBD             |      |
| DF-760020 – East 2 <sup>rd</sup> Stage FBD             | M29  |
| CO-320001 – Various Sources through Catalytic Oxidizer |      |
| DC-751500 – Flash Dryer System                         | M36  |
| DC-750029 – ACM #1 Mill                                | M40  |
| DC-753400 – ACM #2 Feed Bin (Bin Vent)                 | M44  |
| DC-752500 – ACM #1 Feed Bin (Bin Vent)                 |      |
| DC-750030 – ACM #2 Mill                                | M52  |
| PV-780303 – Pug Mill Vacuum Cleaner                    | M56  |
| DC-780201 – Pug Mill Feed Hopper (Bin Vent)            |      |
| DC-790001 – Haver C Packer                             | M64  |
| DC-770025 – Haver A Packer                             | M68  |
| DC-780100 – "C" Bag Dump Station                       | M72  |
| DC-790000 – Haver C Packing Hopper (Bin Vent)          | M76  |
| DC-752010 – Long Conveyor                              |      |
| DC-770021 – Haver A Packing Hopper (Vent)              |      |
| TK-750310 – Anion Addition                             |      |
| DC-770135 – Receiver Bulk Bag Hopper (Bin Vent)        |      |
| DC-780401 – 51 Mill                                    |      |
| TK-720560/TK-720565 – Soda Ash System                  | M100 |
|                                                        |      |

Source: "A" Bag Dump Station Emission Point I.D.: 45

### Attachment M **Air Pollution Control Device Sheet** (BAGHOUSE)

Control Device ID No. (must match Emission Units Table): DC-770001

| 1.  | Manufacturer: Smoot (Tech Air)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2. Total number of compartments: 1                                                                                                                                                                                          |  |  |  |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
|     | Model No. SBV-9-3-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3. Number of compartment online for normal operation: 1                                                                                                                                                                     |  |  |  |
| 4.  | <ol> <li>Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volu<br/>capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                             |  |  |  |
| 5.  | Baghouse Configuration:    Open Pressure      (check one)    Electrostatically Enha      Other, Specify                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Closed Pressure Closed Suction                                                                                                                                                                                              |  |  |  |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Oction         Cotton       Weight       10         Teflon       Thickness       in         Others, specify       Image: Context of the second secon | <ul> <li>7. Bag Dimension:<br/>Diameter 4.88 in.<br/>Length 3 (36 in) ft.</li> <li>8. Total cloth area: 110 ft<sup>2</sup></li> <li>9. Number of bags: 9</li> <li>10. Operating air to cloth ratio: 2.9:1 ft/min</li> </ul> |  |  |  |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Automatic Intermittent                                                                                                                                                                                                      |  |  |  |
| 12. | 12. Method used to clean bags:         Mechanical Shaker       Sonic Cleaning         Pneumatic Shaker       Reverse Air Flow         Bag Collapse       Pulse Jet         Manual Cleaning       Reverse Jet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                             |  |  |  |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                                                                                                                                              |  |  |  |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 15. Collection efficiency:Rating: 99.99%Guaranteed minimum:1 μm99.99%                                                                                                                                                       |  |  |  |
|     | Gas Stream C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | haracteristics                                                                                                                                                                                                              |  |  |  |
| 16. | Gas flow rate into the collector: 1,400       ACFM         ACFM: Design:       PSIA       Maximum:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | at 70 °F and 14.7 PSIA<br>PSIA Average Expected: PSIA                                                                                                                                                                       |  |  |  |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | lb. Water/lb. Dry Air                                                                                                                                                                                                       |  |  |  |
| 18. | Gas Stream Temperature: Ambient °F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 19. Fan Requirements:   3   hp     OR   ft <sup>3</sup> /min                                                                                                                                                                |  |  |  |
| 20. | Stabilized static pressure loss across baghouse. Pres                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | $\begin{array}{llllllllllllllllllllllllllllllllllll$                                                                                                                                                                        |  |  |  |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | grain/scf Outlet: grain/scf                                                                                                                                                                                                 |  |  |  |

| 22. | Type of Pollutant(s) to be collected (if particulate give specific type): |
|-----|---------------------------------------------------------------------------|
|     | Bentone <sup>™</sup> product                                              |

| 23. Is there any $SO_3$ in the emission s                                                                  | · · · ·    |                 |                     | 3 conte                          |                           | ppmv           |
|------------------------------------------------------------------------------------------------------------|------------|-----------------|---------------------|----------------------------------|---------------------------|----------------|
| 24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions: |            |                 |                     |                                  |                           |                |
| Pollutant                                                                                                  |            | lb/hr           | IN<br>Ib/hr grains/ |                                  | OUT<br>Icf Ib/hr grains/a |                |
| PM/PM10/PM2.5                                                                                              |            | 5.77            | NA                  |                                  | 0.0058                    | NA             |
|                                                                                                            |            |                 |                     |                                  | =.                        |                |
| 25. Complete the table:                                                                                    | Particle S | ize Distributio | n at Inlet          | Frac                             | tion Efficience           | v of Collector |
|                                                                                                            | 14/0:      | to Collector    |                     | Fraction Efficiency of Collector |                           |                |
| Particulate Size Range (microns)<br>0 – 2                                                                  | vveign     | 11.4            | ange                | Weight % for Size Range          |                           |                |
|                                                                                                            |            |                 |                     |                                  | 99.9                      |                |
| 2 – 4                                                                                                      |            | 22.7            |                     |                                  |                           |                |
| 4 – 6                                                                                                      |            | 20.7            |                     |                                  |                           |                |
| 6 – 8                                                                                                      |            | 17.5            |                     |                                  |                           |                |
| 8 – 10                                                                                                     | 13.9       |                 |                     |                                  |                           |                |
| 10 – 12                                                                                                    |            | 8.8             |                     |                                  |                           |                |
| 12 – 16                                                                                                    |            | 5.0             |                     |                                  |                           |                |
| 16 – 20                                                                                                    |            |                 |                     |                                  |                           |                |
| 20 – 30                                                                                                    |            |                 |                     |                                  | 100                       |                |
| 30 – 40                                                                                                    |            |                 |                     |                                  |                           |                |
| 40 – 50                                                                                                    |            |                 |                     |                                  |                           |                |
| 50 – 60<br>60 – 70                                                                                         |            | 0.0             |                     |                                  |                           |                |
|                                                                                                            |            |                 |                     |                                  |                           |                |
| 70 – 80                                                                                                    |            |                 |                     |                                  |                           |                |
| 80 – 90                                                                                                    |            |                 |                     |                                  |                           |                |
| 90 – 100                                                                                                   |            |                 |                     |                                  |                           |                |
| >100                                                                                                       |            |                 |                     |                                  |                           |                |
|                                                                                                            |            |                 |                     |                                  |                           |                |

M2 of M103

| 26. | How is filter monitored for indications of deterioration (e.g., broken bags)?                                 |
|-----|---------------------------------------------------------------------------------------------------------------|
|     | Continuous Opacity                                                                                            |
|     | Pressure Drop                                                                                                 |
|     |                                                                                                               |
|     | Alarms-Audible to Process Operator                                                                            |
|     | Visual opacity readings, Frequency:                                                                           |
|     | Other, specify: Visual inspection of bags once per year                                                       |
| 27  | Describe any recording device and frequency of log entries:                                                   |
| 1   | None                                                                                                          |
| 1   | None                                                                                                          |
| 1   |                                                                                                               |
|     |                                                                                                               |
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|     |                                                                                                               |
| 1   |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
| 28. | Describe any filter seeding being performed:                                                                  |
|     | None                                                                                                          |
|     |                                                                                                               |
|     |                                                                                                               |
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|     |                                                                                                               |
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|     |                                                                                                               |
| 29. | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
|     | reheating, gas humidification):                                                                               |
|     | None                                                                                                          |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
| 1   |                                                                                                               |
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| 1   |                                                                                                               |
| 1   |                                                                                                               |
|     |                                                                                                               |
| 30. | Describe the collection material disposal system:                                                             |
|     | Recycled back into the process.                                                                               |
|     |                                                                                                               |
| 1   |                                                                                                               |
|     |                                                                                                               |
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| 1   |                                                                                                               |
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|     |                                                                                                               |
|     |                                                                                                               |
|     | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes              |

| 32. <b>Proposed Monitoring, Recordkeeping, Reporting, and Testing</b><br>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.                                                                                                                                                                                                                     |                                                                                                                                                                                              |                                                                                                            |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|--|--|--|
| MONITORING:<br>None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                              | RECORDKEEPING:<br>None                                                                                     |  |  |  |  |
| REPORTING:<br>None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                              | TESTING:<br>None                                                                                           |  |  |  |  |
| MONITORING:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                              | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process |  |  |  |  |
| RECORDKEEPING:<br>REPORTING:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Please describe the proposed recordkeeping that will accompany the monitoring.<br>Please describe any proposed emissions testing for this process equipment on air pollution control device. |                                                                                                            |  |  |  |  |
| TESTING:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | •                                                                                                                                                                                            | emissions testing for this process equipment on air                                                        |  |  |  |  |
| 33. Manufacturer's Gua<br>None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | aranteed Capture Efficiency for eac                                                                                                                                                          | h air pollutant.                                                                                           |  |  |  |  |
| 34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.<br>99.99% less than 1 micron                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                              |                                                                                                            |  |  |  |  |
| <ul> <li>35. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty. Daily - Check unit differential pressure</li> <li>Weekly – Check timer and solenoid valves for function. This usually is only listening to check uniform time interval between blasts.</li> <li>Monthly – lube fan, rotary valve and screw conveyor. Check seals on latter two for dust loss.</li> <li>Quarterly – inspect bags for "soft to hand" condition and uniform tightness of clamps.</li> </ul> |                                                                                                                                                                                              |                                                                                                            |  |  |  |  |

Source: Clay Storage Silos A-F Emission Point I.D.: 9A

## Attachment M Air Pollution Control Device Sheet (BAGHOUSE)

Control Device ID No. (must match Emission Units Table): DC-701300

| 1.  | Manufacturer: Flexkleen                                                                                                                                                                                                            | 2. Total number of compartments: 1                                                                       |  |  |  |  |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--|--|--|--|
|     | Model No. 84-CT-30                                                                                                                                                                                                                 | 3. Number of compartment online for normal operation: 1                                                  |  |  |  |  |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state                                                                                                                           | m with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency. |  |  |  |  |
| 5.  | Baghouse Configuration:Image: Open Pressure(check one)Image: Electrostatically EnhanceImage: Other, Specify                                                                                                                        | Closed Pressure Closed Suction                                                                           |  |  |  |  |
| 6.  | Filter Fabric Bag Material:<br>Nomex nylon Wool<br>Polyester Polypropylene<br>Acrylics Ceramics<br>Fiber Glass                                                                                                                     | 7. Bag Dimension:         Diameter       5.5       in.         Length       7 (84 in.)       ft.         |  |  |  |  |
|     | Cotton Weight 10 oz./sq.yd                                                                                                                                                                                                         | 8. Total cloth area: 250 ft <sup>2</sup>                                                                 |  |  |  |  |
|     | Teflon Thickness in                                                                                                                                                                                                                | 9. Number of bags: 30                                                                                    |  |  |  |  |
|     | Others, specify                                                                                                                                                                                                                    | 10. Operating air to cloth ratio:4.64:1ft/min                                                            |  |  |  |  |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                   | Automatic Intermittent                                                                                   |  |  |  |  |
| 12. | <ul> <li>2. Method used to clean bags:</li> <li>Mechanical Shaker Sonic Cleaning Reverse Air Jet</li> <li>Pneumatic Shaker Reverse Air Flow Other:</li> <li>Bag Collapse Pulse Jet</li> <li>Manual Cleaning Reverse Jet</li> </ul> |                                                                                                          |  |  |  |  |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                       | Frequency if timer actuated Other                                                                        |  |  |  |  |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                              | 15. Collection efficiency:Rating: 99.99%Guaranteed minimum:1 μm99.99%                                    |  |  |  |  |
|     | Gas Stream Characteristics                                                                                                                                                                                                         |                                                                                                          |  |  |  |  |
| 16. | Gas flow rate into the collector: 1,160 ACFM                                                                                                                                                                                       | at 70 °F and 14.7 PSIA                                                                                   |  |  |  |  |
|     | ACFM: Design: PSIA Maximum:                                                                                                                                                                                                        | PSIA Average Expected: PSIA                                                                              |  |  |  |  |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                                                                                            | Ib. Water/Ib. Dry Air                                                                                    |  |  |  |  |
| 18. | Gas Stream Temperature: 70 °F                                                                                                                                                                                                      | 19. Fan Requirements: 2 hp<br>OR ft <sup>3</sup> /min                                                    |  |  |  |  |
| 20. | Stabilized static pressure loss across baghouse. Pre                                                                                                                                                                               | ssure Drop: High 4 in. H <sub>2</sub> O<br>Low <1 in. H <sub>2</sub> O                                   |  |  |  |  |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                        | grain/scf Outlet: grain/scf                                                                              |  |  |  |  |

22. Type of Pollutant(s) to be collected (if particulate give specific type): Clay

| 23. Is there any $SO_3$ in the emission s | stream?                                             | No 🗌                    | Yes SC | ₀ cont                           | ent:                        | ppmv |  |
|-------------------------------------------|-----------------------------------------------------|-------------------------|--------|----------------------------------|-----------------------------|------|--|
| 24. Emission rate of pollutant (specify   | ) into and o                                        | ut of collector a       |        | desigr                           | · •                         |      |  |
| Pollutant                                 | IN<br>Ib/hr grains/                                 |                         |        | acf                              | OUT<br>acf Ib/hr grains/acf |      |  |
| PM/PM10/PM2.5                             |                                                     | 78.50                   |        |                                  | 0.0785                      | NA   |  |
|                                           |                                                     | /8.30                   | INA .  |                                  | - 0.0785                    |      |  |
|                                           |                                                     |                         |        |                                  |                             |      |  |
| 25. Complete the table:                   | Particle Size Distribution at Inlet<br>to Collector |                         |        | Fraction Efficiency of Collector |                             |      |  |
| Particulate Size Range (microns)          | Weig                                                | Weight % for Size Range |        |                                  | Weight % for Size Range     |      |  |
| 0 – 2                                     | 0                                                   |                         |        | 99.9                             |                             |      |  |
| 2 – 4                                     |                                                     | 0.647                   |        |                                  |                             |      |  |
| 4 – 6                                     | 2.315                                               |                         |        |                                  |                             |      |  |
| 6 – 8                                     | 3.563                                               |                         |        |                                  |                             |      |  |
| 8 – 10                                    | 5.811                                               |                         |        |                                  |                             |      |  |
| 10 – 12                                   | 3.787                                               |                         |        |                                  |                             |      |  |
| 12 – 16                                   | 8.665                                               |                         |        |                                  |                             |      |  |
| 16 – 20                                   | 8.755                                               |                         |        |                                  |                             |      |  |
| 20 – 30                                   | 11.748                                              |                         |        | 100                              |                             |      |  |
| 30 - 40                                   | 7.37                                                |                         |        |                                  | 100                         |      |  |
| 40 – 50                                   | 3.789                                               |                         |        |                                  |                             |      |  |
| 50 – 60                                   | 8.015                                               |                         |        |                                  |                             |      |  |
| 60 – 70                                   | 4.198                                               |                         |        |                                  |                             |      |  |
| 70 – 80                                   | 4.205                                               |                         |        |                                  |                             |      |  |
| 80 – 90                                   | 4.14                                                |                         |        |                                  |                             |      |  |
| 90 – 100                                  | 0                                                   |                         |        |                                  |                             |      |  |
| >100                                      |                                                     | 23.02                   |        |                                  |                             |      |  |

|   | 26.     | How is filter monitored for indications of deterioration (e.g., broken bags)?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   |         | Continuous Opacity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|   |         | Pressure Drop                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   |         | Alarms-Audible to Process Operator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|   |         | Visual opacity readings, Frequency:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|   |         | Other, specify: Visually inspect bags once per year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|   | 0.7     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   | 27.     | Describe any recording device and frequency of log entries:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1 |         | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| I |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|   |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ł | 28      | Describe any filter seeding being performed:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|   |         | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| I |         | INONE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| ł | 00      | Dependence on a set of a set o |
| ł |         | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   |         | reheating, gas humidification):                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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|   | 30.     | Describe the collection material disposal system:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| I |         | Recycled back into process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| ſ | 31      | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1 | ~ * * * | nare jee measure wagnessee eander warres in the Ennoder of the Bata daminuty chool: 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| 32. <b>Proposed Monitoring, Recordkeeping, Reporting, and Testing</b><br>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the<br>proposed operating parameters. Please propose testing in order to demonstrate compliance with the<br>proposed emissions limits. |                                     |                                                      |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------|--|--|--|
| MONITORING:                                                                                                                                                                                                                                                                                                     |                                     | RECORDKEEPING:                                       |  |  |  |
| None                                                                                                                                                                                                                                                                                                            |                                     | None                                                 |  |  |  |
|                                                                                                                                                                                                                                                                                                                 |                                     |                                                      |  |  |  |
|                                                                                                                                                                                                                                                                                                                 |                                     |                                                      |  |  |  |
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|                                                                                                                                                                                                                                                                                                                 |                                     |                                                      |  |  |  |
| REPORTING:                                                                                                                                                                                                                                                                                                      |                                     | TESTING:                                             |  |  |  |
| None                                                                                                                                                                                                                                                                                                            |                                     | None                                                 |  |  |  |
|                                                                                                                                                                                                                                                                                                                 |                                     |                                                      |  |  |  |
|                                                                                                                                                                                                                                                                                                                 |                                     |                                                      |  |  |  |
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|                                                                                                                                                                                                                                                                                                                 |                                     |                                                      |  |  |  |
| MONITORING:                                                                                                                                                                                                                                                                                                     | Please list and describe the pro-   | ocess parameters and ranges that are proposed to be  |  |  |  |
|                                                                                                                                                                                                                                                                                                                 |                                     | trate compliance with the operation of this process  |  |  |  |
|                                                                                                                                                                                                                                                                                                                 | equipment or air control device.    |                                                      |  |  |  |
| RECORDKEEPING:                                                                                                                                                                                                                                                                                                  |                                     | cordkeeping that will accompany the monitoring.      |  |  |  |
| REPORTING                                                                                                                                                                                                                                                                                                       |                                     | emissions testing for this process equipment on air  |  |  |  |
| TESTING:                                                                                                                                                                                                                                                                                                        | pollution control device.           | emissions testing for this process equipment on air  |  |  |  |
| reorino.                                                                                                                                                                                                                                                                                                        | pollution control device.           | emissions testing for this process equipment on an   |  |  |  |
| 33. Manufacturer's Gua                                                                                                                                                                                                                                                                                          | aranteed Capture Efficiency for ea  | ch air pollutant                                     |  |  |  |
| None                                                                                                                                                                                                                                                                                                            | ,,,,,,                              |                                                      |  |  |  |
|                                                                                                                                                                                                                                                                                                                 |                                     |                                                      |  |  |  |
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| O.A. Mars fraction de O                                                                                                                                                                                                                                                                                         |                                     |                                                      |  |  |  |
| 34. Manufacturer's Gua<br>99.99% less than 1 micro                                                                                                                                                                                                                                                              | aranteed Control Efficiency for eac | h air pollutant.                                     |  |  |  |
| 99.9970 iess mail 1 micro.                                                                                                                                                                                                                                                                                      | Ц                                   |                                                      |  |  |  |
|                                                                                                                                                                                                                                                                                                                 |                                     |                                                      |  |  |  |
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|                                                                                                                                                                                                                                                                                                                 |                                     |                                                      |  |  |  |
| •                                                                                                                                                                                                                                                                                                               | ng ranges and maintenance proce     | dures required by Manufacturer to maintain warranty. |  |  |  |
| NA                                                                                                                                                                                                                                                                                                              |                                     |                                                      |  |  |  |
|                                                                                                                                                                                                                                                                                                                 |                                     |                                                      |  |  |  |
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Source: Day Bin Emission Point I.D.: 9B

## Attachment M Air Pollution Control Device Sheet (BAGHOUSE)

Control Device ID No. (must match Emission Units Table): DC-720100

## Equipment Information and Filter Characteristics

| 1.  | Manufacturer: Flexkleen                                                                                                                                                                                                                                                                      | 2. Total number of compartments: 1                                                                                                                                                                             |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Model No. DC-460                                                                                                                                                                                                                                                                             | 3. Number of compartment online for normal operation: 1                                                                                                                                                        |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state                                                                                                                                                                                     | m with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                       |
| 5.  | Baghouse Configuration:    Image: Open Pressure      (check one)    Image: Electrostatically Enhance      Image: Other, Specify    Image: Other, Specify                                                                                                                                     | Closed Pressure Closed Suction                                                                                                                                                                                 |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Oction         Cotton       Weight       10         Teflon       Thickness       in         Others, specify       Others, specify | 7. Bag Dimension:Diameter $3.66$ in.Diameter $3.66$ in.Length $6.75 (81 in.)$ ft.8. Total cloth area: $775$ ft <sup>2</sup> 9. Number of bags: $12x10 = 120$ 10. Operating air to cloth ratio: $1.49:1$ ft/min |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                             | Automatic Intermittent                                                                                                                                                                                         |
| 12. | Method used to clean bags:          Mechanical Shaker       Sonic Cleaning         Pneumatic Shaker       Reverse Air Flow         Bag Collapse       Pulse Jet         Manual Cleaning       Reverse Jet                                                                                    | ⊠ Reverse Air Jet<br>☐ Other:                                                                                                                                                                                  |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                                                 | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                                                                                                                                 |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                        | 15. Collection efficiency:Rating:99.99%Guaranteed minimum:1 μm99.99%                                                                                                                                           |
|     | Gas Stream C                                                                                                                                                                                                                                                                                 | haracteristics                                                                                                                                                                                                 |
|     | Gas flow rate into the collector:1,160ACFMACFM:Design:PSIAMaximum:Water Vapor Content of Effluent Stream:                                                                                                                                                                                    | at 70 °F and 14.7 PSIA<br>PSIA Average Expected: PSIA<br>Ib. Water/lb. Dry Air                                                                                                                                 |
|     | Gas Stream Temperature: 70 °F                                                                                                                                                                                                                                                                | 19. Fan Requirements: 2 hp<br>OR ft <sup>3</sup> /min                                                                                                                                                          |
| 20. | Stabilized static pressure loss across baghouse. Pres                                                                                                                                                                                                                                        | ssure Drop: High 4 in. $H_2O$<br>Low <1 in. $H_2O$                                                                                                                                                             |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                  | grain/scf Outlet: grain/scf                                                                                                                                                                                    |

22. Type of Pollutant(s) to be collected (if particulate give specific type): Clay

| 23. Is there any $SO_3$ in the emission s | tream?        | 🛛 No 🛛                        | Yes SC     | <sub>3</sub> cont | ent:            | ppmv             |
|-------------------------------------------|---------------|-------------------------------|------------|-------------------|-----------------|------------------|
| 24. Emission rate of pollutant (specify   | ) into and o  | ut of collector a             |            | desigr            | . –             |                  |
| Pollutant                                 |               | lb/hr                         | IN grains/ | acf               | lb/hr           | UT<br>grains/acf |
| PM/PM10/PM2.5                             |               | 78.50                         | NA         |                   |                 | NA               |
|                                           |               | 78.30                         |            |                   | 0.0785          |                  |
| 25. Complete the table:                   | Particle S    | Size Distribution to Collecto |            | Fra               | ction Efficienc | y of Collector   |
| Particulate Size Range (microns)          | Weig          | ht % for Size F               | Range      | '                 | Weight % for S  | Size Range       |
| 0 – 2                                     |               | 0                             |            |                   | 99.9            |                  |
| 2 – 4                                     |               | 0.647                         |            |                   |                 |                  |
| 4 – 6                                     |               | 2.315                         |            |                   |                 |                  |
| 6 – 8                                     |               | 3.563                         | ··         |                   |                 |                  |
| 8 – 10                                    | 8 – 10 5.811  |                               |            |                   |                 |                  |
| 10 – 12                                   | 10 – 12 3.787 |                               |            |                   |                 |                  |
| 12 – 16                                   |               | 8.665                         |            |                   |                 |                  |
| 16 – 20                                   |               | 8.755                         |            |                   |                 |                  |
| 20 - 30 11                                |               | 11.748                        |            |                   | 100             |                  |
| 30 – 40                                   |               | 7.37                          |            |                   |                 |                  |
| 40 – 50                                   |               | 3.789                         |            |                   |                 |                  |
| 50 - 60                                   | 50 - 60 8.015 |                               |            |                   |                 |                  |
| 60 – 70                                   | 4.198         |                               |            |                   |                 |                  |
| 70 – 80                                   |               | 4.205                         |            |                   |                 |                  |
| 80 – 90                                   |               | 4.14                          |            |                   |                 |                  |
| 90 – 100                                  |               | 0                             |            |                   |                 |                  |
| >100                                      |               | 23.02                         |            |                   |                 |                  |

| 26.                  | . How is filter monitored for indications of deterioration (e.g., broken bags)?                                                 |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------|
|                      | Continuous Opacity                                                                                                              |
|                      | Pressure Drop                                                                                                                   |
|                      |                                                                                                                                 |
|                      | Alarms-Audible to Process Operator                                                                                              |
|                      | Visual opacity readings, Frequency:                                                                                             |
|                      | Other, specify: Visually inspect bags once per year                                                                             |
| 27                   | Describe any recording device and frequency of log entries:                                                                     |
| <b> </b> <sup></sup> | None                                                                                                                            |
|                      |                                                                                                                                 |
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| 28.                  | Describe any filter seeding being performed:                                                                                    |
|                      | None                                                                                                                            |
|                      |                                                                                                                                 |
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| 20                   | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas                   |
| 20.                  |                                                                                                                                 |
|                      | reheating, gas humidification):                                                                                                 |
|                      | None                                                                                                                            |
|                      |                                                                                                                                 |
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|                      |                                                                                                                                 |
| 30.                  | Describe the collection material disposal system:                                                                               |
| 1                    |                                                                                                                                 |
|                      | Recycled back into process.                                                                                                     |
|                      | Recycled back into process.<br>Have you included <i>Baghouse Control Device</i> in the Emissions Points Data Summary Sheet? Yes |

| Please propose m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | g parameters. Please propose                                                                                                                                                                                                                                                                                                                                                                                                            | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING:<br>None |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| · · · · · · · · · · · · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · _ · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · ~ · ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ _ ~ _ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ _ |                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                      |  |  |
| REPORTING:<br>None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                         | TESTING:<br>None                                                                                                                                     |  |  |
| MONITORING:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Please list and describe the pro                                                                                                                                                                                                                                                                                                                                                                                                        | ocess parameters and ranges that are proposed to be                                                                                                  |  |  |
| RECORDKEEPING:<br>REPORTING:<br>TESTING:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | monitored in order to demonstrate compliance with the operation of this process<br>equipment or air control device.<br>Please describe the proposed recordkeeping that will accompany the monitoring.<br>Please describe any proposed emissions testing for this process equipment on air<br>pollution control device.<br>Please describe any proposed emissions testing for this process equipment on air<br>pollution control device. |                                                                                                                                                      |  |  |
| 33. Manufacturer's Gua                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | aranteed Capture Efficiency for eac                                                                                                                                                                                                                                                                                                                                                                                                     | ch air pollutant.                                                                                                                                    |  |  |
| None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                      |  |  |
| 34. Manufacturer's Gua<br>99.99% less than 1 micror                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ranteed Control Efficiency for eac                                                                                                                                                                                                                                                                                                                                                                                                      | h air pollutant.                                                                                                                                     |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                      |  |  |
| 35. Describe all operation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ng ranges and maintenance proce                                                                                                                                                                                                                                                                                                                                                                                                         | dures required by Manufacturer to maintain warranty.                                                                                                 |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                      |  |  |

Control Device ID No. (must match Emission Units Table): HP-780304

| Equi | oment l  | nformation | and | Filter | Characteristics |
|------|----------|------------|-----|--------|-----------------|
| Equi | princine | mornation  | anu | i nuor | onaluotenstios  |

| 1.  | Manufacturer: Hosokawa Mirropul Environmental                                                                                                                | 2. Total number of compartments: 1                                                                       |  |  |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--|--|
|     | Systems<br>Model No. 12-55PB                                                                                                                                 | <ol> <li>Number of compartment online for normal<br/>operation: 1</li> </ol>                             |  |  |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state                                                     | m with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency. |  |  |
| 5.  | Baghouse Configuration: 🛛 Open Pressure                                                                                                                      | Closed Pressure Closed Suction                                                                           |  |  |
|     | (check one) Electrostatically Enha                                                                                                                           | anced Fabric                                                                                             |  |  |
|     | Other, Specify                                                                                                                                               |                                                                                                          |  |  |
| 6.  | Filter Fabric Bag Material:                                                                                                                                  | 7. Bag Dimension:                                                                                        |  |  |
| 1   | Polyester Polypropylene                                                                                                                                      | Diameter 5.637 in.                                                                                       |  |  |
|     | Acrylics Ceramics                                                                                                                                            | Length 5.08 (61 in.) ft.                                                                                 |  |  |
|     | Cotton Weight 10 oz./sq.yd                                                                                                                                   | 8. Total cloth area: 413 ft <sup>2</sup>                                                                 |  |  |
|     | Teflon Thickness in                                                                                                                                          | 9. Number of bags: 12                                                                                    |  |  |
|     | Others, specify                                                                                                                                              | 10. Operating air to cloth ratio:1.6:1ft/min                                                             |  |  |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                             | Automatic Intermittent                                                                                   |  |  |
|     | Method used to clean bags:<br>Mechanical Shaker Sonic Cleaning<br>Pneumatic Shaker Reverse Air Flow<br>Bag Collapse Pulse Jet<br>Manual Cleaning Reverse Jet | ⊠ Reverse Air Jet<br>☐ Other:                                                                            |  |  |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                 | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                           |  |  |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                        | 15. Collection efficiency:Rating:99.99%Guaranteed minimum:1 μm99.99%                                     |  |  |
|     | Gas Stream C                                                                                                                                                 | haracteristics                                                                                           |  |  |
| 16. | Gas flow rate into the collector: 650 ACFM                                                                                                                   | at 100 °F and 8 PSIA                                                                                     |  |  |
|     | ACFM: Design: PSIA Maximum:                                                                                                                                  | PSIA Average Expected: PSIA                                                                              |  |  |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                      | lb. Water/lb. Dry Air                                                                                    |  |  |
| 18. | Gas Stream Temperature: 100 °F                                                                                                                               | 19. Fan Requirements: 2 hp                                                                               |  |  |
|     |                                                                                                                                                              | OR ft <sup>3</sup> /min                                                                                  |  |  |
| 20. | Stabilized static pressure loss across baghouse. Pre-                                                                                                        | ssure Drop: High 8 in. H <sub>2</sub> O                                                                  |  |  |
|     |                                                                                                                                                              | Low <1 in. H <sub>2</sub> O                                                                              |  |  |
| 21. | Particulate Loading: Inlet:                                                                                                                                  | grain/scf Outlet: grain/scf                                                                              |  |  |

| 22. Type of Pollutant(s) to be collected (if particulate give specific type): |                |                               |                 |             |                 |                |
|-------------------------------------------------------------------------------|----------------|-------------------------------|-----------------|-------------|-----------------|----------------|
| Bentone™ product                                                              |                |                               |                 |             |                 |                |
|                                                                               |                |                               |                 |             |                 |                |
|                                                                               |                |                               |                 |             |                 |                |
| 23. Is there any SO <sub>3</sub> in the emission s                            |                |                               |                 | $D_3$ conte |                 | ppmv           |
| 24. Emission rate of pollutant (specify                                       | /) into and ou |                               | t maximum<br>IN | design      |                 | litions:<br>UT |
| Pollutant                                                                     |                | lb/hr                         | grains/         | acf         | lb/hr           | grains/acf     |
| PM/PM10/PM2.5                                                                 |                | 6.92                          | NA              |             | 0.0069          | NA             |
|                                                                               |                |                               |                 |             |                 |                |
| 25. Complete the table:                                                       | Particle Si    | ze Distributio<br>to Collecto |                 | Frac        | tion Efficiency | y of Collector |
| Particulate Size Range (microns)                                              | Weight         | to Collecto                   |                 |             | Veight % for S  |                |
| 0 – 2                                                                         |                | 0.5                           |                 |             | 99.9            |                |
| 2 – 4                                                                         |                | 4.2                           |                 |             |                 |                |
| 4 - 6                                                                         | <u></u>        | 9.3                           |                 | -           |                 |                |
| 6 – 8                                                                         |                | 9.2                           |                 | -           |                 |                |
| 8 – 10                                                                        | 6.0            |                               |                 |             |                 |                |
| 10 – 12                                                                       |                | 6.5                           |                 | 1           |                 |                |
| 12 – 16                                                                       |                | 14.3                          |                 |             |                 |                |
| 16-20                                                                         | 16.2           |                               |                 |             |                 |                |
| 20-30                                                                         |                | 21.8                          |                 |             | 100             |                |
| 30-40                                                                         |                | 10.6                          |                 |             |                 |                |
| 40-50                                                                         |                | 1.4                           |                 |             |                 |                |
| 50 – 60                                                                       |                |                               |                 |             |                 |                |
| 60 – 70                                                                       | 1              |                               |                 |             |                 |                |
| 70 – 80                                                                       |                | 0                             |                 |             |                 |                |
| 80 – 90                                                                       |                |                               |                 |             |                 |                |
| 90 – 100                                                                      |                |                               |                 |             |                 |                |
| >100                                                                          | >100           |                               |                 |             |                 |                |

| 26. | How is filter monitored for indications of deterioration (e.g., broken bags)?                                 |
|-----|---------------------------------------------------------------------------------------------------------------|
|     | Continuous Opacity                                                                                            |
| 1   | Pressure Drop                                                                                                 |
| 1   |                                                                                                               |
|     | Alarms-Audible to Process Operator                                                                            |
| 1   | Visual opacity readings, Frequency:                                                                           |
|     | Other, specify: Visually inspect bags once per year                                                           |
|     |                                                                                                               |
| 27. | Describe any recording device and frequency of log entries:                                                   |
|     | None                                                                                                          |
| 1   |                                                                                                               |
| 1   |                                                                                                               |
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| 28. | Describe any filter seeding being performed:                                                                  |
|     | None                                                                                                          |
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|     |                                                                                                               |
| 29. | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
|     | reheating, gas humidification):                                                                               |
|     | None                                                                                                          |
| 1   |                                                                                                               |
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|     | Describe the collection material disposal system:                                                             |
|     | Recycled back in to process.                                                                                  |
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|     |                                                                                                               |
|     | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes              |

| Please propose m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | g parameters. Please propose                                                                                                                                                                                                        | and Testing<br>porting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING:<br>None |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| REPORTING:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                     | TESTING:                                                                                                                                            |  |  |
| None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                     | None                                                                                                                                                |  |  |
| MONITORING:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | monitored in order to demons                                                                                                                                                                                                        | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process                                          |  |  |
| RECORDKEEPING:<br>REPORTING:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | equipment or air control device.<br>Please describe the proposed recordkeeping that will accompany the monitoring.<br>Please describe any proposed emissions testing for this process equipment on air<br>pollution control device. |                                                                                                                                                     |  |  |
| TESTING:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | pollution control device.                                                                                                                                                                                                           | emissions testing for this process equipment on air                                                                                                 |  |  |
| 33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.<br>None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                     |                                                                                                                                                     |  |  |
| <ul> <li>34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.</li> <li>99.99% for less than 1 micron</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                     |                                                                                                                                                     |  |  |
| <ul> <li>35. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.</li> <li>Daily:</li> <li>Collector – Check exhaust for visible dust.</li> <li>Compressed Air System – Check for air leakage (low pressure).Check valves.</li> <li>Manometer – Check and record reading.</li> <li>Weekly</li> <li>Filter Bags- Check for tears, holes, proper fastening</li> <li>Hopper – Check for bridging or plugging; clean out</li> <li>Annual – Inspect the collector thoroughly, clean collector, touch up paint where necessary</li> </ul> |                                                                                                                                                                                                                                     |                                                                                                                                                     |  |  |

Source: West 2<sup>nd</sup> Stage FBD Emission Point I.D.: 018

## Attachment M **Air Pollution Control Device Sheet** (BAGHOUSE)

Control Device ID No. (must match Emission Units Table): DF-760018

| 1.  | Manufacturer: Witte                                                                                                                                                                                       | 2. Total number of compartments: 1                                                                                                                                                                                                   |  |  |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|     | Model No.                                                                                                                                                                                                 | 3. Number of compartment online for normal operation: 1                                                                                                                                                                              |  |  |
| 4.  | Provide diagram(s) of unit describing capture syste<br>capacity, horsepower of movers. If applicable, state                                                                                               | em with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                                            |  |  |
| 5.  | Baghouse Configuration:Image: Open Pressure(check one)Image: Electrostatically EnhanceImage: Other, Specify                                                                                               | Closed Pressure Closed Suction                                                                                                                                                                                                       |  |  |
| 6.  | Filter Fabric Bag Material:<br>Nomex nylon Wool<br>Polyester Polypropylene<br>Acrylics Ceramics<br>Fiber Glass<br>Cotton Weight 16 oz./sq.yd<br>Teflon Thickness in<br>Others, specify                    | <ul> <li>7. Bag Dimension:<br/>Diameter 4 5/8 in.<br/>Length 8.3 (100 in) ft.</li> <li>8. Total cloth area: 2,754 ft<sup>2</sup></li> <li>9. Number of bags: 270</li> <li>10. Operating air to cloth ratio: 6.54:1 ft/min</li> </ul> |  |  |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                          | Automatic Intermittent                                                                                                                                                                                                               |  |  |
|     | Method used to clean bags:          Mechanical Shaker       Sonic Cleaning         Pneumatic Shaker       Reverse Air Flow         Bag Collapse       Pulse Jet         Manual Cleaning       Reverse Jet | ⊠ Reverse Air Jet<br>☐ Other:                                                                                                                                                                                                        |  |  |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                              | Frequency if timer actuated Other                                                                                                                                                                                                    |  |  |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                     | 15. Collection efficiency:Rating: 99.9%Guaranteed minimum:1 μm99.99%                                                                                                                                                                 |  |  |
|     | Gas Stream C                                                                                                                                                                                              | haracteristics                                                                                                                                                                                                                       |  |  |
|     | Gas flow rate into the collector:       18,000       ACFM         ACFM:       Design:       PSIA       Maximum:         Water Vapor Content of Effluent Stream:                                           | If at 150 °F and 14.7 PSIA<br>PSIA Average Expected: PSIA<br>Ib. Water/lb. Dry Air                                                                                                                                                   |  |  |
|     | Gas Stream Temperature: 150 °F                                                                                                                                                                            | 19. Fan Requirements: 2 hp<br>OR ft <sup>3</sup> /min                                                                                                                                                                                |  |  |
| 20. | Stabilized static pressure loss across baghouse. Pre                                                                                                                                                      | ssure Drop: High 4 in. H <sub>2</sub> O<br>Low 4 in. H <sub>2</sub> O                                                                                                                                                                |  |  |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                               | grain/scf Outlet: grain/scf                                                                                                                                                                                                          |  |  |

| 22. Type of Pollutant(s) to be collecte<br>Organo Clay Based Rhelogical Addi |            | ate give specific | type):        |                     |                 |                |  |
|------------------------------------------------------------------------------|------------|-------------------|---------------|---------------------|-----------------|----------------|--|
| 23. Is there any SO $_3$ in the emission s                                   | stream?    | ⊠ No □ Y          | es SC         | o <sub>3</sub> cont | ent:            | ppmv           |  |
| 24. Emission rate of pollutant (specify                                      |            | 1                 | maximum       |                     | operating cond  | litions:       |  |
| Pollutant                                                                    |            | lb/hr             | N             |                     | O<br>lb/hr      | UT             |  |
| PM/PM10/PM2.5                                                                |            | 2,205             | grains/<br>NA | aci                 | 0.13            | grains/acf     |  |
| 1 W/1 W10/1 W12.5                                                            |            | 2,205             |               |                     | 0.15            |                |  |
| 25. Complete the table:                                                      | Particle S | Bize Distributior | n at Inlet    | Fra                 | ction Efficienc | v of Collector |  |
| to Collector<br>Particulate Size Range (microns) Weight % for Size Range     |            |                   | inde          |                     | Weight % for S  | -              |  |
| 0-2                                                                          |            | 5.0               |               |                     | 99.9            | g              |  |
| 2 – 4                                                                        |            | 8.8               |               |                     |                 |                |  |
| 4 - 6                                                                        |            | 13.9              |               |                     |                 |                |  |
| 6 – 8                                                                        |            | 17.5              |               |                     |                 |                |  |
| 8 – 10                                                                       |            | 20.7              |               |                     |                 |                |  |
| 10 – 12                                                                      |            | 22.7              |               |                     |                 |                |  |
| 12 – 16                                                                      |            | 11.4              |               |                     |                 |                |  |
| 16 – 20                                                                      |            |                   |               |                     |                 |                |  |
| 20 – 30                                                                      |            |                   |               |                     | 100             |                |  |
| 30 – 40                                                                      |            |                   |               |                     |                 |                |  |
| 40 – 50                                                                      |            |                   |               |                     |                 |                |  |
| 50 – 60                                                                      |            | 0                 |               |                     |                 |                |  |
| 60 – 70                                                                      |            | 0                 |               |                     |                 |                |  |
| 70 – 80                                                                      |            |                   |               |                     |                 |                |  |
| 80 – 90                                                                      |            |                   |               |                     |                 |                |  |
| 90 – 100                                                                     |            |                   |               |                     |                 |                |  |
| >100                                                                         |            |                   |               |                     |                 |                |  |

| -        |                                                                                                               |
|----------|---------------------------------------------------------------------------------------------------------------|
| 26.      | How is filter monitored for indications of deterioration (e.g., broken bags)?                                 |
|          | Continuous Opacity                                                                                            |
|          | Pressure Drop                                                                                                 |
|          |                                                                                                               |
|          | Alarms-Audible to Process Operator                                                                            |
|          | Visual opacity readings, Frequency:                                                                           |
|          | Other, specify: Visually inspect bags once per year                                                           |
| 27       | Describe any recording device and frequency of log entries:                                                   |
| 1        | None                                                                                                          |
|          | None                                                                                                          |
|          |                                                                                                               |
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|          |                                                                                                               |
| 28.      | Describe any filter seeding being performed:                                                                  |
|          | None                                                                                                          |
|          |                                                                                                               |
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| 29.      | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
|          | reheating, gas humidification):                                                                               |
|          | None                                                                                                          |
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| 30.      | Describe the collection material disposal system:                                                             |
| 1        | Material is returned to the process.                                                                          |
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| <u> </u> |                                                                                                               |
| 1.31     | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes              |

| Please propose m<br>proposed operatin<br>proposed emission | g parameters. Please propose                           | porting in order to demonstrate compliance with the testing in order to demonstrate compliance with the    |
|------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| MONITORING:<br>None                                        |                                                        | RECORDKEEPING:<br>None                                                                                     |
| REPORTING:<br>None                                         |                                                        | TESTING:<br>None                                                                                           |
| MONITORING:                                                |                                                        | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process |
| RECORDKEEPING:<br>REPORTING:                               |                                                        | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air     |
| TESTING:                                                   | Please describe any proposed pollution control device. | emissions testing for this process equipment on air                                                        |
| 33. Manufacturer's Gua<br>None                             | aranteed Capture Efficiency for eac                    | ch air pollutant.                                                                                          |
| 34. Manufacturer's Gua<br>99.99%                           | aranteed Control Efficiency for eac                    | n air pollutant.                                                                                           |
|                                                            |                                                        |                                                                                                            |
| 35. Describe all operati<br>NA                             | ng ranges and maintenance proce                        | dures required by Manufacturer to maintain warranty.                                                       |

Control Device ID No. (must match Emission Units Table): DF-760017

| <b>Equipment Information</b> | and | Filter | Characteristics |
|------------------------------|-----|--------|-----------------|
|                              |     |        |                 |

| 1.  | Manufacturer: Witte                                                                                                                                                                                                                                                                           | 2. Total number of compartments: 1                                                                                                                       |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Model No. NA                                                                                                                                                                                                                                                                                  | <ol> <li>Number of compartment online for normal<br/>operation: 1</li> </ol>                                                                             |
| 4.  | Provide diagram(s) of unit describing capture syste<br>capacity, horsepower of movers. If applicable, state                                                                                                                                                                                   | em with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                |
| 5.  | Baghouse Configuration:Image: Open Pressure(check one)Image: Electrostatically EnhanceImage: Other, Specify                                                                                                                                                                                   | Closed Pressure Closed Suction                                                                                                                           |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Cotton         Cotton       Weight       16         Teflon       Thickness       in         Others, specify Aramid Felt       Filt | 7. Bag Dimension:in.Diameter4 5/8in.Length8.33 (100 in)ft.8. Total cloth area:2,754ft²9. Number of bags:27010. Operating air to cloth ratio:6.54:1ft/min |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                              | Automatic Intermittent                                                                                                                                   |
|     | Method used to clean bags:<br>Mechanical Shaker Sonic Cleaning<br>Pneumatic Shaker Reverse Air Flow<br>Bag Collapse Pulse Jet<br>Manual Cleaning Reverse Jet                                                                                                                                  | Reverse Air Jet                                                                                                                                          |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                                                  | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                                                                           |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                         | 15. Collection efficiency:Rating: 99.9%Guaranteed minimum:1 μm99.99%                                                                                     |
|     | Gas Stream C                                                                                                                                                                                                                                                                                  | haracteristics                                                                                                                                           |
| 16. | Gas flow rate into the collector:18,000ACFNACFM:Design:PSIAMaximum:                                                                                                                                                                                                                           | I at     150     °F and 14.7     PSIA       PSIA     Average Expected:     PSIA                                                                          |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                                                                                                                                                       | lb. Water/lb. Dry Air                                                                                                                                    |
| 18. | Gas Stream Temperature: 150 °F                                                                                                                                                                                                                                                                | 19. Fan Requirements:30hpORft³/min                                                                                                                       |
| 20. | Stabilized static pressure loss across baghouse. Pre                                                                                                                                                                                                                                          | $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                     |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                   | grain/scf Outlet: grain/scf                                                                                                                              |

| 22. Type of Pollutant(s) to be collected (if particulate give specific type):<br>Organo Clay Based Rhelogical Additive |            |                                  |          |      |                 |                  |
|------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------|----------|------|-----------------|------------------|
|                                                                                                                        |            |                                  |          |      |                 |                  |
| 23. Is there any SO <sub>3</sub> in the emission s                                                                     | stream?    | ⊠ No □ Y                         | es SC    | onte |                 |                  |
| 24. Emission rate of pollutant (specify                                                                                |            |                                  |          |      |                 | ppmv<br>ditions: |
|                                                                                                                        | ,          | 1                                | N        |      |                 | UT               |
| Pollutant                                                                                                              |            | lb/hr                            | grains/  | acf  | lb/hr           | grains/acf       |
| PM/PM10/PM2.5                                                                                                          |            | 2,205                            | NA       |      | 0.13            | NA               |
|                                                                                                                        |            | 1                                |          |      |                 |                  |
| 25. Complete the table:                                                                                                | Particle S | ize Distributior<br>to Collector | at inlet | Frac | ction Efficienc | y of Collector   |
| Particulate Size Range (microns)                                                                                       | Weig       | ht % f <mark>or Size</mark> Ra   | inge     | V    | Veight % for S  | ize Range        |
| 0 – 2                                                                                                                  |            | 5.0                              |          |      | 99.9            |                  |
| 2 – 4                                                                                                                  |            | 8.8                              |          |      |                 |                  |
| 4 – 6                                                                                                                  |            | 13.9                             |          |      |                 |                  |
| 6 – 8                                                                                                                  |            | 17.5                             |          |      |                 |                  |
| 8 – 10                                                                                                                 |            | 20.7                             |          |      |                 |                  |
| 10 – 12                                                                                                                |            | 22.7                             |          |      |                 |                  |
| 12 16                                                                                                                  |            | 11.4                             |          |      |                 |                  |
| 16 – 20                                                                                                                |            |                                  |          |      |                 |                  |
| 20 – 30                                                                                                                |            |                                  |          |      | 100             |                  |
| 30 – 40                                                                                                                |            |                                  |          |      |                 | ſ                |
| 40 – 50                                                                                                                |            |                                  |          |      |                 |                  |
| 50 – 60                                                                                                                |            | 0                                |          |      |                 |                  |
| 60 – 70                                                                                                                |            | 0                                |          |      |                 |                  |
| 70 – 80                                                                                                                |            |                                  |          |      |                 |                  |
| 80 – 90                                                                                                                |            |                                  |          |      |                 |                  |
| 90 - 100                                                                                                               |            |                                  |          |      |                 |                  |
| >100                                                                                                                   |            |                                  |          |      |                 |                  |

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| 26       | . How is filter monitored for indications of deterioration (e.g., broken bags)?                               |
|          | Continuous Opacity                                                                                            |
|          | Pressure Drop                                                                                                 |
|          | Alarms-Audible to Process Operator                                                                            |
|          |                                                                                                               |
|          | Visual opacity readings, Frequency:                                                                           |
|          | Other, specify: Visually inspect bags once per year                                                           |
| 27       | . Describe any recording device and frequency of log entries:                                                 |
|          | None                                                                                                          |
|          |                                                                                                               |
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| 28       | Describe any filter seeding being performed:                                                                  |
| 120.     | None                                                                                                          |
| 1        | None                                                                                                          |
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| 29.      | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
|          | reheating, gas humidification):                                                                               |
|          | None                                                                                                          |
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| 30.      | Describe the collection material disposal system:                                                             |
|          | Material is returned to the process.                                                                          |
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| <u> </u> |                                                                                                               |
| 31.      | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes              |

| Please propose m                 | g parameters. Please propose                                                           | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the |
|----------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| MONITORING:<br>None              |                                                                                        | RECORDKEEPING:<br>None                                                                                                     |
|                                  |                                                                                        |                                                                                                                            |
| REPORTING:<br>None               |                                                                                        | TESTING:<br>None                                                                                                           |
|                                  |                                                                                        |                                                                                                                            |
| MONITORING:                      |                                                                                        | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process                 |
| RECORDKEEPING:<br>REPORTING:     | Please describe the proposed red<br>Please describe any proposed                       | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air                     |
| TESTING:                         | pollution control device.<br>Please describe any proposed<br>pollution control device. | emissions testing for this process equipment on air                                                                        |
| 33. Manufacturer's Gua<br>None   | aranteed Capture Efficiency for eac                                                    | h air pollutant.                                                                                                           |
| 34. Manufacturer's Gua<br>99.99% | ranteed Control Efficiency for eac                                                     | ו air pollutant.                                                                                                           |
|                                  |                                                                                        |                                                                                                                            |
| 35. Describe all operation NA    | ng ranges and maintenance proce                                                        | dures required by Manufacturer to maintain warranty.                                                                       |

# Attachment M **Air Pollution Control Device Sheet**

(BAGHOUSE)

Control Device ID No. (must match Emission Units Table): DF-760019

Reverse Jet

Manual Cleaning

Expected pressure drop range

13. Cleaning initiated by:

I Timer

|     | Equipment Information                                                                                                                                                                                                                                      | and Filter Characteristics                                                                                                                                                                                                            |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.  | Manufacturer: Witte                                                                                                                                                                                                                                        | 2. Total number of compartments: 1                                                                                                                                                                                                    |
|     | Model No. NA                                                                                                                                                                                                                                               | 3. Number of compartment online for normal operation: 1                                                                                                                                                                               |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state                                                                                                                                                   | em with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                                             |
| 5.  | Baghouse Configuration:Image: Open Pressure(check one)Image: Electrostatically EnhanceImage: Other, SpecifyImage: Other, Specify                                                                                                                           | Closed Pressure Closed Suction anced Fabric                                                                                                                                                                                           |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Cotton         Cotton       Weight       16         Others, specify Aramid Felt       oz./sq.yd | <ul> <li>7. Bag Dimension:<br/>Diameter 4 5/8 in.<br/>Length 8.33 (100 in) ft.</li> <li>8. Total cloth area: 2,754 ft<sup>2</sup></li> <li>9. Number of bags: 270</li> <li>10. Operating air to cloth ratio: 6.54:1 ft/min</li> </ul> |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                           | Automatic Intermittent                                                                                                                                                                                                                |
| 12. | Method used to clean bags:           Mechanical Shaker         Sonic Cleaning           Pneumatic Shaker         Reverse Air Flow           Bag Collapse         Pulse Jet                                                                                 | ⊠ Reverse Air Jet<br>□ Other:                                                                                                                                                                                                         |

#### Frequency if timer actuated in. of water Other

14. Operation Hours: Max. per day: 24 15. Collection efficiency: Rating: 99.9 % Guaranteed minimum: 99.99 Max. per yr: 365 1 µm %

**Gas Stream Characteristics** 

| 16. Gas flow rate into the co  | llector: 18,00 | 00 ACFI       | Mat 150      | ) °F and      | 14.7      | PSIA                 |
|--------------------------------|----------------|---------------|--------------|---------------|-----------|----------------------|
| ACFM: Design:                  | PSIA           | Maximum:      | PSIA         | Average E     | Expected: | PSIA                 |
| 17. Water Vapor Content of     | Effluent Stre  | am:           |              | lb. Water/lb. | Dry Air   |                      |
| 18. Gas Stream Temperatur      | re: 150        | °F            | 19. Fan Requ | irements:     | 30        | hp                   |
|                                |                |               |              | OR            |           | ft <sup>3</sup> /min |
| 20. Stabilized static pressure | e loss across  | baghouse. Pre | essure Drop: | High          | 4         | in. H₂O              |
|                                |                |               |              | Low 4         |           | in. H₂O              |
| 21. Particulate Loading:       | Inlet:         |               | grain/scf    | Outlet:       |           | grain/scf            |

| · · ·                                                                                                                  |               |                 |                        |                                  |                |                 |
|------------------------------------------------------------------------------------------------------------------------|---------------|-----------------|------------------------|----------------------------------|----------------|-----------------|
| 22. Type of Pollutant(s) to be collected (if particulate give specific type):<br>Organo Clay Based Rhelogical Additive |               |                 |                        |                                  |                |                 |
|                                                                                                                        |               |                 |                        |                                  |                |                 |
|                                                                                                                        |               |                 |                        | . <u>.</u>                       |                |                 |
| 23. Is there any $SO_3$ in the emission s                                                                              |               |                 |                        | 0 <sub>3</sub> conte             | ····           | ppmv            |
| 24. Emission rate of pollutant (specify                                                                                | /) into and o | 1               | t maximum<br><b>IN</b> | design                           |                | ditions:<br>PUT |
| Pollutant                                                                                                              |               | lb/hr           | grains/                | acf                              | lb/hr          | grains/acf      |
| PM/PM10/PM2.5                                                                                                          |               | 2,205           | NA                     |                                  | 0.013          | NA              |
|                                                                                                                        |               |                 |                        |                                  |                |                 |
| 25. Complete the table: Particle Size Distribution at Inlet<br>to Collector                                            |               |                 |                        | Fraction Efficiency of Collector |                |                 |
| Particulate Size Range (microns)                                                                                       | Weigl         | ht % for Size R | ange                   | v                                | Veight % for S | Size Range      |
| 0 – 2                                                                                                                  |               | 5.0             |                        | 99.9                             |                |                 |
| 2 – 4                                                                                                                  |               | 8.8             |                        |                                  |                |                 |
| 4 - 6                                                                                                                  |               | 13.9            |                        |                                  |                |                 |
| 6 – 8                                                                                                                  |               | 17.5            |                        |                                  |                |                 |
| 8 – 10                                                                                                                 |               | 20.7            |                        |                                  |                |                 |
| 10 – 12                                                                                                                |               | 22.7            |                        |                                  |                |                 |
| 12 – 16                                                                                                                |               | 11.4            |                        |                                  |                |                 |
| 16 – 20                                                                                                                |               |                 |                        |                                  |                |                 |
| 20 – 30                                                                                                                |               |                 |                        |                                  | 100            |                 |
| 30 - 40                                                                                                                |               |                 |                        |                                  |                |                 |
| 40 – 50                                                                                                                | 0             |                 |                        |                                  |                |                 |
| 50 - 60                                                                                                                |               |                 |                        |                                  |                |                 |
| 60 – 70                                                                                                                |               |                 |                        |                                  |                |                 |
| 70 – 80                                                                                                                |               |                 |                        |                                  |                |                 |
| 80 – 90                                                                                                                |               |                 |                        |                                  |                |                 |
| 90 - 100                                                                                                               |               |                 |                        |                                  |                |                 |
| >100                                                                                                                   |               |                 |                        |                                  |                |                 |

| 26. | . How is filter monitored for indications of deterioration (e.g., broken bags)?                               |
|-----|---------------------------------------------------------------------------------------------------------------|
|     | Continuous Opacity                                                                                            |
|     | Pressure Drop                                                                                                 |
|     |                                                                                                               |
|     | Alarms-Audible to Process Operator                                                                            |
|     | Visual opacity readings, Frequency:                                                                           |
|     | Other, specify: Visually inspect bags once per year                                                           |
|     |                                                                                                               |
| 27. | Describe any recording device and frequency of log entries:                                                   |
| 1 I | None                                                                                                          |
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| 28. | Describe any filter seeding being performed:                                                                  |
| I   | None                                                                                                          |
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| 29. | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
| 1   | reheating, gas humidification):                                                                               |
| I   | None                                                                                                          |
| I   |                                                                                                               |
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| 20  | Describe the collection material disposal system:                                                             |
| 30. | Describe the collection material disposal system.                                                             |
|     | Material is returned to the process.                                                                          |
|     |                                                                                                               |
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| 04  | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes              |

| 32. <b>Proposed Monitoring, Recordkeeping, Reporting, and Testing</b><br>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with proposed operating parameters. Please propose testing in order to demonstrate compliance with proposed emissions limits. |                                     |                                                                                                            |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------|--|--|--|
| MONITORING:                                                                                                                                                                                                                                                                                       |                                     | RECORDKEEPING:                                                                                             |  |  |  |
| None                                                                                                                                                                                                                                                                                              |                                     | None                                                                                                       |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
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|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
| REPORTING:                                                                                                                                                                                                                                                                                        |                                     | TESTING:                                                                                                   |  |  |  |
| None                                                                                                                                                                                                                                                                                              |                                     | None                                                                                                       |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
| NONTOPRIC                                                                                                                                                                                                                                                                                         |                                     |                                                                                                            |  |  |  |
| MONITORING:                                                                                                                                                                                                                                                                                       | monitored in order to demons        | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process |  |  |  |
|                                                                                                                                                                                                                                                                                                   | equipment or air control device.    |                                                                                                            |  |  |  |
| RECORDKEEPING:                                                                                                                                                                                                                                                                                    |                                     | cordkeeping that will accompany the monitoring.                                                            |  |  |  |
| REPORTING:                                                                                                                                                                                                                                                                                        | pollution control device.           | emissions testing for this process equipment on air                                                        |  |  |  |
| TESTING:                                                                                                                                                                                                                                                                                          | Please describe any proposed        | emissions testing for this process equipment on air                                                        |  |  |  |
|                                                                                                                                                                                                                                                                                                   | pollution control device.           |                                                                                                            |  |  |  |
| 33. Manufacturer's Gua                                                                                                                                                                                                                                                                            | aranteed Capture Efficiency for eac | ch air pollutant.                                                                                          |  |  |  |
| TUNE                                                                                                                                                                                                                                                                                              |                                     |                                                                                                            |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
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|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
|                                                                                                                                                                                                                                                                                                   | aranteed Control Efficiency for eac | h air pollutant.                                                                                           |  |  |  |
| 99.99%                                                                                                                                                                                                                                                                                            |                                     |                                                                                                            |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
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|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
| 35. Describe all operati<br>NA                                                                                                                                                                                                                                                                    | ng ranges and maintenance proce     | dures required by Manufacturer to maintain warranty.                                                       |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |
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|                                                                                                                                                                                                                                                                                                   |                                     |                                                                                                            |  |  |  |

Control Device ID No. (must match Emission Units Table): DF-760020

| Ea | ui | oment | Information    | and    | Filter | Characteristics  |
|----|----|-------|----------------|--------|--------|------------------|
|    | ~  |       | IIII OTHING OT | 011101 |        | 0110100101101100 |

| 1.                                                                                                                                                                           | Manufacturer: Witte                                                                                                                                                                                                                   | 2. Total number of compartments: 1                                                                                                                                                                                  |  |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
|                                                                                                                                                                              | Model No. NA                                                                                                                                                                                                                          | 3. Number of compartment online for normal operation: 1                                                                                                                                                             |  |  |  |  |  |
| 4.                                                                                                                                                                           | Provide diagram(s) of unit describing capture syste<br>capacity, horsepower of movers. If applicable, state                                                                                                                           | m with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                            |  |  |  |  |  |
| 5. Baghouse Configuration:       Open Pressure       Closed Pressure       Closed Suction         (check one)       Electrostatically Enhanced Fabric         Other, Specify |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                     |  |  |  |  |  |
| 6.                                                                                                                                                                           | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Cotton         Cotton       Weight       16         Oz./sq.yd       Tefler | 7. Bag Dimension:         Diameter         4 5/8         in.           Length         8.33 (100 in)         ft.           8. Total cloth area:         2,754         ft <sup>2</sup> 9. Number of bags:         270 |  |  |  |  |  |
|                                                                                                                                                                              | Teflon Thickness in Others, specify                                                                                                                                                                                                   | 10. Operating air to cloth ratio: 6.54:1 ft/min                                                                                                                                                                     |  |  |  |  |  |
| 11                                                                                                                                                                           | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                      |                                                                                                                                                                                                                     |  |  |  |  |  |
|                                                                                                                                                                              | Method used to clean bags:          Mechanical Shaker       Sonic Cleaning         Pneumatic Shaker       Reverse Air Flow         Bag Collapse       Pulse Jet         Manual Cleaning       Reverse Jet                             | ⊠ Reverse Air Jet<br>□ Other:                                                                                                                                                                                       |  |  |  |  |  |
| 13.                                                                                                                                                                          | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                          | Frequency if timer actuated Other                                                                                                                                                                                   |  |  |  |  |  |
| 14.                                                                                                                                                                          | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                 | 15. Collection efficiency:Rating: 99.9%Guaranteed minimum:1 μm99.99%                                                                                                                                                |  |  |  |  |  |
|                                                                                                                                                                              | Gas Stream C                                                                                                                                                                                                                          | haracteristics                                                                                                                                                                                                      |  |  |  |  |  |
| 16.                                                                                                                                                                          | Gas flow rate into the collector:18,000ACFNACFM:Design:PSIAMaximum:                                                                                                                                                                   | A at         150         °F and 14.7         PSIA           PSIA         Average Expected:         PSIA                                                                                                             |  |  |  |  |  |
| 17.                                                                                                                                                                          | Water Vapor Content of Effluent Stream:                                                                                                                                                                                               | lb. Water/lb. Dry Air                                                                                                                                                                                               |  |  |  |  |  |
| 18.                                                                                                                                                                          | Gas Stream Temperature: 150 °F                                                                                                                                                                                                        | 19. Fan Requirements:30hpORft³/min                                                                                                                                                                                  |  |  |  |  |  |
| 20.                                                                                                                                                                          | Stabilized static pressure loss across baghouse. Pre-                                                                                                                                                                                 | ssure Drop: High 4 in. H <sub>2</sub> O<br>Low 4 in. H <sub>2</sub> O                                                                                                                                               |  |  |  |  |  |
| 21.                                                                                                                                                                          | Particulate Loading: Inlet:                                                                                                                                                                                                           | grain/scf Outlet: grain/scf                                                                                                                                                                                         |  |  |  |  |  |

| 22. Type of Pollutant(s) to be collected (if particulate give specific type):<br>Organo Clay Based Rhelogical Additive |            |                                   |          |     |                 |                |  |  |
|------------------------------------------------------------------------------------------------------------------------|------------|-----------------------------------|----------|-----|-----------------|----------------|--|--|
| 23. Is there any SO <sub>3</sub> in the emission stream? $\square$ No $\square$ Yes SO <sub>3</sub> content: ppmv      |            |                                   |          |     |                 |                |  |  |
| 24. Emission rate of pollutant (specify                                                                                |            |                                   |          |     |                 |                |  |  |
|                                                                                                                        |            |                                   | N        | (   |                 | UT             |  |  |
| Pollutant                                                                                                              |            | lb/hr                             | grains/a | аст | lb/hr           | grains/acf     |  |  |
| PM/PM10/PM2.5                                                                                                          |            | 2,205                             | NA       |     | 0.013           | NA             |  |  |
|                                                                                                                        |            |                                   |          |     |                 |                |  |  |
| 25. Complete the table:                                                                                                | Particle S | Size Distribution<br>to Collector |          | Fra | ction Efficienc | y of Collector |  |  |
| Particulate Size Range (microns)                                                                                       | Weig       | ht % for Size Ra                  | ange     | 1   | Weight % for S  | ize Range      |  |  |
| 0 – 2                                                                                                                  |            | 5.0                               |          |     | 99.9            |                |  |  |
| 2-4                                                                                                                    |            | 8.8                               |          |     |                 |                |  |  |
| 4 – 6                                                                                                                  |            | 13.9                              |          |     |                 |                |  |  |
| 6 - 8                                                                                                                  |            | 17.5                              |          |     |                 |                |  |  |
| 8 – 10                                                                                                                 |            | 20.7                              |          |     |                 |                |  |  |
| 10 – 12                                                                                                                |            | 22.7                              |          |     |                 |                |  |  |
| 12 – 16                                                                                                                |            | 11.4                              |          |     |                 |                |  |  |
| 16 – 20                                                                                                                |            |                                   |          |     |                 |                |  |  |
| 20 – 30                                                                                                                |            |                                   |          |     | 100             |                |  |  |
| 30 - 40                                                                                                                |            |                                   |          |     |                 |                |  |  |
| 40 – 50                                                                                                                |            |                                   |          |     |                 |                |  |  |
| 50 – 60                                                                                                                |            | 0                                 |          |     |                 |                |  |  |
| 60 – 70                                                                                                                |            | 0                                 |          |     |                 |                |  |  |
| 70 – 80                                                                                                                |            |                                   |          |     |                 |                |  |  |
| 80 – 90                                                                                                                |            |                                   |          |     |                 |                |  |  |
| 90 – 100                                                                                                               |            |                                   |          |     |                 |                |  |  |
| >100                                                                                                                   |            |                                   |          |     |                 |                |  |  |

| -        |                                                                                                               |
|----------|---------------------------------------------------------------------------------------------------------------|
| 26.      | . How is filter monitored for indications of deterioration (e.g., broken bags)?                               |
| 1        | Continuous Opacity                                                                                            |
|          | Pressure Drop                                                                                                 |
|          | Adorma Audible to Presess Operator                                                                            |
|          | Alarms-Audible to Process Operator                                                                            |
|          | Visual opacity readings, Frequency:                                                                           |
|          | Other, specify: Visually inspected once per year                                                              |
| 27       | Describe any recording device and frequency of log entries:                                                   |
| 1-1.     | None                                                                                                          |
|          | None                                                                                                          |
| 1        |                                                                                                               |
|          |                                                                                                               |
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|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
| 28       | Describe any filter seeding being performed:                                                                  |
| 20.      | None                                                                                                          |
|          | None                                                                                                          |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
| 1        |                                                                                                               |
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|          |                                                                                                               |
|          |                                                                                                               |
| İ        |                                                                                                               |
| 20       | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
| 23.      |                                                                                                               |
|          | reheating, gas humidification):                                                                               |
|          | None                                                                                                          |
|          |                                                                                                               |
|          |                                                                                                               |
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|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
| 1        |                                                                                                               |
| 20       | Describe the collection material dispessal system                                                             |
| 100.     | Describe the collection material disposal system:                                                             |
|          | Material is returned to the process.                                                                          |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
| 1        |                                                                                                               |
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|          |                                                                                                               |
| <u> </u> |                                                                                                               |
| 31.      | Have you included Baghouse Control Device in the Emissions Points Data Summary Sheet? Yes                     |

| Please propose m                 | g parameters. Please propose                           | <b>I, and Testing</b><br>reporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING:<br>None |  |  |  |  |  |
|----------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
|                                  |                                                        |                                                                                                                                                                 |  |  |  |  |  |
| REPORTING:<br>None               |                                                        | TESTING:<br>None                                                                                                                                                |  |  |  |  |  |
| MONITORING:                      |                                                        | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process                                                      |  |  |  |  |  |
| RECORDKEEPING:<br>REPORTING:     | Please describe the proposed red                       | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air                                                          |  |  |  |  |  |
| TESTING:                         | Please describe any proposed pollution control device. | emissions testing for this process equipment on air                                                                                                             |  |  |  |  |  |
| None                             | aranteed Capture Efficiency for eac                    |                                                                                                                                                                 |  |  |  |  |  |
| 34. Manufacturer's Gua<br>99.99% | aranteed Control Efficiency for eac                    | n air pollutant.                                                                                                                                                |  |  |  |  |  |
|                                  |                                                        |                                                                                                                                                                 |  |  |  |  |  |
| 35. Describe all operati<br>NA   | ng ranges and maintenance proce                        | dures required by Manufacturer to maintain warranty.                                                                                                            |  |  |  |  |  |

## Attachment M Air Pollution Control Device Sheet (AFTERBURNER SYSTEM)

Control Device ID No. (must match Emission Units Table): CO-320001

Equipment Information

| 1.           | Manufacturer: Wheelbrator<br>Model No. C-5000 PAB-G50 TE                                                             | <ul> <li>2. ☐ Thermal Energy Recovery</li> <li>☐ Recuperative (Conventional)</li> <li>⊠ Catalytic</li> </ul> |
|--------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 3.           | Provide diagram(s) of unit describing capture syste<br>capacity, horsepower of movers. If applicable, state          | em with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.    |
| 4.           | Combustion chamber dimensions:                                                                                       | 5. Stack Dimensions:                                                                                         |
|              | Length: 11.58 ft                                                                                                     | Height: 55 ft                                                                                                |
|              | Diameter: 5.36 x 5.36 ft                                                                                             | Diameter: 2.125 ft                                                                                           |
|              | Cross-sectional area: 28.7 ft <sup>2</sup>                                                                           |                                                                                                              |
| 6.           | Combustion (destruction) efficiency:                                                                                 | 7. Retention or residence time of materials in                                                               |
|              | Estimated: 95 %                                                                                                      | combustion chamber:                                                                                          |
|              | Minimum guaranteed: 95 %                                                                                             | Maximum: 1.9 sec<br>Minimum: 1.9 sec                                                                         |
| 8.           | Throat diameter: 1.71 x 1.46 ft                                                                                      | 9. Combustion Chamber Volume: ft <sup>3</sup>                                                                |
|              | Fuel used in burners:                                                                                                |                                                                                                              |
| 10.          | Natural Gas                                                                                                          | 11. Burners per afterburner:<br>Number of burners: 1                                                         |
|              | Fuel Oil, Number:                                                                                                    | BTU/hr for burner: 3,000,000 BTU/hr                                                                          |
|              | Other, specify:                                                                                                      |                                                                                                              |
| 12           | Fuel heating value of natural gas:                                                                                   | 13. Flow rate of natural gas:                                                                                |
| <sup>'</sup> | BTU/lb                                                                                                               | 180,000 ft <sup>3</sup> /min                                                                                 |
| 14.          | Is a catalyst material used?: Xes No                                                                                 | 15. Expected frequency of catalyst replacement:                                                              |
|              | If yes, catalyst material used:                                                                                      | 1 yr(s)                                                                                                      |
|              |                                                                                                                      | 16. Date catalyst was last replaced:                                                                         |
|              |                                                                                                                      | Month/Year: February 2014                                                                                    |
| 17.          | Space Velocity of the catalyst material used:                                                                        | 18. Catalyst area: 28.78 ft <sup>2</sup>                                                                     |
|              | 1/hour                                                                                                               | <b>19</b> . Volume of catalyst bed: 13.19 ft <sup>3</sup>                                                    |
| 20.          | Minimum loading:                                                                                                     | 21. Temperature catalyst bed inlet: 600 °F                                                                   |
|              | Maximum loading:                                                                                                     | Temperature catalyst bed outlet: 675°F                                                                       |
| 22.          | Explain degradation or performance indicator criteria                                                                | determining catalyst replacement:                                                                            |
|              | Temperature and pressure drop are monitored. Catalyst de added to maintain the 5.5 inch depth. Catalyst is typically | epth is checked based on these values. Additional catalyst is added every 6 to 12 months.                    |
| 23.          | Heat exchanger used? Xes No                                                                                          | 24. Heat exchanger surface area? ft <sup>2</sup>                                                             |
|              | Describe heat exchanger:                                                                                             | 25. Average thermal efficiency: %                                                                            |
| 26.          | Temperature of gases: After preheat: 1000                                                                            | °F Before preheat: 180 °F                                                                                    |
| 27.          | Dilution air flow rate: ft <sup>3</sup> /minut                                                                       | e                                                                                                            |
| 28.          | Describe method of gas mixing used:                                                                                  |                                                                                                              |
| <u> </u>     |                                                                                                                      |                                                                                                              |

| 29. | Name                                                                                                                                                                                                | Quar<br>Grains of H    |                         | Quantity-Dens<br>(LB/hr, ft <sup>3</sup> /hr, e   |              | Source                                         | of Material                                       |  |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------|---------------------------------------------------|--------------|------------------------------------------------|---------------------------------------------------|--|
|     | Ethanol/VOC                                                                                                                                                                                         | N.                     | A                       | 142.10lb/hr                                       |              | Vacuum I                                       | Pumps (7-17A)                                     |  |
|     | Methyl Chloride/VOC                                                                                                                                                                                 | N.                     | A                       | 1.30 lb/hr                                        |              | Vacuum I                                       | Pumps (7-17A)                                     |  |
|     | Ethanol/VOC                                                                                                                                                                                         | N                      | A                       | 443.54lb/hr                                       | 443.541b/hr  |                                                | 3, 29, 30, 32, 33, 34)                            |  |
|     | Ethanol/VOC                                                                                                                                                                                         | N                      | A                       | 114.91 lb/hr                                      | 114.91 lb/hr |                                                | l/51 Mill (10)                                    |  |
|     | Methyl Chloride/VOC                                                                                                                                                                                 | N                      | 4                       | 0.25 lb/hr                                        |              | Pug Mil                                        | l/51 Mill (10)                                    |  |
|     |                                                                                                                                                                                                     |                        |                         |                                                   |              |                                                |                                                   |  |
| 30. | 30. Estimate total combustibles to afterburner 170.60 lb/hr or ACF/hr                                                                                                                               |                        |                         |                                                   |              |                                                |                                                   |  |
| 31. | 31. Estimated total flow rate to afterburner or catalyst including materials to be burned, carrier gases, auxil fuel, etc.:<br>Ib/hr, ACF/hr, or scfm                                               |                        |                         |                                                   |              |                                                |                                                   |  |
|     | Total flow rate = Flue g                                                                                                                                                                            | as flow rate           |                         | <u> </u>                                          |              |                                                |                                                   |  |
| 32. | Afterburner operating p                                                                                                                                                                             | arameters:             |                         | During maximum<br>operation of feeding<br>unit(s) |              | ouring typical<br>ration of feeding<br>unit(s) | During minimum<br>operation of feeding<br>unit(s) |  |
|     | Combustion chamber to                                                                                                                                                                               | emperature in °l       |                         | 600                                               |              | 600                                            | 600                                               |  |
|     | Emission stream gas te                                                                                                                                                                              | emperature in          |                         |                                                   |              |                                                |                                                   |  |
|     | Combined gas stream                                                                                                                                                                                 | entering catalys       | t bed in                |                                                   |              |                                                |                                                   |  |
|     | Flue stream leaving the                                                                                                                                                                             | e catalyst bed         |                         |                                                   |              |                                                |                                                   |  |
|     | Emission stream flow rate (scfm)                                                                                                                                                                    |                        |                         |                                                   |              |                                                |                                                   |  |
|     | Efficiency (VOC Reduction)                                                                                                                                                                          |                        |                         | 95 %                                              |              | 95 %                                           | 95 %                                              |  |
|     | Efficiency (Other; speci                                                                                                                                                                            | fy contaminant)        |                         | 95 %                                              |              | 95 %                                           | 95 %                                              |  |
| 33. | Inlet Emission stream p                                                                                                                                                                             | arameters:             |                         |                                                   | 1            | _                                              |                                                   |  |
|     |                                                                                                                                                                                                     |                        | Maxii                   | mum                                               |              | Тур                                            | ical                                              |  |
|     | Pressure (mmHg):                                                                                                                                                                                    |                        |                         |                                                   |              |                                                |                                                   |  |
|     | Heat Content (BTU/scf)                                                                                                                                                                              | ):                     |                         |                                                   | _            |                                                |                                                   |  |
|     | Oxygen Content (%):                                                                                                                                                                                 |                        | 10.2                    |                                                   | -            | 10.                                            |                                                   |  |
|     | Moisture Content (%):                                                                                                                                                                               |                        | 50.8                    | <b>—</b>                                          |              | 50.8                                           | 35%                                               |  |
|     | Are halogenated organi<br>Are particulates presen<br>Are metals present?                                                                                                                            |                        | ⊠ Yes<br>□ Yes<br>□ Yes | ∐ No<br>□ No<br>⊠ No                              |              |                                                |                                                   |  |
| 34. | For thermal afterburner                                                                                                                                                                             | s, is the combus<br>No | stion chamber           | temperature conti                                 | านอนร        | sly monitored a                                | nd recorded?                                      |  |
|     | For catalytic afterburn<br>recorded? 🛛 Yes                                                                                                                                                          | ers, is the tem        | perature rise<br>No     | across the catal                                  | yst b        | ed continuous                                  | ly monitored and                                  |  |
| 36. | Is the VOC concentration                                                                                                                                                                            | on of exhaust m        | onitored and re         | ecorded?                                          | s            | $\boxtimes$                                    | No                                                |  |
|     | 37. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):<br>Inlet gas is pre-heated by the heat exchanger. |                        |                         |                                                   |              |                                                |                                                   |  |
|     | 38. Describe the collection material disposal system:<br>The catalyst is consumed.                                                                                                                  |                        |                         |                                                   |              |                                                |                                                   |  |
| 39. | Have you included <b>Afte</b>                                                                                                                                                                       | rburner Contro         | Device in the           | e Emissions Points                                | s Data       | a Summary She                                  | eet? Yes                                          |  |

### Waste Gas (Emission Stream) to be Burned

| 40. Proposed Monitoring, Recordkeeping, Reporting, and Testing<br>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the<br>proposed operating parameters. Please propose testing in order to demonstrate compliance with the<br>proposed emissions limits. |                                                                                                              |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| MONITORING:                                                                                                                                                                                                                                                                                              | RECORDKEEPING:                                                                                               |  |  |  |  |  |
| None Proposed                                                                                                                                                                                                                                                                                            | Hours of operation                                                                                           |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          | Date, time, and length of any start-up, shut-down, and/or malfunctions.                                      |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          | Maintain records for 5 years.                                                                                |  |  |  |  |  |
| REPORTING:                                                                                                                                                                                                                                                                                               | TESTING:                                                                                                     |  |  |  |  |  |
| None Proposed                                                                                                                                                                                                                                                                                            | None Proposed                                                                                                |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          | rocess parameters and ranges that are proposed to be<br>strate compliance with the operation of this process |  |  |  |  |  |
| RECORDKEEPING: Please describe the proposed re                                                                                                                                                                                                                                                           | ecordkeeping that will accompany the monitoring.<br>d emissions testing for this process equipment on air    |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          | d emissions testing for this process equipment on air                                                        |  |  |  |  |  |
| 41. Manufacturer's Guaranteed Capture Efficiency for ea                                                                                                                                                                                                                                                  | ach air pollutant.                                                                                           |  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                       |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
| 42. Manufacturer's Guaranteed Control Efficiency for ea                                                                                                                                                                                                                                                  | ch air pollutant.                                                                                            |  |  |  |  |  |
| 95%                                                                                                                                                                                                                                                                                                      |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
| 43. Describe all operating ranges and maintenance proc                                                                                                                                                                                                                                                   | edures required by Manufacturer to maintain warranty.                                                        |  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                       |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                                                                                              |  |  |  |  |  |

Control Device ID No. (must match Emission Units Table): DC-751500

| <b>Equipment Information</b> | and | Filter | Characteristics |
|------------------------------|-----|--------|-----------------|
|                              |     |        |                 |

| 1.  | Manufacturer: Mirropul                                                                                                                                                                                                                                                                       | 2. Total number of compartments: 1                                                                                                                                                           |                                              |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
|     | Model No. 500T-10 TRH                                                                                                                                                                                                                                                                        | <ol> <li>Number of compartment online fo<br/>operation: 1</li> </ol>                                                                                                                         | r normal                                     |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state                                                                                                                                                                                     |                                                                                                                                                                                              |                                              |
| 5.  | Baghouse Configuration:Image: Open Pressure(check one)Image: Electrostatically EnhanceImage: Other, Specify                                                                                                                                                                                  | Closed Pressure Closed Suction anced Fabric                                                                                                                                                  |                                              |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Oction         Cotton       Weight       18         Teflon       Thickness       in         Others, specify       Others, specify | <ul> <li>7. Bag Dimension:<br/>Diameter 4.67<br/>Length 124</li> <li>8. Total cloth area: 6,325</li> <li>9. Number of bags: 500</li> <li>10. Operating air to cloth ratio: 3.95:1</li> </ul> | in.<br>ft.<br>ft <sup>2</sup><br>ft/min      |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                             | Automatic Intermittent                                                                                                                                                                       |                                              |
|     | Method used to clean bags:          Mechanical Shaker       Sonic Cleaning         Pneumatic Shaker       Reverse Air Flow         Bag Collapse       Pulse Jet         Manual Cleaning       Reverse Jet                                                                                    | ⊠ Reverse Air Jet<br>□ Other:                                                                                                                                                                |                                              |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                                                 | Frequency if timer actuated Other                                                                                                                                                            |                                              |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                        | 15. Collection efficiency:Rating:99.9Guaranteed minimum:1 μm99.99                                                                                                                            | %<br>%                                       |
|     | Gas Stream C                                                                                                                                                                                                                                                                                 | haracteristics                                                                                                                                                                               |                                              |
|     | Gas flow rate into the collector:25,000ACFM atACFM:Design:PSIAMaximum:Water Vapor Content of Effluent Stream:                                                                                                                                                                                | 210 °F and 14.7<br>PSIA Average Expected:<br>Ib. Water/Ib. Dry Air                                                                                                                           | PSIA<br>PSIA                                 |
|     | Gas Stream Temperature: 230 °F                                                                                                                                                                                                                                                               | 19. Fan Requirements: 150<br>OR                                                                                                                                                              | hp<br>ft <sup>3</sup> /min                   |
| 20. | Stabilized static pressure loss across baghouse. Pre                                                                                                                                                                                                                                         | ssure Drop: High 5<br>Low 1                                                                                                                                                                  | in. H <sub>2</sub> O<br>in. H <sub>2</sub> O |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                  | grain/scf Outlet: gr                                                                                                                                                                         | ain/scf                                      |

| 22. Type of Pollutant(s) to be collecte<br>Bentone™ product | ed (if particu | late give specifi                | c type):  |          |                |                |
|-------------------------------------------------------------|----------------|----------------------------------|-----------|----------|----------------|----------------|
| 23. Is there any SO <sub>3</sub> in the emission $s$        | stream?        |                                  | Yes SC    | 0₃ conte | nt:            | ppmv           |
| 24. Emission rate of pollutant (specify                     | y) into and o  | ut of collector a                | t maximum | design   | -              | ditions:       |
| Dellutent                                                   |                |                                  | IN<br>IN  |          |                | UT             |
| Pollutant                                                   |                | lb/hr                            | grains/   |          | lb/hr          | grains/acf     |
| PM/PM10/PM2.5                                               |                | 3,675                            | NA        |          | 0.44           | NA             |
|                                                             |                |                                  |           |          |                |                |
| 25. Complete the table:                                     | Particle \$    | Size Distributio<br>to Collector |           | Frac     | tion Efficienc | y of Collector |
| Particulate Size Range (microns)                            | Weig           | ht % for Size R                  | ange      | v        | leight % for S | ize Range      |
| 0 – 2                                                       |                | 0.5                              |           |          | 99.9           |                |
| 2 – 4                                                       |                | 4.2                              |           |          |                |                |
| 4 – 6                                                       | 2              | 9.3                              |           |          |                |                |
| 6 – 8                                                       |                | 9.2                              |           |          |                |                |
| 8 – 10                                                      | 6.0 6.5        |                                  |           | -        |                |                |
| 10 - 12                                                     |                |                                  |           |          |                |                |
| 12 – 16                                                     | 14.3           |                                  |           |          |                |                |
| 16 – 20                                                     |                | 16.2                             |           |          |                |                |
| 20 - 30                                                     |                | 21.8                             |           |          | 100            |                |
| 30 – 40                                                     |                | 10.6                             |           |          |                |                |
| 40 – 50                                                     |                | 1.4                              |           |          |                |                |
| 50 – 60                                                     |                |                                  |           |          |                |                |
| 60 – 70                                                     |                |                                  |           |          |                |                |
| 70 – 80                                                     |                | 0                                |           |          |                |                |
| 80 – 90                                                     |                | 0                                |           |          |                |                |
| 90 – 100                                                    |                |                                  |           |          |                |                |
| >100                                                        |                |                                  |           |          |                |                |

| 26  | <ul> <li>How is filter monitored for indications of deterioration (e.g., broken bags)?</li> <li>Continuous Opacity</li> <li>Pressure Drop</li> <li>Alarms-Audible to Process Operator</li> </ul> |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | <ul> <li>☐ Visual opacity readings, Frequency:</li> <li>☑ Other, specify: Visually inspected once per year</li> </ul>                                                                            |
| 27  | . Describe any recording device and frequency of log entries:<br>None                                                                                                                            |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
| 28  | . Describe any filter seeding being performed:<br>None                                                                                                                                           |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
| 29. | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):<br>None                                            |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
| 30. | Describe the collection material disposal system:                                                                                                                                                |
|     | Material is returned to the process.                                                                                                                                                             |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
| 31. | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes                                                                                                 |

| Please propose n<br>proposed operatin<br>proposed emission                                                     | g parameters. Please propose                                                                                                                                                                         | eporting in order to demonstrate compliance with the testing in order to demonstrate compliance with the |  |  |
|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--|--|
| MONITORING:<br>None                                                                                            |                                                                                                                                                                                                      | RECORDKEEPING:<br>None                                                                                   |  |  |
| REPORTING:<br>None                                                                                             |                                                                                                                                                                                                      | TESTING:<br>None                                                                                         |  |  |
| MONITORING                                                                                                     | MONITORING: Please list and describe the process parameters and ranges that are proposed monitored in order to demonstrate compliance with the operation of this pr equipment or air control device. |                                                                                                          |  |  |
| RECORDKEEPING:<br>REPORTING:                                                                                   | Please describe the proposed recordkeeping that will accompany the monitoring.<br>Please describe any proposed emissions testing for this process equipment on air pollution control device.         |                                                                                                          |  |  |
| TESTING:                                                                                                       | Please describe any proposed pollution control device.                                                                                                                                               | emissions testing for this process equipment on air                                                      |  |  |
| None                                                                                                           | aranteed Capture Efficiency for eac                                                                                                                                                                  |                                                                                                          |  |  |
| 34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.<br>99.99%                             |                                                                                                                                                                                                      |                                                                                                          |  |  |
| 35. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty. NA |                                                                                                                                                                                                      |                                                                                                          |  |  |

Control Device ID No. (must match Emission Units Table): DC-750029

| Equipment Information | and Filter | Characteristics |
|-----------------------|------------|-----------------|
|                       |            |                 |

| 1.   | Manufacturer: Mikro-Pulsaire                                                                                                                                                                                                                                                                 | 2. Total number of compartments: 1                                                                                                                                                                                     |  |  |  |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
|      | Model No. 815-8-20                                                                                                                                                                                                                                                                           | 3. Number of compartment online for normal operation: 1                                                                                                                                                                |  |  |  |
| 4.   | Provide diagram(s) of unit describing capture syste<br>capacity, horsepower of movers. If applicable, state                                                                                                                                                                                  | m with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                               |  |  |  |
| 5.   | Baghouse Configuration:    Open Pressure      (check one)    Electrostatically Enha      Other, Specify                                                                                                                                                                                      | Closed Pressure Closed Suction                                                                                                                                                                                         |  |  |  |
| 6.   | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Octton         Cotton       Weight       16         Teflon       Thickness       in         Others, specify       Others, specify | <ul> <li>7. Bag Dimension:<br/>Diameter 4.625 in.<br/>Length 8 ft.</li> <li>8. Total cloth area: 942 ft<sup>2</sup></li> <li>9. Number of bags: 81</li> <li>10. Operating air to cloth ratio: 4.78:1 ft/min</li> </ul> |  |  |  |
| 11.  | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                             | Automatic Intermittent                                                                                                                                                                                                 |  |  |  |
|      | Method used to clean bags:<br>Mechanical Shaker Sonic Cleaning<br>Pneumatic Shaker Reverse Air Flow<br>Bag Collapse Pulse Jet<br>Manual Cleaning Reverse Jet<br>Cleaning initiated by:                                                                                                       | ⊠ Reverse Air Jet<br>□ Other:                                                                                                                                                                                          |  |  |  |
|      | Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                                                                           | Frequency if timer actuated Other                                                                                                                                                                                      |  |  |  |
| 14.  | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                        | 15. Collection efficiency:Rating:99.99%Guaranteed minimum:1 μm99.99%                                                                                                                                                   |  |  |  |
|      | Gas Stream Characteristics                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                        |  |  |  |
|      | Gas flow rate into the collector:4,500ACFMACFM:Design:PSIAMaximum:Water Vapor Content of Effluent Stream:                                                                                                                                                                                    | PSIA Average Expected: PSIA                                                                                                                                                                                            |  |  |  |
| ┝─── |                                                                                                                                                                                                                                                                                              | Ib. Water/Ib. Dry Air                                                                                                                                                                                                  |  |  |  |
| 18.  | Gas Stream Temperature: 100 °F                                                                                                                                                                                                                                                               | 19. Fan Requirements:   75   hp     OR   ft <sup>3</sup> /min                                                                                                                                                          |  |  |  |
| 20.  | Stabilized static pressure loss across baghouse. Pre                                                                                                                                                                                                                                         | ssure Drop: High 4 in. $H_2O$<br>Low <1 in. $H_2O$                                                                                                                                                                     |  |  |  |
| 21.  | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                  | grain/scf Outlet: grain/scf                                                                                                                                                                                            |  |  |  |

| 22. | Type of Pollutant(s) to be collected (if particulate give specific type) |
|-----|--------------------------------------------------------------------------|
|     | Bentone <sup>™</sup> product                                             |

| 23. Is there any SO <sub>3</sub> in the emission stream? $\square$ No $\square$ Yes SO <sub>3</sub> content: ppmv |                |                 |               |       |                                  |            |
|-------------------------------------------------------------------------------------------------------------------|----------------|-----------------|---------------|-------|----------------------------------|------------|
| 24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions:        |                |                 |               |       |                                  |            |
| Pollutant                                                                                                         |                | lb/hr           | IN<br>grains/ | acf   | lb/hr                            | grains/acf |
| PM/PM10/PM2.5                                                                                                     |                | 5.77            | NA            |       | 0.0058                           | NA         |
|                                                                                                                   |                |                 |               |       |                                  |            |
| 25. Complete the table:                                                                                           | <br>Particle S | ize Distributio | n at Inlet    |       |                                  |            |
|                                                                                                                   | t              | to Collector    |               |       | Fraction Efficiency of Collector |            |
| Particulate Size Range (microns)                                                                                  | Weigh          | nt % for Size R | ange          | 1     | Weight % for Size Range          |            |
| 0-2                                                                                                               |                | 5.0             |               |       | 99.9%                            |            |
| 2 – 4                                                                                                             |                | 8.8             |               |       |                                  |            |
| 4 – 6                                                                                                             |                | 13.9            |               |       |                                  |            |
| 6 – 8                                                                                                             |                | 17.5            |               |       |                                  |            |
| 8 – 10                                                                                                            |                | 20.7            |               |       |                                  |            |
| 10 – 12                                                                                                           |                | 22.7            |               |       |                                  |            |
| 12 – 16                                                                                                           |                | 11.4            |               |       |                                  |            |
| 16 - 20<br>20 - 30<br>30 - 40                                                                                     |                |                 |               |       |                                  |            |
|                                                                                                                   |                | 100%            |               | 1000/ |                                  |            |
|                                                                                                                   |                |                 |               |       |                                  |            |
| 40 – 50                                                                                                           |                |                 |               |       |                                  |            |
| 50 – 60                                                                                                           |                | 0.0             |               |       |                                  |            |
| 60 – 70                                                                                                           |                | 0.0             |               |       |                                  |            |
| 70 – 80                                                                                                           |                |                 |               |       |                                  |            |
| 80 – 90                                                                                                           |                |                 |               |       |                                  |            |
| 90 – 100                                                                                                          |                |                 |               |       |                                  |            |
| >100                                                                                                              |                |                 |               |       |                                  |            |

| 26.      | How is filter monitored for indications of deterioration (e.g., broken bags)?                                 |
|----------|---------------------------------------------------------------------------------------------------------------|
| 1        | Continuous Opacity                                                                                            |
|          | Pressure Drop                                                                                                 |
|          | Alarms-Audible to Process Operator                                                                            |
|          | Visual opacity readings, Frequency:                                                                           |
|          |                                                                                                               |
| <b>_</b> | Other, specify: Visually inspect bags once per year.                                                          |
| 27.      | Describe any recording device and frequency of log entries:                                                   |
| 1        | None                                                                                                          |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
| 1        |                                                                                                               |
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|          |                                                                                                               |
| 28.      | Describe any filter seeding being performed:                                                                  |
|          | None                                                                                                          |
|          |                                                                                                               |
|          |                                                                                                               |
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|          | •                                                                                                             |
|          |                                                                                                               |
| 29.      | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
|          | reheating, gas humidification):                                                                               |
|          | None                                                                                                          |
|          |                                                                                                               |
| }        |                                                                                                               |
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| 1        |                                                                                                               |
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| 1        |                                                                                                               |
|          |                                                                                                               |
| 30.      | Describe the collection material disposal system:                                                             |
| 1        | Recycled back into the process.                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
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|          |                                                                                                               |
|          |                                                                                                               |
| 31.      | Have you included Baghouse Control Device in the Emissions Points Data Summary Sheet? Yes                     |

| Please propose n                                                                                                                  | g parameters. Please propose                                                                  | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING:<br>None |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| DEDODTING:                                                                                                                        |                                                                                               |                                                                                                                                                      |  |  |
| REPORTING:<br>None                                                                                                                |                                                                                               | TESTING:<br>None                                                                                                                                     |  |  |
| MONITORING:                                                                                                                       | Please list and describe the promonitored in order to demons equipment or air control device. | ocess parameters and ranges that are proposed to be<br>strate compliance with the operation of this process                                          |  |  |
| RECORDKEEPING:<br>REPORTING:                                                                                                      | Please describe the proposed red                                                              | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air                                               |  |  |
| TESTING:                                                                                                                          |                                                                                               | emissions testing for this process equipment on air                                                                                                  |  |  |
| None                                                                                                                              | aranteed Capture Efficiency for eac                                                           |                                                                                                                                                      |  |  |
| <ul> <li>34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.</li> <li>99.99 % less than 1 micron.</li> </ul> |                                                                                               |                                                                                                                                                      |  |  |
| 35. Describe all operati<br>NA                                                                                                    | ng ranges and maintenance proce                                                               | dures required by Manufacturer to maintain warranty.                                                                                                 |  |  |
|                                                                                                                                   |                                                                                               |                                                                                                                                                      |  |  |

| Equipment | Information | and Filter | <b>Characteristics</b> |
|-----------|-------------|------------|------------------------|
|-----------|-------------|------------|------------------------|

| 1.  | Manufacturer: Hosokawa Mirropul Environmental                                                                                                                                                                                                                                                             | 2. Total number of compartments: 1                                                                                                                                                                                              |  |  |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|     | Systems<br>Model No. 12-55PB                                                                                                                                                                                                                                                                              | 3. Number of compartment online for normal operation: 1                                                                                                                                                                         |  |  |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state I                                                                                                                                                                                                | m with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                                        |  |  |
| 5.  | Baghouse Configuration:Image: Open Pressure(check one)Image: Electrostatically EnhanceImage: Other, SpecifyImage: Other, Specify                                                                                                                                                                          | Closed Pressure Closed Suction                                                                                                                                                                                                  |  |  |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Cotton         Cotton       Weight       10         Teflon       Thickness       in         Others, specify       Image: Context of the system | <ul> <li>7. Bag Dimension:<br/>Diameter 5.64 in.<br/>Length 5.08 (61 in) ft.</li> <li>8. Total cloth area: 413 ft<sup>2</sup></li> <li>9. Number of bags: 12</li> <li>10. Operating air to cloth ratio: 1.6:1 ft/min</li> </ul> |  |  |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                                          | Automatic Intermittent                                                                                                                                                                                                          |  |  |
| 12. | Method used to clean bags:          Mechanical Shaker       Sonic Cleaning         Pneumatic Shaker       Reverse Air Flow         Bag Collapse       Pulse Jet         Manual Cleaning       Reverse Jet                                                                                                 | ⊠ Reverse Air Jet<br>☐ Other:                                                                                                                                                                                                   |  |  |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                                                              | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                                                                                                                                                  |  |  |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                                     | 15. Collection efficiency:Rating:99.99%Guaranteed minimum:1 μm99.99%                                                                                                                                                            |  |  |
|     | Gas Stream Cl                                                                                                                                                                                                                                                                                             | haracteristics                                                                                                                                                                                                                  |  |  |
| 16. | Gas flow rate into the collector:650ACFMACFM: Design:PSIAMaximum:                                                                                                                                                                                                                                         | at 100 °F and 8 PSIA<br>PSIA Average Expected: PSIA                                                                                                                                                                             |  |  |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                                                                                                                                                                   | lb. Water/lb. Dry Air                                                                                                                                                                                                           |  |  |
| 18. | Gas Stream Temperature: 100 °F                                                                                                                                                                                                                                                                            | 19. Fan Requirements: 2 hp<br>OR ft <sup>3</sup> /min                                                                                                                                                                           |  |  |
| 20. | Stabilized static pressure loss across baghouse. Pres                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                 |  |  |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                               | grain/scf Outlet: grain/scf                                                                                                                                                                                                     |  |  |

| 22. Type of Pollutant(s) to be collected (if particulate give specific type):<br>Bentone™ product |               |                                   |              |                      |                 |                  |
|---------------------------------------------------------------------------------------------------|---------------|-----------------------------------|--------------|----------------------|-----------------|------------------|
| 23. Is there any $SO_3$ in the emission s                                                         | stream?       | No No                             | ′es SC       | D <sub>3</sub> conte | ent:            | ppmv             |
| 24. Emission rate of pollutant (specify                                                           | /) into and o | 1                                 |              | design               |                 |                  |
| Pollutant                                                                                         |               | lb/hr                             | N<br>grains/ | acf                  | O<br>Ib/hr      | UT<br>grains/acf |
| PM/PM10/PM2.5                                                                                     |               | 5.77                              | NA NA        |                      | 0.0058          | NA               |
|                                                                                                   |               |                                   |              |                      |                 |                  |
| 25. Complete the table:                                                                           | Particle S    | Size Distribution<br>to Collector |              | Frae                 | ction Efficienc | y of Collector   |
| Particulate Size Range (microns)                                                                  | Weig          | ht % for Size R                   | ange         | ١                    | Neight % for S  | ize Range        |
| 0 – 2                                                                                             |               | 0.5                               |              |                      | 99.9            |                  |
| 2 – 4                                                                                             |               | 4.2                               |              |                      |                 |                  |
| 4 - 6                                                                                             |               | 9.3                               |              |                      |                 |                  |
| 6 – 8                                                                                             |               | 9.2                               |              |                      |                 |                  |
| 8 – 10                                                                                            |               | 6.0                               |              |                      |                 |                  |
| 10 – 12                                                                                           |               | 6.5                               |              |                      |                 |                  |
| 12 – 16                                                                                           | 14.3          |                                   |              |                      |                 |                  |
| 16 – 20                                                                                           |               | 16.2                              |              |                      |                 |                  |
| 20 - 30                                                                                           |               | 21.8                              |              |                      | 100             |                  |
| 30 – 40                                                                                           |               | 10.6                              |              |                      |                 |                  |
| 40 – 50                                                                                           |               | 1.4                               |              |                      |                 |                  |
| 50 - 60                                                                                           |               |                                   |              |                      |                 |                  |
| 60 – 70                                                                                           |               |                                   |              |                      |                 |                  |
| 70 – 80                                                                                           |               |                                   |              |                      |                 |                  |
| 80 90                                                                                             |               |                                   |              |                      |                 |                  |
| 90 – 100                                                                                          |               |                                   |              |                      |                 |                  |
| >100                                                                                              |               |                                   |              |                      |                 |                  |

| E.  |     |                                                                                                               |
|-----|-----|---------------------------------------------------------------------------------------------------------------|
|     | 26. | How is filter monitored for indications of deterioration (e.g., broken bags)?                                 |
|     |     | Continuous Opacity                                                                                            |
|     |     | Pressure Drop                                                                                                 |
|     |     |                                                                                                               |
|     |     | Alarms-Audible to Process Operator                                                                            |
| I   |     | Visual opacity readings, Frequency:                                                                           |
| I   |     | Other, specify: Visually inspect bags once per year                                                           |
| ľ   | 27  | Describe any recording device and frequency of log entries:                                                   |
| 1   | 21. | None                                                                                                          |
| I   |     | Noie                                                                                                          |
| L   |     |                                                                                                               |
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| I   |     |                                                                                                               |
| t   | 28  | Describe any filter seeding being performed:                                                                  |
| l   | 20. | None                                                                                                          |
| I   |     | None                                                                                                          |
| I   |     |                                                                                                               |
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| L   |     |                                                                                                               |
| L   |     |                                                                                                               |
| ٢   | 29  | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
| L   |     | reheating, gas humidification):                                                                               |
| ł   |     |                                                                                                               |
| ľ   |     | None                                                                                                          |
| L   |     |                                                                                                               |
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|     |     |                                                                                                               |
| L   |     |                                                                                                               |
| Γ   | 30  | Describe the collection material disposal system:                                                             |
| ľ   |     | Recycled back in to process.                                                                                  |
| L   |     | Recycled back in to process.                                                                                  |
| L   |     |                                                                                                               |
| L   |     |                                                                                                               |
| I   |     |                                                                                                               |
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|     |     |                                                                                                               |
| L   |     |                                                                                                               |
|     |     |                                                                                                               |
| Γ   | 31  | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes              |
| 1.1 |     | There you mondered <b>Dagnouse Control Device</b> in the Linssions Found Data Summary Speel! I CS             |

| Please propose n<br>proposed operatin<br>proposed emission<br>MONITORING:<br>None                                                                                                                                                                 | g parameters. Please propose                                  | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING:<br>None |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| REPORTING:<br>None                                                                                                                                                                                                                                |                                                               | TESTING:<br>None                                                                                                                                     |
| MONITORING:                                                                                                                                                                                                                                       | monitored in order to demons equipment or air control device. | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process                                           |
| RECORDKEEPING:<br>REPORTING:                                                                                                                                                                                                                      |                                                               | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air                                               |
| TESTING:                                                                                                                                                                                                                                          | Please describe any proposed pollution control device.        | emissions testing for this process equipment on air                                                                                                  |
| None                                                                                                                                                                                                                                              | aranteed Capture Efficiency for eac                           |                                                                                                                                                      |
| 34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.<br>99.99% for less than 1 micron                                                                                                                                         |                                                               |                                                                                                                                                      |
|                                                                                                                                                                                                                                                   | ng ranges and maintenance proce                               | dures required by Manufacturer to maintain warranty.                                                                                                 |
| Daily:<br>Collector – Check exhaust for visible dust.<br>Compressed Air System – Check for air leakage (low pressure).Check valves.<br>Manometer – Check and record reading.<br>Weekly:<br>Filter Bags- Check for tears, holes, proper fastening. |                                                               |                                                                                                                                                      |
| Hopper - Check for bridg:                                                                                                                                                                                                                         |                                                               | up paint where necessary.                                                                                                                            |

|     | Equipment Information and Filter Characteristics                                                         |                                                                                                           |  |  |
|-----|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--|--|
| 1.  | Manufacturer: Hosokawa Mirropul Environmental                                                            | 2. Total number of compartments: 1                                                                        |  |  |
|     | Systems                                                                                                  | 3. Number of compartment online for normal                                                                |  |  |
|     | Model No. 12-55PB                                                                                        | operation: 1                                                                                              |  |  |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state | em with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency. |  |  |
| 5.  | Baghouse Configuration: 🛛 Open Pressure                                                                  | Closed Pressure Closed Suction                                                                            |  |  |
|     | (check one)                                                                                              | anced Fabric                                                                                              |  |  |
|     | Other, Specify                                                                                           |                                                                                                           |  |  |
| 6.  | Filter Fabric Bag Material:                                                                              | 7. Bag Dimension:                                                                                         |  |  |
| 1   | ☐ Nomex hylon ☐ Wool<br>⊠ Polyester ☐ Polypropylene                                                      | Diameter 5.64 in.                                                                                         |  |  |
|     | Acrylics Ceramics                                                                                        | Length 5.08 (61 in) ft.                                                                                   |  |  |
|     | Fiber Glass<br>Cotton Weight 10 oz./sq.yd                                                                | 8. Total cloth area: $413$ $ft^2$                                                                         |  |  |
|     | Teflon Thickness in                                                                                      | 9. Number of bags: 12                                                                                     |  |  |
|     | Others, specify                                                                                          | 10. Operating air to cloth ratio: 1.6:1 ft/min                                                            |  |  |
| 11. | Baghouse Operation: 🛛 Continuous                                                                         | Automatic Intermittent                                                                                    |  |  |
| 12. | 12. Method used to clean bags:                                                                           |                                                                                                           |  |  |
|     | Mechanical Shaker Sonic Cleaning                                                                         | 🛛 Reverse Air Jet                                                                                         |  |  |
|     | Pneumatic Shaker Reverse Air Flow Reg Colleges                                                           | Other:                                                                                                    |  |  |
|     | Bag Collapse Pulse Jet                                                                                   |                                                                                                           |  |  |
| 13  | Cleaning initiated by:                                                                                   |                                                                                                           |  |  |
| 15. | ⊠ Timer                                                                                                  | Frequency if timer actuated                                                                               |  |  |
|     | Expected pressure drop range in. of water                                                                | Other                                                                                                     |  |  |
| 14. | Operation Hours: Max. per day: 24                                                                        | 15. Collection efficiency: Rating: 99.99 %                                                                |  |  |
|     | Max. per yr: 365                                                                                         | Guaranteed minimum: 1 µm 99.99 %                                                                          |  |  |
|     | Gas Stream C                                                                                             | haracteristics                                                                                            |  |  |
| 16. | Gas flow rate into the collector: 650 ACFM                                                               | at 100 °F and 8 PSIA                                                                                      |  |  |
|     | ACFM: Design: PSIA Maximum:                                                                              | PSIA Average Expected: PSIA                                                                               |  |  |
| 17. | Water Vapor Content of Effluent Stream:                                                                  | Ib. Water/Ib. Dry Air                                                                                     |  |  |
| 18. | Gas Stream Temperature: 100 °F                                                                           | 19. Fan Requirements: 2 hp                                                                                |  |  |
| _   |                                                                                                          | OR ft <sup>3</sup> /min                                                                                   |  |  |
| 20. | Stabilized static pressure loss across baghouse. Pres                                                    | ssure Drop: High 8 in. H <sub>2</sub> O                                                                   |  |  |
|     |                                                                                                          | Low <1 in. H <sub>2</sub> O                                                                               |  |  |
| 21. | Particulate Loading: Inlet:                                                                              | grain/scf Outlet: grain/scf                                                                               |  |  |

| 22. | Type of Pollutant(s) to be collected (if particulate give specific type): |
|-----|---------------------------------------------------------------------------|
|     | Bentone <sup>™</sup> product                                              |

| 23. Is there any SO <sub>3</sub> in the emission s |               |                                |                  | $P_3$ conte |                 | ppmv            |
|----------------------------------------------------|---------------|--------------------------------|------------------|-------------|-----------------|-----------------|
| 24. Emission rate of pollutant (specify            | ) into and oi | ut of collector a              | it maximum<br>IN | design<br>  |                 | ditions:<br>IUT |
| Pollutant                                          |               | lb/hr                          | grains/          | acf         | lb/hr           | grains/act      |
| PM/PM10/PM2.5                                      |               | 5.77                           | NA               |             | 0.0058          | NA              |
| 25. Complete the table:                            | Particle S    | ize Distributio<br>to Collecto |                  | Frac        | ction Efficienc | y of Collector  |
| Particulate Size Range (microns)                   | Weigl         | nt % for Size F                | Range            | ١           | Neight % for S  | Size Range      |
| 0 – 2                                              |               | 0.5                            |                  |             | 99.9            |                 |
| 2 – 4                                              |               | 4.2                            |                  |             |                 | je.             |
| 4 - 6                                              |               | 9.3                            |                  |             |                 |                 |
| 6 – 8                                              |               | 9.2                            |                  |             |                 |                 |
| 8 – 10                                             |               | 6.0                            |                  |             |                 |                 |
| 10 – 12                                            |               | 6.5                            |                  |             |                 |                 |
| 12 – 16                                            |               | 14.3                           |                  |             |                 |                 |
| 16 – 20                                            |               | 16.2                           |                  |             |                 |                 |
| 20 - 30                                            |               | 21.8                           |                  |             | 100             |                 |
| 30 – 40                                            |               | 10.6                           |                  |             |                 |                 |
| 40 – 50                                            |               | 1.4                            |                  |             |                 |                 |
| 50 - 60                                            |               |                                |                  |             |                 |                 |
| 60 – 70                                            |               |                                | :                |             |                 |                 |
| 70 – 80                                            |               |                                |                  |             |                 |                 |
| 80 – 90                                            |               |                                |                  |             |                 |                 |
| 90 – 100                                           |               |                                |                  |             |                 |                 |
| >100                                               |               |                                |                  |             |                 |                 |

|          | 26. | How is filter monitored for indications of deterioration (e.g., broken bags)?                                 |
|----------|-----|---------------------------------------------------------------------------------------------------------------|
| E        |     | Continuous Opacity                                                                                            |
|          |     | Pressure Drop                                                                                                 |
|          |     |                                                                                                               |
|          |     | Alarms-Audible to Process Operator                                                                            |
|          |     | Visual opacity readings, Frequency:                                                                           |
|          |     | Other, specify: Visually inspect bags once per year                                                           |
| E        |     |                                                                                                               |
| 14       | 27. | Describe any recording device and frequency of log entries:                                                   |
|          |     | None                                                                                                          |
|          |     |                                                                                                               |
| 1        |     |                                                                                                               |
|          |     |                                                                                                               |
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|          |     |                                                                                                               |
| F        |     |                                                                                                               |
| 12       |     | Describe any filter seeding being performed:                                                                  |
|          |     | None                                                                                                          |
|          |     |                                                                                                               |
|          |     |                                                                                                               |
|          |     |                                                                                                               |
| Ł        |     |                                                                                                               |
| L        |     |                                                                                                               |
| L        |     |                                                                                                               |
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|          |     |                                                                                                               |
|          |     |                                                                                                               |
| 2        | 9.  | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
|          |     | reheating, gas humidification):                                                                               |
|          |     | None                                                                                                          |
| 1        |     |                                                                                                               |
| L        |     |                                                                                                               |
| L        |     |                                                                                                               |
| I.       |     |                                                                                                               |
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| 1        |     |                                                                                                               |
| 1        |     |                                                                                                               |
| H        |     |                                                                                                               |
| 3        |     | Describe the collection material disposal system:                                                             |
| 1        |     | Recycled back into process.                                                                                   |
| 1        |     | - ·                                                                                                           |
| 1        |     |                                                                                                               |
| 1        |     |                                                                                                               |
| 1        |     |                                                                                                               |
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|          |     |                                                                                                               |
| 1        |     |                                                                                                               |
| ⊢        |     |                                                                                                               |
| 3        | 1.  | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes              |
| <u> </u> |     |                                                                                                               |

| <ul> <li>32. Proposed Monitoring, Recordkeep<br/>Please propose monitoring, record<br/>proposed operating parameters.<br/>proposed emissions limits.</li> <li>MONITORING:<br/>None</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                               | ping, Reporting, and Testing<br>dkeeping, and reporting in order to demonstrate compliance with the<br>Please propose testing in order to demonstrate compliance with the<br>RECORDKEEPING:<br>None |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| REPORTING:<br>None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | TESTING:<br>None                                                                                                                                                                                    |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                     |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | describe the process parameters and ranges that are proposed to be<br>order to demonstrate compliance with the operation of this process<br>r control device.                                       |  |  |
| RECORDKEEPING: Please describe<br>REPORTING: Please describe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | e the proposed recordkeeping that will accompany the monitoring.<br>e any proposed emissions testing for this process equipment on air                                                              |  |  |
| pollution control<br>TESTING: Please describe<br>pollution control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | e any proposed emissions testing for this process equipment on air                                                                                                                                  |  |  |
| 33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.<br>None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                     |  |  |
| 34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.<br>99.99% less than 1 micron.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                     |  |  |
| <ul> <li>35. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.</li> <li>Daily:</li> <li>Collector – Check exhaust for visible dust.</li> <li>Compressed Air System – Check for air leakage (low pressure). Check valves.</li> <li>Manometer – Check and record reading.</li> <li>Weekly:</li> <li>Filter Bags- Check for tears, holes, proper fastening.</li> <li>Hopper – Check for bridging or plugging; clean out.</li> <li>Annual – Inspect the collector thoroughly, clean collector, touch up paint where necessary.</li> </ul> |                                                                                                                                                                                                     |  |  |

| Equipment | Information | and Filte | r Characteristics |
|-----------|-------------|-----------|-------------------|
|           |             |           |                   |

| 1. Manufacturer: Micropul                                                                                                                                                                                                                               | 2. Total number of compartments: 1                                                                                                                                                                                    |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| Model No. 1005-8-50-TR-C                                                                                                                                                                                                                                | 3. Number of compartment online for normal operation: 1                                                                                                                                                               |  |  |  |
| <ol> <li>Provide diagram(s) of unit describing capture syst<br/>capacity, horsepower of movers. If applicable, state</li> </ol>                                                                                                                         | em with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                             |  |  |  |
| <ul> <li>5. Baghouse Configuration: Open Pressure<br/>(check one) Electrostatically Enh</li> <li>Other, Specify</li> </ul>                                                                                                                              | Closed Pressure Closed Suction                                                                                                                                                                                        |  |  |  |
| <ul> <li>6. Filter Fabric Bag Material:</li> <li>Nomex nylon Wool</li> <li>Polyester Polypropylene</li> <li>Acrylics Ceramics</li> <li>Fiber Glass</li> <li>Cotton Weight 16 oz./sq.yd</li> <li>Teflon Thickness in</li> <li>Others, specify</li> </ul> | <ul> <li>7. Bag Dimension:<br/>Diameter 4.625 in.<br/>Length 8 ft.</li> <li>8. Total cloth area: 968 ft<sup>2</sup></li> <li>9. Number of bags: 100</li> <li>10. Operating air to cloth ratio: 4.65 ft/min</li> </ul> |  |  |  |
| 11. Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                    | Automatic Intermittent                                                                                                                                                                                                |  |  |  |
| 12. Method used to clean bags:<br>Mechanical Shaker Sonic Cleaning<br>Pneumatic Shaker Reverse Air Flow<br>Bag Collapse Pulse Jet<br>Manual Cleaning Reverse Jet                                                                                        | ⊠ Reverse Air Jet<br>☐ Other:                                                                                                                                                                                         |  |  |  |
| <ul> <li>13. Cleaning initiated by:</li> <li>☑ Timer</li> <li>☑ Expected pressure drop range in. of water</li> </ul>                                                                                                                                    | Frequency if timer actuated Other                                                                                                                                                                                     |  |  |  |
| 14. Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                               | 15. Collection efficiency:Rating:99.99%Guaranteed minimum:1 μm99.99%                                                                                                                                                  |  |  |  |
| Gas Stream C                                                                                                                                                                                                                                            | haracteristics                                                                                                                                                                                                        |  |  |  |
| 16. Gas flow rate into the collector: 4,500       ACFN         ACFM: Design:       PSIA       Maximum:                                                                                                                                                  | I at     70     °F and     14.7     PSIA       PSIA     Average Expected:     PSIA                                                                                                                                    |  |  |  |
| 17. Water Vapor Content of Effluent Stream:                                                                                                                                                                                                             | lb. Water/lb. Dry Air                                                                                                                                                                                                 |  |  |  |
| 18. Gas Stream Temperature: °F                                                                                                                                                                                                                          | 19. Fan Requirements: 75 hp<br>OR ft <sup>3</sup> /min                                                                                                                                                                |  |  |  |
| 20. Stabilized static pressure loss across baghouse. Pre                                                                                                                                                                                                | essure Drop: High 4 in. H <sub>2</sub> O<br>Low <1 in. H <sub>2</sub> O                                                                                                                                               |  |  |  |
| 21. Particulate Loading: Inlet:                                                                                                                                                                                                                         | grain/scf Outlet: grain/scf                                                                                                                                                                                           |  |  |  |

| 22. Type of Pollutant(s) to be collected (if particulate give specific type):                              |            |                                  |            |         |                  |              |
|------------------------------------------------------------------------------------------------------------|------------|----------------------------------|------------|---------|------------------|--------------|
| Bentone <sup>™</sup> product                                                                               |            |                                  |            |         |                  |              |
|                                                                                                            |            |                                  |            |         |                  |              |
| 23. Is there any $SO_3$ in the emission                                                                    |            | 🛛 No 🗌 Y                         |            | )₃ cont |                  | ppmv         |
| 24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions: |            |                                  |            |         |                  |              |
| Pollutant                                                                                                  |            | lb/hr                            | grains/    | acf     | lb/hr            | grains/acf   |
| PM/PM10/PM2.5                                                                                              |            | 5.77                             | NA         |         | 0.0058           | NA           |
|                                                                                                            |            |                                  |            |         |                  |              |
| 25. Complete the table:                                                                                    | Particle S | ize Distributior<br>to Collector | n at Inlet | Fra     | ction Efficiency | of Collector |
| Particulate Size Range (microns)                                                                           | Weig       | nt % for Size Ra                 | inge       | 1       | Weight % for S   | ize Range    |
| 0-2                                                                                                        |            | 5.0                              |            |         | 99.9%            |              |
| 2 – 4                                                                                                      |            | 8.8                              |            | 1       |                  |              |
| 4 – 6                                                                                                      |            | 13.9                             |            |         |                  |              |
| 6 – 8                                                                                                      |            | 17.5                             |            |         |                  |              |
| 8 – 10                                                                                                     |            | 20.7                             |            |         |                  |              |
| 10 – 12                                                                                                    |            | 22.7                             |            |         |                  |              |
| 12 – 16                                                                                                    |            | 11.4                             |            |         |                  |              |
| 16 – 20                                                                                                    |            |                                  |            |         |                  |              |
| 20 - 30                                                                                                    |            |                                  |            |         | 1000/            |              |
| 30 – 40                                                                                                    |            |                                  |            |         | 100%             |              |
| 40 – 50                                                                                                    |            |                                  |            |         |                  |              |
| 50 – 60                                                                                                    |            | 0                                |            |         |                  |              |
| 60 – 70                                                                                                    |            | 0                                |            |         |                  |              |
| 70 – 80                                                                                                    |            |                                  |            |         |                  |              |
| 80 – 90                                                                                                    |            |                                  |            |         |                  |              |
| 90 – 100                                                                                                   |            |                                  |            |         |                  |              |
| >100                                                                                                       |            |                                  |            |         |                  |              |

| 26. | How is filter monitored for indications of deterioration (e.g., broken bags)?                                                                         |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Continuous Opacity Pressure Drop                                                                                                                      |
|     | Alarms-Audible to Process Operator                                                                                                                    |
|     | Visual opacity readings, Frequency: Other, specify: Visually inspect bags once per year                                                               |
| 27. | Describe any recording device and frequency of log entries:                                                                                           |
|     | None                                                                                                                                                  |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 28. | Describe any filter seeding being performed:                                                                                                          |
|     | None                                                                                                                                                  |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 29. | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):<br>None |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 1   |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 30  | Describe the collection material disposal system:                                                                                                     |
|     | Recycled back into the process.                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| [   |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 31. | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes                                                      |

| Please propose n               | g parameters. Please propose                           | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING: |
|--------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| None                           |                                                        | None                                                                                                                                         |
| REPORTING:<br>None             |                                                        | TESTING:<br>None                                                                                                                             |
| MONITORING:                    |                                                        | ocess parameters and ranges that are proposed to be<br>strate compliance with the operation of this process                                  |
| RECORDKEEPING:<br>REPORTING:   | Please describe the proposed red                       | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air                                       |
| TESTING:                       | Please describe any proposed pollution control device. | emissions testing for this process equipment on air                                                                                          |
| None                           | aranteed Capture Efficiency for eac                    |                                                                                                                                              |
| 99.99 % less than 1 micro      |                                                        |                                                                                                                                              |
| 35. Describe all operati<br>NA | ng ranges and maintenance proce                        | dures required by Manufacturer to maintain warranty.                                                                                         |

(BAGHOUSE)

| Equipment | Information | and Filter | <b>Characteristics</b> |
|-----------|-------------|------------|------------------------|
|-----------|-------------|------------|------------------------|

| 1.  | Manufacturer: Mikro-Pulsair                                                                                                                                                                                                                                                                  | 2. Total number of compartments: 1                                                                                                                                                                                         |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Model No. 7-55PB-220C                                                                                                                                                                                                                                                                        | 3. Number of compartment online for normal operation: 1                                                                                                                                                                    |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state                                                                                                                                                                                     | m with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                                   |
| 5.  | Baghouse Configuration:Image: Open Pressure(check one)Image: Electrostatically EnhanceImage: Other, Specify                                                                                                                                                                                  | Closed Pressure Closed Suction                                                                                                                                                                                             |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Cotton         Cotton       Weight       16         Teflon       Thickness       in         Others, specify       Others, specify | <ul> <li>7. Bag Dimension:<br/>Diameter 4.5 in.<br/>Length 4.58 (55 in) ft.</li> <li>8. Total cloth area: 92 ft<sup>2</sup></li> <li>9. Number of bags: 7</li> <li>10. Operating air to cloth ratio: 2.2 ft/min</li> </ul> |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                             | Automatic Intermittent                                                                                                                                                                                                     |
| 12. | Method used to clean bags:<br>Mechanical Shaker Sonic Cleaning<br>Pneumatic Shaker Reverse Air Flow<br>Bag Collapse Pulse Jet<br>Manual Cleaning Reverse Jet                                                                                                                                 | ⊠ Reverse Air Jet<br>□ Other:                                                                                                                                                                                              |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                                                 | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                                                                                                                                             |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                        | 15. Collection efficiency:Rating:99.9%Guaranteed minimum:1 μm99.99%                                                                                                                                                        |
|     | Gas Stream Cl                                                                                                                                                                                                                                                                                | haracteristics                                                                                                                                                                                                             |
|     | Gas flow rate into the collector:200ACFMACFM:Design:PSIAMaximum:Water Vapor Content of Effluent Stream:                                                                                                                                                                                      | at 220 °F and 14.7 PSIA<br>PSIA Average Expected: PSIA<br>Ib. Water/Ib. Dry Air                                                                                                                                            |
| 18. | Gas Stream Temperature: 100 °F                                                                                                                                                                                                                                                               | 19. Fan Requirements: 7.5 hp<br>OR ft <sup>3</sup> /min                                                                                                                                                                    |
| 20. | Stabilized static pressure loss across baghouse. Pres                                                                                                                                                                                                                                        | ssure Drop: High 4 in. H <sub>2</sub> O<br>Low <1 in. H <sub>2</sub> O                                                                                                                                                     |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                  | grain/scf Outlet: grain/scf                                                                                                                                                                                                |

| 22. | ype of Pollutant(s) to be collected (if particulate give specific type) | ): |
|-----|-------------------------------------------------------------------------|----|
|     | Bentone™ product                                                        |    |

| 23. Is there any $SO_3$ in the emission s |              |                                |                  | 03 cont    |                 | ppmv                  |  |
|-------------------------------------------|--------------|--------------------------------|------------------|------------|-----------------|-----------------------|--|
| 24. Emission rate of pollutant (specify   | ) into and o | ut of collector a              | it maximum<br>IN | desigr<br> | _               | ditions:<br><b>UT</b> |  |
| Pollutant                                 |              | lb/hr                          | grains/          | acf        | lb/hr           | grains/acf            |  |
| PM/PM10/PM2.5 (emissions include DC-      | -780401)     | 13.85                          | NA               |            | 0.0138          | NA                    |  |
|                                           |              |                                |                  |            |                 |                       |  |
| 25. Complete the table:                   | Particle S   | ize Distributio<br>to Collecto |                  | Fra        | ction Efficienc | y of Collector        |  |
| Particulate Size Range (microns)          | Weigl        | nt % for Size F                | Range            | ١          | Weight % for S  | ize Range             |  |
| 0 – 2                                     |              | 0.5                            |                  |            | 99.9            |                       |  |
| 2 – 4                                     |              | 4.2                            |                  |            |                 |                       |  |
| 4 – 6                                     |              | 9.3                            |                  | -          |                 |                       |  |
| 6 – 8                                     |              | 9.2                            |                  |            |                 |                       |  |
| 8 – 10                                    | 6.0          |                                |                  |            |                 |                       |  |
| 10 – 12                                   | 6.5          |                                |                  |            |                 |                       |  |
| 12 16                                     |              | 14.3                           |                  |            |                 |                       |  |
| 16 – 20                                   |              | 16.2                           | 2                |            |                 |                       |  |
| 20 - 30                                   |              | 21.8                           |                  |            | 100             | 100                   |  |
| 30 - 40                                   |              |                                |                  |            |                 |                       |  |
| 40 – 50                                   |              | 1.4                            |                  |            |                 |                       |  |
| 50 - 60                                   |              |                                |                  |            |                 |                       |  |
| 60 - 70                                   |              |                                |                  |            |                 |                       |  |
| 70 – 80                                   |              |                                |                  |            |                 |                       |  |
| 80 – 90                                   |              |                                |                  |            |                 |                       |  |
| 90 – 100                                  |              |                                |                  |            |                 |                       |  |
| >100                                      |              |                                |                  |            |                 |                       |  |

| 26       | . How is filter monitored for indications of deterioration (e.g., broken bags)?                               |
|----------|---------------------------------------------------------------------------------------------------------------|
| 1        | Continuous Opacity                                                                                            |
|          | Pressure Drop                                                                                                 |
|          |                                                                                                               |
|          | Alarms-Audible to Process Operator                                                                            |
|          | Visual opacity readings, Frequency:                                                                           |
|          | Other, specify: Visually inspect bags once per year                                                           |
| 27       |                                                                                                               |
| 21       | . Describe any recording device and frequency of log entries:                                                 |
|          | None                                                                                                          |
|          |                                                                                                               |
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|          |                                                                                                               |
| 20       | . Describe any filter seeding being performed:                                                                |
| 120      |                                                                                                               |
|          | None                                                                                                          |
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| 1        |                                                                                                               |
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| 29.      | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
|          | reheating, gas humidification):                                                                               |
|          | None                                                                                                          |
|          | None                                                                                                          |
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| <u> </u> |                                                                                                               |
| 30.      | Describe the collection material disposal system:                                                             |
|          | Material is returned to the process.                                                                          |
| 1        | •                                                                                                             |
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|          | 1                                                                                                             |
| -        |                                                                                                               |
| 131      | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes              |

| Please propose n                 | g parameters. Please propose                                                                          | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING:<br>None |
|----------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  |                                                                                                       |                                                                                                                                                      |
| REPORTING:<br>None               |                                                                                                       | TESTING:<br>None                                                                                                                                     |
| MONITORING:                      | Please list and describe the pro-<br>monitored in order to demons<br>equipment or air control device. | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process                                           |
| RECORDKEEPING:<br>REPORTING:     |                                                                                                       | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air                                               |
| TESTING:                         | Please describe any proposed pollution control device.                                                | emissions testing for this process equipment on air                                                                                                  |
| None                             | aranteed Capture Efficiency for eac                                                                   |                                                                                                                                                      |
| 34. Manufacturer's Gua<br>99.99% | aranteed Control Efficiency for eac                                                                   | h air pollutant.                                                                                                                                     |
|                                  |                                                                                                       |                                                                                                                                                      |
| 35. Describe all operati<br>NA   | ng ranges and maintenance proce                                                                       | dures required by Manufacturer to maintain warranty.                                                                                                 |

| Equipment | Information | and Filter | Characteristics |
|-----------|-------------|------------|-----------------|
|           |             |            |                 |

| 1.  | Manufacturer: Rage Inc.                                                                                                                                                                                                                                                                                   | 2. Total number of compartments: 1                                                                                                                                                                                          |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Model No. 37R3                                                                                                                                                                                                                                                                                            | 3. Number of compartment online for normal operation: 1                                                                                                                                                                     |
| 4.  | Provide diagram(s) of unit describing capture syste<br>capacity, horsepower of movers. If applicable, state                                                                                                                                                                                               | em with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                                   |
| 5.  | Baghouse Configuration:    Open Pressure      (check one)    Electrostatically Enha      Other, Specify                                                                                                                                                                                                   | Closed Pressure Closed Suction                                                                                                                                                                                              |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Cotton         Cotton       Weight       16         Teflon       Thickness       in         Others, specify       Image: Context of the system | <ul> <li>7. Bag Dimension:<br/>Diameter 5 in.<br/>Length 3.17 (38 in.) ft.</li> <li>8. Total cloth area: 163 ft<sup>2</sup></li> <li>9. Number of bags: 37</li> <li>10. Operating air to cloth ratio: 5:1 ft/min</li> </ul> |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                                          | Automatic Intermittent                                                                                                                                                                                                      |
| 12. | Method used to clean bags:<br>Mechanical Shaker Sonic Cleaning<br>Pneumatic Shaker Reverse Air Flow<br>Bag Collapse Pulse Jet<br>Manual Cleaning Reverse Jet                                                                                                                                              | ⊠ Reverse Air Jet<br>☐ Other:                                                                                                                                                                                               |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                                                              | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                                                                                                                                              |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                                     | 15. Collection efficiency:Rating:99.99%Guaranteed minimum:1 μm99.99%                                                                                                                                                        |
|     | Gas Stream C                                                                                                                                                                                                                                                                                              | haracteristics                                                                                                                                                                                                              |
| 16. | Gas flow rate into the collector:1,160ACFMACFM:Design:PSIAMaximum:                                                                                                                                                                                                                                        | at 70 °F and 14.7 PSIA<br>PSIA Average Expected: PSIA                                                                                                                                                                       |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                                                                                                                                                                   | lb. Water/lb. Dry Air                                                                                                                                                                                                       |
| 18. | Gas Stream Temperature: 70 °F                                                                                                                                                                                                                                                                             | 19. Fan Requirements: 2 hp<br>OR ft <sup>3</sup> /min                                                                                                                                                                       |
| 20. | Stabilized static pressure loss across baghouse. Pre                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                             |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                               | grain/scf Outlet: grain/scf                                                                                                                                                                                                 |

| 22. Type of Pollutant(s) to be collecte<br>Bentone™ product | ed (if particul | late give specific                | : type):     |          |                |                  |
|-------------------------------------------------------------|-----------------|-----------------------------------|--------------|----------|----------------|------------------|
| 23. Is there any $SO_3$ in the emission :                   | stream?         | No 1                              | ′es SC       | 0₃ conte | ent:           | ppmv             |
| 24. Emission rate of pollutant (specify                     | /) into and o   |                                   |              | design   |                |                  |
| Pollutant                                                   |                 | lb/hr                             | N<br>grains/ | acf      | O<br>lb/hr     | UT<br>grains/acf |
| PM/PM10/PM2.5                                               |                 | 6.92                              | NA NA        |          | 0.0069         | NA               |
|                                                             |                 |                                   |              |          |                |                  |
| 25. Complete the table:                                     | Particle S      | Size Distribution<br>to Collector | n at Inlet   | Frac     | tion Efficienc | y of Collector   |
| Particulate Size Range (microns)                            | Weig            | ht % for Size Ra                  | ange         | V        | Veight % for S | ize Range        |
| 0-2                                                         |                 | 0.8                               |              |          | 99.9           |                  |
| 2 – 4                                                       |                 | 34.8                              |              |          |                |                  |
| 4 – 6                                                       |                 | 9.2                               |              |          |                |                  |
| 6 – 8                                                       |                 |                                   |              |          |                |                  |
| 8 – 10                                                      |                 | 2.7                               |              |          |                |                  |
| 10 – 12                                                     |                 | 1.3                               |              |          |                |                  |
| 12 – 16                                                     |                 | 32.8                              |              |          |                |                  |
| 16 – 20                                                     |                 |                                   |              |          |                |                  |
| 20 – 30                                                     |                 |                                   |              |          | 100            |                  |
| 30 – 40                                                     |                 |                                   |              |          |                |                  |
| 40 - 50                                                     |                 |                                   |              |          |                |                  |
| 50 – 60                                                     |                 | 0                                 |              |          |                |                  |
| 60 – 70                                                     |                 |                                   |              |          |                |                  |
| 70 – 80                                                     |                 |                                   |              |          |                |                  |
| 80 – 90                                                     |                 |                                   |              |          |                |                  |
| 90 – 100                                                    |                 |                                   |              |          |                |                  |
| >100                                                        |                 |                                   |              |          |                |                  |

| 0.0   |                                                                                                               |
|-------|---------------------------------------------------------------------------------------------------------------|
| 26.   | . How is filter monitored for indications of deterioration (e.g., broken bags)?                               |
|       | Continuous Opacity                                                                                            |
| 1     | Pressure Drop                                                                                                 |
|       | Alarms-Audible to Process Operator                                                                            |
|       | Visual opacity readings, Frequency:                                                                           |
|       |                                                                                                               |
|       | Other, specify: visual inspection, bags changed once per year                                                 |
| 27.   | Describe any recording device and frequency of log entries:                                                   |
|       | None                                                                                                          |
|       |                                                                                                               |
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| 28.   | Describe any filter seeding being performed:                                                                  |
|       | None                                                                                                          |
|       |                                                                                                               |
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| 29.   | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
|       | reheating, gas humidification):                                                                               |
|       | None                                                                                                          |
|       |                                                                                                               |
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| 20-   | Departies the collection motorial discount over                                                               |
| 130.  | Describe the collection material disposal system:                                                             |
| I     | Recycled back into process.                                                                                   |
|       |                                                                                                               |
|       |                                                                                                               |
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| I     |                                                                                                               |
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| I 31. | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes              |

| 32. Proposed Monitoring, Recordkeeping, Reporting, and Testing<br>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the<br>proposed operating parameters. Please propose testing in order to demonstrate compliance with the<br>proposed emissions limits. |                                      |                                                       |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------|--|--|--|--|
| MONITORING:                                                                                                                                                                                                                                                                                              |                                      | RECORDKEEPING:                                        |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                     |                                      | None                                                  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
| REPORTING:                                                                                                                                                                                                                                                                                               |                                      | TESTING:                                              |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                     |                                      | None                                                  |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
| MONITORING:                                                                                                                                                                                                                                                                                              | Please list and describe the pro-    | bcess parameters and ranges that are proposed to be   |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          | monitored in order to demons         | trate compliance with the operation of this process   |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          | equipment or air control device.     |                                                       |  |  |  |  |
| RECORDKEEPING:                                                                                                                                                                                                                                                                                           | Please describe the proposed re      | cordkeeping that will accompany the monitoring.       |  |  |  |  |
| REPORTING:                                                                                                                                                                                                                                                                                               |                                      | emissions testing for this process equipment on air   |  |  |  |  |
| TESTING:                                                                                                                                                                                                                                                                                                 | pollution control device.            | emissions testing for this process equipment on air   |  |  |  |  |
| reorino.                                                                                                                                                                                                                                                                                                 | pollution control device.            | emissions testing for this process equipment on air i |  |  |  |  |
| 33 Manufacturer's Gua                                                                                                                                                                                                                                                                                    | aranteed Capture Efficiency for each | ch air pollutant                                      |  |  |  |  |
| None                                                                                                                                                                                                                                                                                                     |                                      | shan ponatant.                                        |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
| <ol> <li>Manufacturer's Gua</li> <li>99.99% less than 1 micror</li> </ol>                                                                                                                                                                                                                                | aranteed Control Efficiency for eac  | h air pollutant.                                      |  |  |  |  |
| 99.99% less man 1 microi                                                                                                                                                                                                                                                                                 | 1                                    |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
|                                                                                                                                                                                                                                                                                                          |                                      |                                                       |  |  |  |  |
| 5. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.                                                                                                                                                                                               |                                      |                                                       |  |  |  |  |
| JA                                                                                                                                                                                                                                                                                                       |                                      |                                                       |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                       | ng ranges and maintenance proce      | dures required by Manufacturer to maintain warranty.  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                       | ng ranges and maintenance proce      | dures required by Manufacturer to maintain warranty.  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                       | ng ranges and maintenance proce      | dures required by Manufacturer to maintain warranty.  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                       | ng ranges and maintenance proce      | dures required by Manufacturer to maintain warranty.  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                       | ng ranges and maintenance proce      | dures required by Manufacturer to maintain warranty.  |  |  |  |  |
| NA                                                                                                                                                                                                                                                                                                       | ng ranges and maintenance proce      | dures required by Manufacturer to maintain warranty.  |  |  |  |  |

| Equipment | Information and | Filter Characteristics |  |
|-----------|-----------------|------------------------|--|
|           |                 |                        |  |

| 1.  | Manufacturer: MAC                                                                                                                                                                                                                                                                            | 2. Total number of compartments: 1                                                                                                                                                                                        |     |  |  |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--|--|
|     | Model No. 18AZR14                                                                                                                                                                                                                                                                            | <ol> <li>Number of compartment online for norm<br/>operation: 1</li> </ol>                                                                                                                                                | nal |  |  |
| 4.  | Provide diagram(s) of unit describing capture syste<br>capacity, horsepower of movers. If applicable, state                                                                                                                                                                                  | m with duct arrangement and size of duct, air volun<br>hood face velocity and hood collection efficiency.                                                                                                                 | ne, |  |  |
| 5.  | Baghouse Configuration:    Image: Open Pressure      (check one)    Image: Electrostatically Enhance      Image: Other, Specify    Image: Other, Specify                                                                                                                                     | Closed Pressure Closed Suction                                                                                                                                                                                            |     |  |  |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Cotton         Cotton       Weight       16         Teflon       Thickness       in         Others, specify       Others, specify | <ul> <li>7. Bag Dimension:<br/>Diameter 5.75 in.<br/>Length 8 ft.</li> <li>8. Total cloth area: 265 ft<sup>2</sup></li> <li>9. Number of bags: 25 reg.</li> <li>10. Operating air to cloth ratio: 3.4:1 ft/min</li> </ul> |     |  |  |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                             | Automatic Intermittent                                                                                                                                                                                                    | _   |  |  |
|     | Method used to clean bags:<br>Mechanical Shaker Sonic Cleaning<br>Pneumatic Shaker Reverse Air Flow<br>Bag Collapse Pulse Jet<br>Manual Cleaning Reverse Jet<br>Cleaning initiated by:<br>Timer                                                                                              | Reverse Air Jet     Other:     Frequency if timer actuated                                                                                                                                                                |     |  |  |
|     | Expected pressure drop range in. of water                                                                                                                                                                                                                                                    | Other                                                                                                                                                                                                                     |     |  |  |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                        | 15. Collection efficiency:Rating:99.99%Guaranteed minimum:1 μm99.99%                                                                                                                                                      |     |  |  |
|     | Gas Stream C                                                                                                                                                                                                                                                                                 | naracteristics                                                                                                                                                                                                            |     |  |  |
| 16. | Gas flow rate into the collector:900ACFMACFM:Design:PSIAMaximum:                                                                                                                                                                                                                             | at 70 °F and 14.7 PSIA<br>PSIA Average Expected: PSIA                                                                                                                                                                     |     |  |  |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                                                                                                                                                      | lb. Water/lb. Dry Air                                                                                                                                                                                                     |     |  |  |
| 18. | Gas Stream Temperature: Ambient °F                                                                                                                                                                                                                                                           | 19. Fan Requirements: 10 hp<br>OR ft <sup>3</sup> /mir                                                                                                                                                                    | n   |  |  |
| 20. | Stabilized static pressure loss across baghouse. Pres                                                                                                                                                                                                                                        | ssure Drop: High 4 in. H <sub>2</sub> (<br>Low <1 in. H <sub>2</sub> (                                                                                                                                                    |     |  |  |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                  | grain/scf Outlet: grain/scf                                                                                                                                                                                               |     |  |  |

| 22. Type of Pollutant(s) to be collected (if particulate give specific type):<br>Bentone <sup>™</sup> product |               |                                   |              |         |                 |                |
|---------------------------------------------------------------------------------------------------------------|---------------|-----------------------------------|--------------|---------|-----------------|----------------|
| 22 to those any SQ is the emissive                                                                            |               |                                   |              |         |                 |                |
| 23. Is there any $SO_3$ in the emission 24. Emission rate of pollutant (specify                               |               | $\overline{\times}$ No $\Box$ Y   |              | )₃ cont |                 | ppmv           |
| 24. Emission rate of polititant (specing                                                                      | /) into and o | 1                                 | maximum<br>N | desigi  |                 | UT             |
| Pollutant                                                                                                     |               | lb/hr                             | grains/      | acf     | lb/hr           | grains/acf     |
| PM/PM10/PM2.5                                                                                                 |               | 6.92                              | NA           |         | 0.0069          | NA             |
|                                                                                                               |               |                                   |              |         |                 |                |
| 25. Complete the table:                                                                                       | Particle S    | bize Distributior<br>to Collector | n at Inlet   | Fra     | ction Efficienc | y of Collector |
| Particulate Size Range (microns)                                                                              | Weigl         | ht % for Size Ra                  | inge         |         | Weight % for S  | ize Range      |
| 0 – 2                                                                                                         |               | 5.0                               |              |         | 99.9%           | ,<br>D         |
| 2 – 4                                                                                                         |               | 8.8                               |              |         |                 |                |
| 4 - 6                                                                                                         | 13.9          |                                   |              |         |                 |                |
| 6 – 8                                                                                                         | 17.5          |                                   |              |         |                 |                |
| 8 – 10                                                                                                        |               | 20.7                              |              |         |                 |                |
| 10 – 12                                                                                                       |               | 22.7                              |              |         |                 |                |
| 12 – 16                                                                                                       |               | 11.4                              |              |         |                 |                |
| 16 – 20                                                                                                       |               |                                   |              |         |                 |                |
| 20 – 30                                                                                                       |               |                                   |              |         | 100%            |                |
| 30 – 40                                                                                                       |               |                                   |              |         | 10076           |                |
| 40 – 50                                                                                                       |               |                                   |              |         |                 |                |
| 50 – 60                                                                                                       |               | 0.0                               |              |         |                 |                |
| 60 – 70<br>70 – 80                                                                                            |               | 0.0                               |              |         |                 |                |
|                                                                                                               |               |                                   |              |         |                 |                |
| 80 – 90                                                                                                       |               |                                   |              |         |                 |                |
| 90 - 100                                                                                                      |               |                                   |              |         |                 |                |
| >100                                                                                                          |               |                                   |              |         |                 |                |

| 26  | . How is filter monitored for indications of deterioration (e.g., broken bags)?                                                                       |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Continuous Opacity Pressure Drop                                                                                                                      |
|     | Alarms-Audible to Process Operator                                                                                                                    |
|     | ☐ Visual opacity readings, Frequency: ☑ Other, specify: Visually inspect bags once per year                                                           |
| 27  | . Describe any recording device and frequency of log entries:                                                                                         |
|     | None                                                                                                                                                  |
|     |                                                                                                                                                       |
| ļ   |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 28  | Describe any filter seeding being performed:<br>None                                                                                                  |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 29. | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):<br>None |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 30  | Describe the collection material disposal system:                                                                                                     |
|     | Recycled back into the process.                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 31. | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes                                                      |

| Please propose r                                                                                        | ig parameters. Please propose                                                                        | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING:<br>None |  |  |  |
|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
|                                                                                                         |                                                                                                      |                                                                                                                                                      |  |  |  |
| REPORTING:<br>None                                                                                      |                                                                                                      | TESTING:<br>None                                                                                                                                     |  |  |  |
| MONITORING:                                                                                             | Please list and describe the pro<br>monitored in order to demons<br>equipment or air control device. | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process                                           |  |  |  |
| RECORDKEEPING:<br>REPORTING:                                                                            | Please describe the proposed real                                                                    | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air                                               |  |  |  |
| TESTING:                                                                                                | Please describe any proposed pollution control device.                                               | emissions testing for this process equipment on air                                                                                                  |  |  |  |
| 33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.<br>None                        |                                                                                                      |                                                                                                                                                      |  |  |  |
| 34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.<br>99.99 % less than 1 micron. |                                                                                                      |                                                                                                                                                      |  |  |  |
|                                                                                                         |                                                                                                      |                                                                                                                                                      |  |  |  |
| 35. Describe all operati<br>NA                                                                          | ng ranges and maintenance proce                                                                      | dures required by Manufacturer to maintain warranty.                                                                                                 |  |  |  |

| Equipment | Information | and Filt | ter Charac | teristics |
|-----------|-------------|----------|------------|-----------|
|           |             |          |            |           |

| 1.  | Manufacturer: Micropul                                                                                                                                                                                                                                                                       | 2. Total number of compartments: 1                                                                                                                                                                                     |  |  |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|     | Model No. 81S-8-20                                                                                                                                                                                                                                                                           | 3. Number of compartment online for normal operation: 1                                                                                                                                                                |  |  |
| 4.  | Provide diagram(s) of unit describing capture syste<br>capacity, horsepower of movers. If applicable, state                                                                                                                                                                                  | m with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                               |  |  |
| 5.  | Baghouse Configuration:    Image: Open Pressure      (check one)    Image: Electrostatically Enhance      Image: Other, Specify    Image: Other, Specify                                                                                                                                     | Closed Pressure Closed Suction anced Fabric                                                                                                                                                                            |  |  |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Cotton         Cotton       Weight       16         Teflon       Thickness       in         Others, specify       Others, specify | <ul> <li>7. Bag Dimension:<br/>Diameter 4.625 in.<br/>Length 8 ft.</li> <li>8. Total cloth area: 784 ft<sup>2</sup></li> <li>9. Number of bags: 81</li> <li>10. Operating air to cloth ratio: 5.10:1 ft/min</li> </ul> |  |  |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                             | Automatic Intermittent                                                                                                                                                                                                 |  |  |
| 12. | Method used to clean bags:<br>Mechanical Shaker Sonic Cleaning<br>Pneumatic Shaker Reverse Air Flow<br>Bag Collapse Pulse Jet<br>Manual Cleaning Reverse Jet                                                                                                                                 | ⊠ Reverse Air Jet<br>☐ Other:                                                                                                                                                                                          |  |  |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                                                 | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                                                                                                                                         |  |  |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                        | 15. Collection efficiency:Rating:99.99%Guaranteed minimum:1 μm99.99%                                                                                                                                                   |  |  |
| _   | Gas Stream C                                                                                                                                                                                                                                                                                 | haracteristics                                                                                                                                                                                                         |  |  |
| 16. | Gas flow rate into the collector:4,000ACFMACFM:Design:PSIAMaximum:                                                                                                                                                                                                                           | at 70 °F and 14.7 PSIA<br>PSIA Average Expected: PSIA                                                                                                                                                                  |  |  |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                                                                                                                                                      | lb. Water/lb. Dry Air                                                                                                                                                                                                  |  |  |
| 18. | Gas Stream Temperature: Ambient °F                                                                                                                                                                                                                                                           | 19. Fan Requirements: 75 hp<br>OR ft <sup>3</sup> /min                                                                                                                                                                 |  |  |
| 20. | Stabilized static pressure loss across baghouse. Pres                                                                                                                                                                                                                                        | ssure Drop: High 4 in. $H_2O$<br>Low <1 in. $H_2O$                                                                                                                                                                     |  |  |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                  | grain/scf Outlet: grain/scf                                                                                                                                                                                            |  |  |

| 22. Type of Pollutant(s) to be collected (if particulate give specific type):<br>Bentone <sup>™</sup> product |               |                                  |               |         |                |                  |
|---------------------------------------------------------------------------------------------------------------|---------------|----------------------------------|---------------|---------|----------------|------------------|
| 23. Is there any $SO_3$ in the emission s                                                                     | stream?       |                                  | ′es SO        | 3 conte | ent:           | ppmv             |
| 24. Emission rate of pollutant (specify                                                                       | /) into and o | 1                                |               | design  |                | ditions:         |
| Pollutant                                                                                                     |               | lb/hr                            | N<br>grains/a | acf     | O<br>lb/hr     | UT<br>grains/acf |
| PM/PM10/PM2.5                                                                                                 | - <u></u>     | 5.77                             | NA            |         | 0.0058         | NA               |
|                                                                                                               |               |                                  |               |         |                |                  |
| 25. Complete the table:                                                                                       | Particle S    | ize Distribution<br>to Collector |               | Frac    | tion Efficienc | y of Collector   |
| Particulate Size Range (microns)                                                                              | Weigl         | nt % for Size Ra                 | ange          | V       | Veight % for S | ize Range        |
| 0 – 2                                                                                                         |               | 5.0                              |               |         | 99.9%          | )                |
| 2 – 4                                                                                                         |               | 8.8                              |               |         |                |                  |
| 4 - 6                                                                                                         |               | 13.9<br>17.5<br>20.7<br>22.7     |               |         |                |                  |
| 6 – 8                                                                                                         |               |                                  |               |         |                |                  |
| 8 – 10                                                                                                        |               |                                  |               |         |                |                  |
| 10 – 12                                                                                                       |               |                                  |               |         |                |                  |
| 12 – 16                                                                                                       |               | 11,4                             |               |         |                |                  |
| 16 – 20                                                                                                       |               |                                  |               |         |                |                  |
| 20 – 30                                                                                                       |               |                                  |               |         | 1000/          |                  |
| 30 – 40                                                                                                       |               |                                  |               |         | 100%           |                  |
| 40 – 50                                                                                                       |               |                                  |               |         |                |                  |
| 50 – 60                                                                                                       |               | 0                                |               |         |                |                  |
| 60 – 70                                                                                                       |               | 0                                |               |         |                |                  |
| 70 – 80                                                                                                       |               |                                  |               |         |                |                  |
| 80 – 90                                                                                                       |               |                                  |               |         |                |                  |
| 90 – 100                                                                                                      |               |                                  |               |         |                |                  |
| >100                                                                                                          |               |                                  |               |         |                |                  |

| 26  | How is filter monitored for indications of deterioration (e.g., broken bags)? Continuous Opacity                                                      |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Pressure Drop                                                                                                                                         |
|     | Alarms-Audible to Process Operator Visual opacity readings, Frequency:                                                                                |
|     | Other, specify: Visually inspect bags once per year                                                                                                   |
| 27  | . Describe any recording device and frequency of log entries:                                                                                         |
|     | None                                                                                                                                                  |
|     |                                                                                                                                                       |
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|     |                                                                                                                                                       |
| 28  | . Describe any filter seeding being performed:                                                                                                        |
| [   | None                                                                                                                                                  |
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|     |                                                                                                                                                       |
| 29. | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):<br>None |
|     | none                                                                                                                                                  |
|     |                                                                                                                                                       |
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|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 30. | Describe the collection material disposal system:                                                                                                     |
|     | Recycled back into the process.                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
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|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 31. | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes                                                      |

| Please propose r                                                                                        | ng parameters. Please propose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING:<br>None |  |  |  |  |
|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| REPORTING:<br>None                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TESTING:<br>None                                                                                                                                     |  |  |  |  |
| MONITORING:                                                                                             | Please list and describe the pro                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ocess parameters and ranges that are proposed to be                                                                                                  |  |  |  |  |
| RECORDKEEPING:<br>REPORTING:                                                                            | monitored in order to demonstrate compliance with the operation of this proc<br>equipment or air control device.<br>RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                      |  |  |  |  |
| TESTING:                                                                                                | pollution control device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | emissions testing for this process equipment on air                                                                                                  |  |  |  |  |
| 33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.<br>None                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                      |  |  |  |  |
| 34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.<br>99.99 % less than 1 micron. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                      |  |  |  |  |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                      |  |  |  |  |
| Daily - Check unit differe<br>Weekly – Check timer a<br>between blasts.<br>Monthly – lube fan, rotary   | <ul> <li>B5. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.</li> <li>Daily - Check unit differential pressure</li> <li>Weekly - Check timer and solenoid valves for function. This usually is only listening to check uniform time interval between blasts.</li> <li>Monthly - lube fan, rotary valve and screw conveyor. Check seals on latter two for dust loss.</li> <li>Quarterly - inspect bags for "soft to hand" condition and uniform tightness of clamps.</li> </ul> |                                                                                                                                                      |  |  |  |  |
|                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                      |  |  |  |  |

| Equipment | Information | and Filter | Characteristics |
|-----------|-------------|------------|-----------------|
| Equipment | mornation   | and ritter | Unaracienstics  |

| 1.                         | Manufacturer: Rage Engineering                                                                                                                                                                               | 2. Total number of compartments: 1                                                                                                                                  |  |  |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|                            | Model No. NA                                                                                                                                                                                                 | 3. Number of compartment online for normal operation: 1                                                                                                             |  |  |
| 4.                         | Provide diagram(s) of unit describing capture syste<br>capacity, horsepower of movers. If applicable, state                                                                                                  | m with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                            |  |  |
| 5.                         | Baghouse Configuration:    Open Pressure      (check one)    Electrostatically Enha      Other, Specify                                                                                                      | Closed Pressure Closed Suction                                                                                                                                      |  |  |
| 6.                         | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Oz./sq.yd         Teflon       Thickness       in | <ul> <li>7. Bag Dimension:<br/>Diameter 5 in.<br/>Length 2.04 (24.5) ft.</li> <li>8. Total cloth area: 673 ft<sup>2</sup></li> <li>9. Number of bags: 21</li> </ul> |  |  |
|                            | ☐ Others, specify                                                                                                                                                                                            | 10. Operating air to cloth ratio: 6.8:1 ft/min                                                                                                                      |  |  |
| 11.                        | Baghouse Operation: 🛛 Continuous                                                                                                                                                                             | Automatic Intermittent                                                                                                                                              |  |  |
| 12.                        | Method used to clean bags:<br>Mechanical Shaker Sonic Cleaning<br>Pneumatic Shaker Reverse Air Flow<br>Bag Collapse Pulse Jet<br>Manual Cleaning Reverse Jet                                                 | ⊠ Reverse Air Jet<br>☐ Other:                                                                                                                                       |  |  |
| 13.                        | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                 | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                                                                                      |  |  |
| 14.                        | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                        | 15. Collection efficiency:Rating:99.99%Guaranteed minimum:1 μm99.99%                                                                                                |  |  |
| Gas Stream Characteristics |                                                                                                                                                                                                              |                                                                                                                                                                     |  |  |
| 16.                        | Gas flow rate into the collector: 1,081 ACFM                                                                                                                                                                 |                                                                                                                                                                     |  |  |
|                            | ACFM: Design: PSIA Maximum:                                                                                                                                                                                  | PSIA Average Expected: PSIA                                                                                                                                         |  |  |
|                            | Water Vapor Content of Effluent Stream:                                                                                                                                                                      | lb. Water/lb. Dry Air                                                                                                                                               |  |  |
| 18.                        | Gas Stream Temperature: Ambient °F                                                                                                                                                                           | 19. Fan Requirements:   5   hp     OR   ft <sup>3</sup> /min                                                                                                        |  |  |
| 20.                        | Stabilized static pressure loss across baghouse. Pres                                                                                                                                                        | ssure Drop: High 8 in. H <sub>2</sub> O<br>Low <1 in. H <sub>2</sub> O                                                                                              |  |  |
| 21.                        | Particulate Loading: Inlet:                                                                                                                                                                                  | grain/scf Outlet: grain/scf                                                                                                                                         |  |  |

| 22. Type of Pollutant(s) to be collected (if particulate give specific type): |               |                                            |                       |                 |                |                       |
|-------------------------------------------------------------------------------|---------------|--------------------------------------------|-----------------------|-----------------|----------------|-----------------------|
| Bentone <sup>™</sup> product                                                  |               |                                            |                       |                 |                |                       |
|                                                                               |               |                                            |                       |                 |                |                       |
| 23. Is there any $SO_3$ in the emission s                                     |               |                                            |                       | 3 conte         |                | ppmv                  |
| 24. Emission rate of pollutant (specify                                       | /) into and o |                                            | maximum -<br><b>N</b> | design<br>      |                | litions:<br><b>UT</b> |
| Pollutant                                                                     | Ĩ             | lb/hr                                      |                       |                 | lb/hr          | grains/acf            |
| PM/PM10/PM2.5                                                                 |               | 6.28                                       | NA                    |                 | 0.0063         | NA                    |
|                                                                               | 1             |                                            |                       |                 |                |                       |
| 25. Complete the table:                                                       | Particle S    | Size Distribution at Inlet<br>to Collector |                       | tion Efficiency | y of Collector |                       |
| Particulate Size Range (microns)                                              | Weig          | ht % for Size Ra                           | ange                  | \               | Veight % for S | ize Range             |
| 0 – 2                                                                         |               | 5.0                                        |                       |                 | 99.9           |                       |
| 2 – 4                                                                         |               | 8.8                                        |                       |                 |                |                       |
| 4 – 6                                                                         |               | 13.9                                       |                       |                 |                |                       |
| 6 – 8                                                                         |               | 17.5                                       |                       |                 |                |                       |
| 8 – 10                                                                        |               | 20.7                                       |                       |                 |                |                       |
| 10 – 12                                                                       |               | 22.7                                       |                       |                 |                |                       |
| 12 – 16                                                                       |               | 11.4                                       |                       |                 |                |                       |
| 16 – 20                                                                       |               |                                            |                       |                 |                |                       |
| 20 – 30                                                                       |               |                                            |                       | 100             |                |                       |
| 30 - 40                                                                       |               |                                            |                       |                 |                |                       |
| 40 – 50                                                                       |               |                                            |                       |                 |                |                       |
| 50 – 60                                                                       | 0.01          |                                            |                       |                 |                |                       |
| 60 - 70                                                                       |               |                                            |                       |                 |                |                       |
| 70 – 80                                                                       |               |                                            |                       |                 |                |                       |
| 80 - 90                                                                       |               |                                            |                       |                 |                |                       |
| 90 - 100                                                                      |               |                                            |                       |                 |                |                       |
| >100                                                                          |               |                                            |                       |                 |                |                       |
|                                                                               |               |                                            |                       |                 |                |                       |

| 2  | <ul> <li>6. How is filter monitored for indications of deterioration (e.g., broken bags)?</li> <li>Continuous Opacity</li> <li>Pressure Drop</li> <li>Alarms-Audible to Process Operator</li> </ul> |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <ul> <li>☐ Visual opacity readings, Frequency:</li> <li>☑ Other, specify: Visually inspect bags once per year</li> </ul>                                                                            |
| 2  | 7. Describe any recording device and frequency of log entries:<br>None                                                                                                                              |
|    |                                                                                                                                                                                                     |
|    |                                                                                                                                                                                                     |
|    |                                                                                                                                                                                                     |
| 28 | 3. Describe any filter seeding being performed:<br>None                                                                                                                                             |
|    |                                                                                                                                                                                                     |
|    |                                                                                                                                                                                                     |
|    |                                                                                                                                                                                                     |
| 29 | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):<br>None                                               |
|    |                                                                                                                                                                                                     |
|    |                                                                                                                                                                                                     |
|    |                                                                                                                                                                                                     |
| 30 | Describe the collection material disposal system:<br>Recycled back into the process.                                                                                                                |
|    |                                                                                                                                                                                                     |
|    |                                                                                                                                                                                                     |
|    |                                                                                                                                                                                                     |
| 31 | . Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes                                                                                                  |

| Please propose r<br>proposed operatir<br>proposed emission | ng parameters. Please propose                                                                                                                                                                       | eporting in order to demonstrate compliance with the testing in order to demonstrate compliance with the |  |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--|
| MONITORING:<br>None                                        |                                                                                                                                                                                                     | RECORDKEEPING:<br>None                                                                                   |  |
| REPORTING:<br>None                                         |                                                                                                                                                                                                     | TESTING:<br>None                                                                                         |  |
| MONITORING:                                                | Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device. |                                                                                                          |  |
| RECORDKEEPING:<br>REPORTING:                               | Please describe the proposed recordkeeping that will accompany the monitoring.<br>Please describe any proposed emissions testing for this process equipment on air pollution control device.        |                                                                                                          |  |
| TESTING                                                    | Please describe any proposed emissions testing for this process equipment on air pollution control device.                                                                                          |                                                                                                          |  |
| None                                                       | aranteed Capture Efficiency for eac                                                                                                                                                                 |                                                                                                          |  |
| 99.99%                                                     | aranteed Control Efficiency for eac                                                                                                                                                                 |                                                                                                          |  |
| 35. Describe all operati<br>NA                             | ng ranges and maintenance proce                                                                                                                                                                     | dures required by Manufacturer to maintain warranty.                                                     |  |

Source: Haver C Packing Hopper (Bin Vent) Emission Point I.D.: 47

# Attachment M Air Pollution Control Device Sheet (BAGHOUSE)

| Equipment Information and | Filter Characteristics |
|---------------------------|------------------------|
|---------------------------|------------------------|

| -                          |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                    |  |  |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| 1.                         | Manufacturer: Smoot                                                                                                                                                                                                                                                                                   | 2. Total number of compartments: 1                                                                                                                                                                                                 |  |  |
|                            | Model No. 18AVRC14                                                                                                                                                                                                                                                                                    | 3. Number of compartment online for normal operation: 1                                                                                                                                                                            |  |  |
| 4.                         | Provide diagram(s) of unit describing capture syste<br>capacity, horsepower of movers. If applicable, state                                                                                                                                                                                           | m with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                                           |  |  |
| 5.                         | Baghouse Configuration:Image: Open Pressure(check one)Image: Electrostatically EnhageImage: Other, Specify                                                                                                                                                                                            | Closed Pressure Closed Suction                                                                                                                                                                                                     |  |  |
| 6.                         | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Cotton         Cotton       Weight       8 oz./sq.yd         Teflon       Thickness       in         Others, specify       Others, specify | <ul> <li>7. Bag Dimension:<br/>Diameter 5.63 in.<br/>Length 3.78 (45.38 in.) ft.</li> <li>8. Total cloth area: 221 ft<sup>2</sup></li> <li>9. Number of bags: 9</li> <li>10. Operating air to cloth ratio: 1.4:1 ft/min</li> </ul> |  |  |
| 11.                        | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                                      | Automatic Intermittent                                                                                                                                                                                                             |  |  |
|                            | Method used to clean bags:          Mechanical Shaker       Sonic Cleaning         Pneumatic Shaker       Reverse Air Flow         Bag Collapse       Pulse Jet         Manual Cleaning       Reverse Jet                                                                                             | ⊠ Reverse Air Jet<br>□ Other:                                                                                                                                                                                                      |  |  |
| 13.                        | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                                                          | Frequency if timer actuated Other                                                                                                                                                                                                  |  |  |
| 14.                        | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                                 | 15. Collection efficiency:Rating:99.99%Guaranteed minimum:1 μm99.99%                                                                                                                                                               |  |  |
| Gas Stream Characteristics |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                    |  |  |
| 16.                        | Gas flow rate into the collector:300ACFMACFM:Design:PSIAMaximum:                                                                                                                                                                                                                                      | at 70 °F and 14.7 PSIA<br>PSIA Average Expected: PSIA                                                                                                                                                                              |  |  |
| 17.                        | Water Vapor Content of Effluent Stream:                                                                                                                                                                                                                                                               | lb. Water/lb. Dry Air                                                                                                                                                                                                              |  |  |
| 18.                        | Gas Stream Temperature: Ambient °F                                                                                                                                                                                                                                                                    | 19. Fan Requirements: 3 hp<br>OR ft <sup>3</sup> /min                                                                                                                                                                              |  |  |
| 20.                        | Stabilized static pressure loss across baghouse. Pres                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                    |  |  |
| 21.                        | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                           | grain/scf Outlet: grain/scf                                                                                                                                                                                                        |  |  |

| 22. Type of Pollutant(s) to be collected (if particulate give specific type): |               |                     |          |                         |                |            |
|-------------------------------------------------------------------------------|---------------|---------------------|----------|-------------------------|----------------|------------|
| Bentone <sup>™</sup> product                                                  |               |                     |          |                         |                |            |
|                                                                               |               |                     |          |                         |                |            |
| ·                                                                             |               |                     |          |                         |                |            |
| 23. Is there any $SO_3$ in the emission                                       |               | 🛛 No 🗌 Y            |          | 3 conte                 |                | ppmv       |
| 24. Emission rate of pollutant (specify                                       | y) into and o | 1                   |          | design                  |                |            |
| Pollutant                                                                     |               | IN<br>Ib/hr grains/ |          | OUT<br>acf lb/hr grains |                | grains/acf |
| PM/PM10/PM2.5                                                                 |               | 6.92                | NA       |                         | 0.0069         | NA         |
|                                                                               |               |                     |          |                         |                |            |
| 25. Complete the table:                                                       | Particle S    | Size Distributior   | at Inlet |                         |                |            |
| -                                                                             | ŀ             | to Collector        |          |                         | tion Efficienc |            |
| Particulate Size Range (microns)                                              | Weigl         | ht % for Size Ra    | inge     | 1                       | Veight % for S | ize Range  |
| 0-2                                                                           |               | 5.0                 |          |                         | 99.9           |            |
| 2-4                                                                           |               | 8.8                 |          |                         |                |            |
| 4 - 6                                                                         |               | 13.9                |          |                         |                |            |
| 6 – 8                                                                         |               | 17.5                |          |                         |                |            |
| 8 – 10                                                                        | 8 – 10        |                     | 20.7     |                         |                |            |
| 10 – 12                                                                       |               | 22.7                |          |                         |                |            |
| 12 – 16                                                                       |               | 11.4                |          |                         |                |            |
| 16 – 20                                                                       | _             |                     |          |                         |                |            |
| 20 – 30                                                                       |               |                     |          |                         | 100            |            |
| 30 – 40                                                                       |               |                     |          |                         |                |            |
| 40 – 50                                                                       |               |                     |          |                         |                |            |
| 50 – 60                                                                       | 0             |                     |          |                         |                |            |
| 60 – 70                                                                       |               |                     |          |                         |                |            |
| 70 – 80                                                                       |               |                     |          |                         |                |            |
| 80 – 90                                                                       |               |                     |          |                         |                |            |
| 90 – 100                                                                      |               |                     |          |                         |                |            |
| >100                                                                          |               |                     |          |                         |                |            |

| 26. | How is filter monitored for indications of deterioration (e.g., broken bags)?                                 |
|-----|---------------------------------------------------------------------------------------------------------------|
|     | Continuous Opacity                                                                                            |
| 1   | <ul> <li>Pressure Drop</li> <li>Alarms-Audible to Process Operator</li> </ul>                                 |
|     | Visual opacity readings, Frequency:                                                                           |
|     | Other, specify: Visually inspect bags once per year                                                           |
| 27. | Describe any recording device and frequency of log entries:<br>None                                           |
|     | None                                                                                                          |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
| 28. | Describe any filter seeding being performed:                                                                  |
|     | None                                                                                                          |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
| 29. | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
|     | reheating, gas humidification):                                                                               |
|     | None                                                                                                          |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
| 30. | Describe the collection material disposal system:                                                             |
|     | Recycled back into the process.                                                                               |
| 1   |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
|     |                                                                                                               |
| 24  | Have you included Berthouse Control Bartics in the Exclusion Data to Data One of Martin                       |
| 31. | Have you included Baghouse Control Device in the Emissions Points Data Summary Sheet? Yes                     |

| Please propose n                                                                                                                                                                        | g parameters. Please propose                                                                                                                                                                              | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--|--|
| MONITORING:                                                                                                                                                                             |                                                                                                                                                                                                           | RECORDKEEPING:                                                                                                             |  |  |
| None                                                                                                                                                                                    |                                                                                                                                                                                                           | None                                                                                                                       |  |  |
| REPORTING:<br>None                                                                                                                                                                      |                                                                                                                                                                                                           | TESTING:                                                                                                                   |  |  |
|                                                                                                                                                                                         |                                                                                                                                                                                                           | None                                                                                                                       |  |  |
| MONITORING:                                                                                                                                                                             | Please list and describe the process parameters and ranges that are proposed to be<br>monitored in order to demonstrate compliance with the operation of this process<br>equipment or air control device. |                                                                                                                            |  |  |
| RECORDKEEPING:<br>REPORTING:                                                                                                                                                            | Please describe the proposed recordkeeping that will accompany the monitoring.<br>Please describe any proposed emissions testing for this process equipment on air pollution control device.              |                                                                                                                            |  |  |
| TESTING:                                                                                                                                                                                | •                                                                                                                                                                                                         | emissions testing for this process equipment on air                                                                        |  |  |
| 33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.<br>None                                                                                                        |                                                                                                                                                                                                           |                                                                                                                            |  |  |
| 34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.<br>99.99% less than 1 micron.                                                                                  |                                                                                                                                                                                                           |                                                                                                                            |  |  |
| 35. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.<br>Daily - Check unit differential pressure.                                |                                                                                                                                                                                                           |                                                                                                                            |  |  |
| Weekly – Check timer and solenoid valves for function. This usually is only listening to check uniform time interval between blasts.                                                    |                                                                                                                                                                                                           |                                                                                                                            |  |  |
| Monthly – lube fan, rotary valve and screw conveyor. Check seals on latter two for dust loss.<br>Quarterly – inspect bags for "soft to hand" condition and uniform tightness of clamps. |                                                                                                                                                                                                           |                                                                                                                            |  |  |
|                                                                                                                                                                                         |                                                                                                                                                                                                           |                                                                                                                            |  |  |

Control Device ID No. (must match Emission Units Table): DC 752010

| 1.  | Manufacturer: Torit Dust Collector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2. Total number of compartments: 1                                                                                                                                                                                                   |  |  |  |  |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
|     | Model No. DFT2-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3. Number of compartment online for norm operation: 1                                                                                                                                                                                |  |  |  |  |
| 4.  | Provide diagram(s) of unit describing capture syste<br>capacity, horsepower of movers. If applicable, state                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | em with duct arrangement and size of duct, air volume<br>hood face velocity and hood collection efficiency.                                                                                                                          |  |  |  |  |
| 5.  | Baghouse Configuration:    Open Pressure      (check one)    Electrostatically Enha      Other, Specify                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Closed Pressure Closed Suction                                                                                                                                                                                                       |  |  |  |  |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       Cotton         Cotton       Weight       16         Teflon       Thickness       in         Others, specify Ultra-Web (cellulose)       Image: Content of the second seco | <ul> <li>7. Bag Dimension:<br/>Diameter 13.875 in.<br/>Length 2.17 (26 in.) ft.</li> <li>8. Total cloth area: 1,016 ft<sup>2</sup></li> <li>9. Number of bags: 4</li> <li>10. Operating air to cloth ratio: 2.26:1 ft/min</li> </ul> |  |  |  |  |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Automatic Intermittent                                                                                                                                                                                                               |  |  |  |  |
| 12. | Method used to clean bags:<br>Mechanical Shaker Sonic Cleaning<br>Pneumatic Shaker Reverse Air Flow<br>Bag Collapse Pulse Jet<br>Manual Cleaning Reverse Jet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ⊠ Reverse Air Jet<br>☐ Other:                                                                                                                                                                                                        |  |  |  |  |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                                                                                                                                                       |  |  |  |  |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 15. Collection efficiency:<br>Guaranteed minimum:Rating:<br>99.9999.99%%                                                                                                                                                             |  |  |  |  |
|     | Gas Stream C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | haracteristics                                                                                                                                                                                                                       |  |  |  |  |
| 16. | Gas flow rate into the collector: 2,300ACFMACFM: Design:PSIAMaximum:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | at 70 °F and 14.7 PSIA<br>PSIA Average Expected: PSIA                                                                                                                                                                                |  |  |  |  |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | lb. Water/lb. Dry Air                                                                                                                                                                                                                |  |  |  |  |
| 18. | Gas Stream Temperature: 100 °F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 19. Fan Requirements:3hpORft³/min                                                                                                                                                                                                    |  |  |  |  |
| 20. | Stabilized static pressure loss across baghouse. Pres                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$                                                                                                                                                                                 |  |  |  |  |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | grain/scf Outlet: grain/scf                                                                                                                                                                                                          |  |  |  |  |

| 22. | Type of Pollutant(s) to be collected (if particulate give specific type): |  |
|-----|---------------------------------------------------------------------------|--|
|     | Bentone <sup>™</sup> product                                              |  |

| 23. Is there any SO <sub>3</sub> in the emission stream? $\square$ No $\square$ Yes SO <sub>3</sub> content: ppmv |                                                                                                            |                                  |            |                        |                  |                  |  |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------|------------|------------------------|------------------|------------------|--|
| 24. Emission rate of pollutant (specify                                                                           | 24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions: |                                  |            |                        |                  |                  |  |
| Pollutant                                                                                                         |                                                                                                            | IN IN                            |            | OUT<br>acf Ib/hr grain |                  | JT<br>grains/acf |  |
|                                                                                                                   |                                                                                                            | lb/hr                            | grains/    |                        |                  |                  |  |
| PM/PM10/PM2.5                                                                                                     |                                                                                                            | 5.77                             | NA         |                        | 0.0058           | NA               |  |
|                                                                                                                   |                                                                                                            |                                  |            |                        |                  |                  |  |
| 25. Complete the table:                                                                                           | Particle S                                                                                                 | ize Distributior<br>to Collector | n at Inlet | Fra                    | ction Efficiency | of Collector     |  |
| Particulate Size Range (microns)                                                                                  | Weigl                                                                                                      | ht % for Size Ra                 | inge       |                        | Weight % for Si  | ze Range         |  |
| 0 – 2                                                                                                             |                                                                                                            | 5.0                              |            |                        | 99.9             |                  |  |
| 2 – 4                                                                                                             |                                                                                                            | 8.8                              |            |                        |                  |                  |  |
| 4 – 6                                                                                                             |                                                                                                            | 13.9                             |            |                        |                  |                  |  |
| 6 – 8                                                                                                             | 17.5       20.7       22.7                                                                                 |                                  |            |                        |                  |                  |  |
| 8 – 10                                                                                                            |                                                                                                            |                                  |            |                        |                  |                  |  |
| 10 – 12                                                                                                           |                                                                                                            |                                  |            |                        |                  |                  |  |
| 12 – 16                                                                                                           |                                                                                                            | 11.4                             |            |                        |                  |                  |  |
| 16 – 20                                                                                                           |                                                                                                            |                                  |            |                        |                  |                  |  |
| 20 – 30                                                                                                           |                                                                                                            |                                  |            |                        | 100              |                  |  |
| 30 – 40                                                                                                           |                                                                                                            |                                  |            |                        |                  |                  |  |
| 40 – 50                                                                                                           |                                                                                                            | 0                                |            |                        |                  |                  |  |
| 50 – 60                                                                                                           |                                                                                                            |                                  |            |                        |                  |                  |  |
| 60 – 70                                                                                                           |                                                                                                            |                                  |            |                        |                  |                  |  |
| 70 – 80                                                                                                           |                                                                                                            |                                  |            |                        |                  |                  |  |
| 80 – 90                                                                                                           |                                                                                                            |                                  |            |                        |                  |                  |  |
| 90 - 100                                                                                                          |                                                                                                            |                                  |            |                        |                  |                  |  |
| >100                                                                                                              | >100                                                                                                       |                                  |            |                        |                  |                  |  |

| 26. | <ul> <li>How is filter monitored for indications of deterioration (e.g., broken bags)?</li> <li>Continuous Opacity</li> <li>Pressure Drop</li> <li>Alarms-Audible to Process Operator</li> </ul> |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | <ul> <li>Visual opacity readings, Frequency:</li> <li>Other, specify: Visually inspect bags once per year</li> </ul>                                                                             |
| 27. | Describe any recording device and frequency of log entries:<br>None                                                                                                                              |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
| 28. | Describe any filter seeding being performed:<br>None                                                                                                                                             |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
| 29. | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):<br>None                                            |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
| 30. | Describe the collection material disposal system:                                                                                                                                                |
|     | Recycled back into the process.                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
|     |                                                                                                                                                                                                  |
| 31. | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes                                                                                                 |

| Please propose m                                                                                        | g parameters. Please propose                                                                          | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING:<br>None |  |  |  |  |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| REPORTING:<br>None                                                                                      |                                                                                                       | TESTING:<br>None                                                                                                                                     |  |  |  |  |
| MONITORING:                                                                                             |                                                                                                       | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process                                           |  |  |  |  |
| RECORDKEEPING:<br>REPORTING:                                                                            | Please describe the proposed red                                                                      | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air                                               |  |  |  |  |
| TESTING:                                                                                                |                                                                                                       | emissions testing for this process equipment on air                                                                                                  |  |  |  |  |
| 33. Manufacturer's Gua<br>None                                                                          | aranteed Capture Efficiency for eac                                                                   | ch air pollutant.                                                                                                                                    |  |  |  |  |
|                                                                                                         | 34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.<br>99.99% less than 1 micron |                                                                                                                                                      |  |  |  |  |
|                                                                                                         |                                                                                                       |                                                                                                                                                      |  |  |  |  |
| Daily - Check unit different<br>Weekly – Check timer a<br>between blasts.<br>Monthly – lube fan, rotary | ntial pressure.                                                                                       |                                                                                                                                                      |  |  |  |  |
|                                                                                                         |                                                                                                       | G                                                                                                                                                    |  |  |  |  |

Control Device ID No. (must match Emission Units Table): DC-770021

Equipment Information and Filter Characteristics

| 1.  | Manufacturer: Smoot (Tech Air)                                                                                                                                                                                                                  | 2. Total number of compartments: 1                                                 |        |  |  |  |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------|--|--|--|
|     | Model No. SBV-9-1-1/2r1S                                                                                                                                                                                                                        | <ol> <li>Number of compartment online for nor<br/>operation: 1</li> </ol>          | rmal   |  |  |  |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state                                                                                                                                        |                                                                                    | ıme,   |  |  |  |
| 5.  | Baghouse Configuration:Image: Open Pressure(check one)Image: Electrostatically EnhanceImage: Other, SpecifyImage: Other, Specify                                                                                                                | Closed Pressure Closed Suction                                                     |        |  |  |  |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics                                                                                                                | 7. Bag Dimension:Diameter5.75Length1.5 (18 in.)ft.                                 |        |  |  |  |
|     | Fiber Glass<br>Cotton Weight 10 oz./sq.yd                                                                                                                                                                                                       | 8. Total cloth area: $135$ $ft^2$                                                  |        |  |  |  |
|     | Teflon Thickness in                                                                                                                                                                                                                             | 9. Number of bags: 12                                                              |        |  |  |  |
|     | Others, specify                                                                                                                                                                                                                                 | <b>10</b> . Operating air to cloth ratio: 2.3:1 ft/mi                              | in     |  |  |  |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                | Automatic Intermittent                                                             |        |  |  |  |
| 12. | 12. Method used to clean bags:         Mechanical Shaker       Sonic Cleaning       Reverse Air Jet         Pneumatic Shaker       Reverse Air Flow       Other:         Bag Collapse       Pulse Jet         Manual Cleaning       Reverse Jet |                                                                                    |        |  |  |  |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                    | Frequency if timer actuated Other                                                  |        |  |  |  |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                           | , 0                                                                                | %<br>% |  |  |  |
|     | Gas Stream C                                                                                                                                                                                                                                    | haracteristics                                                                     |        |  |  |  |
| 16. | Gas flow rate into the collector: 305 ACFM                                                                                                                                                                                                      | at 70 °F and 14.7 PSIA                                                             | 4      |  |  |  |
|     | ACFM: Design: PSIA Maximum:                                                                                                                                                                                                                     | PSIA Average Expected: PSIA                                                        | 4      |  |  |  |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                                                                                                         | lb. Water/lb. Dry Air                                                              |        |  |  |  |
| 18. | Gas Stream Temperature: °F                                                                                                                                                                                                                      | 19. Fan Requirements:         2         hp           OR         ft <sup>3</sup> /m | រin    |  |  |  |
| 20. | Stabilized static pressure loss across baghouse. Pres                                                                                                                                                                                           | ssure Drop: High 7 in. H<br>Low <1 in. H                                           | _      |  |  |  |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                     | grain/scf Outlet: grain/scf                                                        |        |  |  |  |

| 22. Type of Pollutant(s) to be collected (if particulate give specific type):                                     |               |                                   |            |        |                    |              |  |  |
|-------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------------|------------|--------|--------------------|--------------|--|--|
| Bentone <sup>™</sup> product                                                                                      |               |                                   |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
| 23. Is there any SO <sub>3</sub> in the emission stream? $\square$ No $\square$ Yes SO <sub>3</sub> content: ppmv |               |                                   |            |        |                    |              |  |  |
| 24. Emission rate of pollutant (specify                                                                           | /) into and o | 1                                 |            | desigr | 1                  |              |  |  |
| <b>N</b> II <i>i i</i>                                                                                            |               |                                   | N          | OUT    |                    |              |  |  |
| Pollutant                                                                                                         |               | lb/hr                             | grains/acf |        | lb/hr              | grains/acf   |  |  |
| PM/PM10/PM2.5                                                                                                     |               | 5.77                              | NA         |        | 0.0058             | NA           |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
| 25. Complete the table:                                                                                           | Particle S    | bize Distributior<br>to Collector | at Inlet   | Fra    | ction Efficiency   | of Collector |  |  |
| Particulate Size Range (microns)                                                                                  | Weigl         | ht % for Size Ra                  | inge       |        | Weight % for Si    | ize Range    |  |  |
| 0 – 1                                                                                                             |               | 0                                 |            |        |                    |              |  |  |
| 1 – 5                                                                                                             |               | 1.708                             |            |        |                    |              |  |  |
| 5 - 10                                                                                                            |               | 11.479                            |            |        |                    |              |  |  |
| 10-20                                                                                                             |               | 33.924                            |            |        | 99.99% to 1 micron |              |  |  |
| 20 - 40                                                                                                           |               | 34.726                            |            |        |                    |              |  |  |
| 40 - 50                                                                                                           |               | 8.795                             |            |        |                    |              |  |  |
| >100                                                                                                              |               | 2.785                             |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |
|                                                                                                                   |               |                                   |            |        |                    |              |  |  |

| 26. | How is filter monitored for indications of deterioration (e.g., broken bags)?  Continuous Opacity Pressure Drop Alarms-Audible to Process Operator    |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | <ul> <li>☐ Visual opacity readings, Frequency:</li> <li>☑ Other, specify: Visually inspect bags once per year</li> </ul>                              |
| 27. | Describe any recording device and frequency of log entries:<br>None                                                                                   |
|     | None                                                                                                                                                  |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 28. | Describe any filter seeding being performed:                                                                                                          |
|     | None                                                                                                                                                  |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 29. | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):<br>None |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 20  | Describe the collection material dispaced system:                                                                                                     |
|     | Describe the collection material disposal system:<br>Recycled back into the process.                                                                  |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
|     |                                                                                                                                                       |
| 31. | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes                                                      |

| 32. Proposed Monitoring, Recordkeeping, Reporting, and Testing<br>Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the |                                                                               |                                                                                                            |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| proposed operatin                                                                                                                                                     | g parameters. Please propose                                                  | testing in order to demonstrate compliance with the                                                        |  |  |  |  |  |
| MONITORING:<br>None                                                                                                                                                   |                                                                               | RECORDKEEPING:<br>None                                                                                     |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               |                                                                                                            |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               | а<br>А                                                                                                     |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               |                                                                                                            |  |  |  |  |  |
| REPORTING:                                                                                                                                                            |                                                                               | TESTING:                                                                                                   |  |  |  |  |  |
| None                                                                                                                                                                  |                                                                               | None                                                                                                       |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               |                                                                                                            |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               |                                                                                                            |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               |                                                                                                            |  |  |  |  |  |
| MONITORING                                                                                                                                                            |                                                                               | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process |  |  |  |  |  |
| RECORDKEEPING:<br>REPORTING:                                                                                                                                          | Please describe the proposed red                                              | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air     |  |  |  |  |  |
| TESTING:                                                                                                                                                              | pollution control device.                                                     | · · · · ·                                                                                                  |  |  |  |  |  |
| TESTING.                                                                                                                                                              | pollution control device.                                                     | emissions testing for this process equipment on air                                                        |  |  |  |  |  |
| 33. Manufacturer's Gua                                                                                                                                                | aranteed Capture Efficiency for eac                                           | ch air pollutant.                                                                                          |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               |                                                                                                            |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               |                                                                                                            |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               |                                                                                                            |  |  |  |  |  |
| 34. Manufacturer's Gua<br>99.99 % less than 1 micro                                                                                                                   | aranteed Control Efficiency for eac                                           | n air pollutant.                                                                                           |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               |                                                                                                            |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               |                                                                                                            |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               |                                                                                                            |  |  |  |  |  |
| 35. Describe all operation<br>Daily - Check unit different                                                                                                            |                                                                               | dures required by Manufacturer to maintain warranty.                                                       |  |  |  |  |  |
|                                                                                                                                                                       |                                                                               | This usually is only listening to check uniform time interval                                              |  |  |  |  |  |
| Monthly – lube fan, rotary                                                                                                                                            | valve and screw conveyor. Check se<br>or "soft to hand" condition and uniform |                                                                                                            |  |  |  |  |  |

Source: Anion Addition Emission Point I.D.: 20

# Attachment M Air Pollution Control Device Sheet (BAGHOUSE)

Control Device ID No. (must match Emission Units Table): TK-750310

Equipment Information and Filter Characteristics

| _   |                                                                                                                                                                                                                                                                     |                                                                                                          |  |  |  |  |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--|--|--|--|
| 1.  | Manufacturer: Mac Process Inc.                                                                                                                                                                                                                                      | 2. Total number of compartments: 1                                                                       |  |  |  |  |
|     | Model No. 19AVRC14                                                                                                                                                                                                                                                  | 3. Number of compartment online for normal operation: 1                                                  |  |  |  |  |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state                                                                                                                                                            | m with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency. |  |  |  |  |
| 5.  | Baghouse Configuration: 🛛 Open Pressure                                                                                                                                                                                                                             | Closed Pressure Closed Suction                                                                           |  |  |  |  |
| ł   | (check one) Electrostatically Enha                                                                                                                                                                                                                                  | anced Fabric                                                                                             |  |  |  |  |
|     | Other, Specify                                                                                                                                                                                                                                                      |                                                                                                          |  |  |  |  |
| 6.  | Filter Fabric Bag Material:                                                                                                                                                                                                                                         | 7. Bag Dimension:                                                                                        |  |  |  |  |
|     | Polyester Polypropylene                                                                                                                                                                                                                                             | Diameter 5.95 in.                                                                                        |  |  |  |  |
|     | Acrylics Ceramics                                                                                                                                                                                                                                                   | Length 1.58 (19 in.) ft.                                                                                 |  |  |  |  |
|     | Cotton Weight 8 oz./sq.yd                                                                                                                                                                                                                                           | 8. Total cloth area: 239 $ft^2$                                                                          |  |  |  |  |
| 1   | Teflon Thickness in                                                                                                                                                                                                                                                 | 9. Number of bags: 14                                                                                    |  |  |  |  |
|     | Others, specify                                                                                                                                                                                                                                                     | 10. Operating air to cloth ratio:1.3:1ft/min                                                             |  |  |  |  |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                                    | Automatic Intermittent                                                                                   |  |  |  |  |
| 12. | 12. Method used to clean bags:         □ Mechanical Shaker       □ Sonic Cleaning       ☑ Reverse Air Jet         □ Pneumatic Shaker       □ Reverse Air Flow       □ Other:         □ Bag Collapse       □ Pulse Jet         □ Manual Cleaning       □ Reverse Jet |                                                                                                          |  |  |  |  |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                                                                                                                        | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                           |  |  |  |  |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                               | 15. Collection efficiency:Rating:99.99%Guaranteed minimum:1 μm99.99%                                     |  |  |  |  |
|     | Gas Stream C                                                                                                                                                                                                                                                        | haracteristics                                                                                           |  |  |  |  |
| 16. | Gas flow rate into the collector: 300 ACFM                                                                                                                                                                                                                          | at 70 °F and 14.7 PSIA                                                                                   |  |  |  |  |
|     | ACFM: Design: PSIA Maximum:                                                                                                                                                                                                                                         | PSIA Average Expected: PSIA                                                                              |  |  |  |  |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                                                                                                                             | lb. Water/lb. Dry Air                                                                                    |  |  |  |  |
| 18. | Gas Stream Temperature: °F                                                                                                                                                                                                                                          | 19. Fan Requirements: 15 hp                                                                              |  |  |  |  |
|     |                                                                                                                                                                                                                                                                     | ORft <sup>3</sup> /min                                                                                   |  |  |  |  |
| 20. | Stabilized static pressure loss across baghouse. Pres                                                                                                                                                                                                               | ssure Drop: High 8 in. H <sub>2</sub> O                                                                  |  |  |  |  |
|     |                                                                                                                                                                                                                                                                     | Low <1 in. H <sub>2</sub> O                                                                              |  |  |  |  |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                         | grain/scf Outlet: grain/scf                                                                              |  |  |  |  |

| <ol> <li>Type of Pollutant(s) to be collected (if particulate give specific type):<br/>Bentone<sup>™</sup> product</li> </ol> |               |                                  |                     |                         |                  |                |  |  |
|-------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------|---------------------|-------------------------|------------------|----------------|--|--|
|                                                                                                                               |               |                                  |                     |                         |                  |                |  |  |
| 23. Is there any $SO_3$ in the emission s                                                                                     | stream?       | 🛛 No 👘 🗌 Y                       | es SC               | )₃ conte                | ent:             | ppmv           |  |  |
| 24. Emission rate of pollutant (specify                                                                                       | /) into and o | 1                                | maximum<br><b>N</b> | design                  |                  | litions:<br>UT |  |  |
| Pollutant                                                                                                                     |               | lb/hr                            | grains/             | acf                     | lb/hr            | grains/acf     |  |  |
| PM/PM10/PM2.5                                                                                                                 |               | 6.28                             | NA                  |                         | 0.0063           | NA             |  |  |
|                                                                                                                               |               |                                  |                     |                         |                  |                |  |  |
| 25. Complete the table:                                                                                                       | Particle S    | ize Distributior<br>to Collector | n at Inlet          | Fra                     | ction Efficiency | y of Collector |  |  |
| Particulate Size Range (microns)                                                                                              | Weigl         | nt % for Size Ra                 | ange                | Weight % for Size Range |                  |                |  |  |
| 0 – 2                                                                                                                         |               |                                  |                     |                         | 99.9             |                |  |  |
| 2 – 4                                                                                                                         |               |                                  |                     |                         |                  |                |  |  |
| 4 - 6                                                                                                                         |               |                                  |                     |                         |                  |                |  |  |
| 6 – 8                                                                                                                         |               |                                  |                     |                         |                  |                |  |  |
| 8 – 10                                                                                                                        |               |                                  |                     |                         |                  |                |  |  |
| 10 – 12                                                                                                                       |               |                                  |                     |                         |                  |                |  |  |
| 12 – 16                                                                                                                       |               |                                  |                     |                         |                  |                |  |  |
| 16 – 20                                                                                                                       |               |                                  |                     |                         |                  |                |  |  |
| 20 – 30                                                                                                                       |               |                                  |                     |                         | 100              |                |  |  |
| 30 – 40                                                                                                                       |               |                                  |                     |                         |                  |                |  |  |
| 40 — 50                                                                                                                       |               |                                  |                     |                         |                  |                |  |  |
| 50 – 60                                                                                                                       |               | 0                                |                     |                         |                  |                |  |  |
| 60 – 70                                                                                                                       |               |                                  |                     |                         |                  |                |  |  |
| 70 – 80                                                                                                                       |               |                                  |                     |                         |                  |                |  |  |
| 80 – 90                                                                                                                       |               |                                  |                     |                         |                  |                |  |  |
| 90 – 100                                                                                                                      |               |                                  |                     |                         |                  |                |  |  |
| >100                                                                                                                          |               |                                  |                     |                         |                  |                |  |  |

| 26.      | How is filter monitored for indications of deterioration (e.g., broken bags)?                                 |
|----------|---------------------------------------------------------------------------------------------------------------|
|          | Continuous Opacity                                                                                            |
|          | Pressure Drop                                                                                                 |
|          | Alarms-Audible to Process Operator                                                                            |
|          | Visual opacity readings, Frequency:                                                                           |
|          | Other, specify: Visually inspect bags once per year                                                           |
| 27.      | Describe any recording device and frequency of log entries:                                                   |
|          | None                                                                                                          |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
| 28.      | Describe any filter seeding being performed:                                                                  |
| 1        | None                                                                                                          |
| 1        |                                                                                                               |
| 1        |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
| 29.      | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
|          | reheating, gas humidification):                                                                               |
|          | None                                                                                                          |
|          |                                                                                                               |
| 1        |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
| 30       | Describe the collection material disposal system:                                                             |
| 50.      | Describe the collection material disposal system:                                                             |
|          | Recycled back into the process.                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
|          |                                                                                                               |
| l        |                                                                                                               |
| I        |                                                                                                               |
| 31       | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes              |
| <b>1</b> | have you more done done done done done done in the Linesions i onto Data outfindry offect! 168                |

| Please propose m                                                                                                                                                                        | g parameters. Please propose        | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING:<br>None |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| REPORTING:<br>None                                                                                                                                                                      |                                     | TESTING:<br>None                                                                                                                                     |  |  |
| MONITORING:                                                                                                                                                                             |                                     | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process                                           |  |  |
| RECORDKEEPING:<br>REPORTING:                                                                                                                                                            | Please describe the proposed red    | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air                                               |  |  |
| TESTING:                                                                                                                                                                                | •                                   | emissions testing for this process equipment on air                                                                                                  |  |  |
| 33. Manufacturer's Gua<br>None                                                                                                                                                          | aranteed Capture Efficiency for eac | ch air pollutant.                                                                                                                                    |  |  |
| <ul> <li>34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.</li> <li>99.99% less than 1 micron.</li> </ul>                                                        |                                     |                                                                                                                                                      |  |  |
|                                                                                                                                                                                         |                                     | dures required by Manufacturer to maintain warranty.                                                                                                 |  |  |
| Daily - Check unit differential pressure.<br>Weekly – Check timer and solenoid valves for function. This usually is only listening to check uniform time interva-<br>between blasts.    |                                     |                                                                                                                                                      |  |  |
| Monthly – lube fan, rotary valve and screw conveyor. Check seals on latter two for dust loss.<br>Quarterly – inspect bags for "soft to hand" condition and uniform tightness of clamps. |                                     |                                                                                                                                                      |  |  |

Control Device ID No. (must match Emission Units Table): DC-770135

| Equipment Information and Filter Characte | ristics |
|-------------------------------------------|---------|
|-------------------------------------------|---------|

| 1. Manufacturer: Smoot                                                                                                                                                                                                                                  | 2. Total number of compartments: 1                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Model No. 72BB9                                                                                                                                                                                                                                         | 3. Number of compartment online for normal operation: 1                                                                                                                                                                             |
| <ol> <li>Provide diagram(s) of unit describing capture syste<br/>capacity, horsepower of movers. If applicable, state</li> </ol>                                                                                                                        | em with duct arrangement and size of duct, air volume, hood face velocity and hood collection efficiency.                                                                                                                           |
| <ul> <li>5. Baghouse Configuration:</li></ul>                                                                                                                                                                                                           | Closed Pressure Closed Suction                                                                                                                                                                                                      |
| <ul> <li>6. Filter Fabric Bag Material:</li> <li>Nomex nylon Wool</li> <li>Polyester Polypropylene</li> <li>Acrylics Ceramics</li> <li>Fiber Glass</li> <li>Cotton Weight 16 oz./sq.yd</li> <li>Teflon Thickness in</li> <li>Others, specify</li> </ul> | <ul> <li>7. Bag Dimension:<br/>Diameter 5.75 in.<br/>Length 6.17 (74 in.) ft.</li> <li>8. Total cloth area: 86.79 ft<sup>2</sup></li> <li>9. Number of bags: 9</li> <li>10. Operating air to cloth ratio: 24.03:1 ft/min</li> </ul> |
| 11. Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                    | Automatic Intermittent                                                                                                                                                                                                              |
| <ul> <li>12. Method used to clean bags:</li> <li>Mechanical Shaker</li> <li>Pneumatic Shaker</li> <li>Bag Collapse</li> <li>Manual Cleaning</li> </ul>                                                                                                  | ☐ Reverse Air Jet<br>☐ Other:                                                                                                                                                                                                       |
| <ul> <li>13. Cleaning initiated by:</li> <li>⊠ Timer</li> <li>□ Expected pressure drop range in. of water</li> </ul>                                                                                                                                    | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                                                                                                                                                      |
| 14. Operation Hours:Max. per day:24Max. per yr:365                                                                                                                                                                                                      | <ol> <li>Collection efficiency: Rating: 99.99%</li> <li>Guaranteed minimum: 1μm 99.99%</li> </ol>                                                                                                                                   |
| Gas Stream C                                                                                                                                                                                                                                            | haracteristics                                                                                                                                                                                                                      |
| 16. Gas flow rate into the collector: 350 SCFM       ACFN         ACFM: Design:       PSIA       Maximum:         17. Water Vapor Content of Effluent Stream:                                                                                           | I at70°F and20.2 PSIAPSIAAverage Expected:PSIAMinimal > 0.1lb. Water/lb. Dry Air                                                                                                                                                    |
| 18. Gas Stream Temperature: 70°F                                                                                                                                                                                                                        | 19. Fan Requirements:2hpOR700ft³/min                                                                                                                                                                                                |
| 20. Stabilized static pressure loss across baghouse. Pre                                                                                                                                                                                                | essure Drop: High 10 in. $H_2O$<br>Low <1 in. $H_2O$                                                                                                                                                                                |
| 21. Particulate Loading: Inlet:                                                                                                                                                                                                                         | grain/scf Outlet: grain/scf                                                                                                                                                                                                         |

| 22. Type of Pollutant(s) to be collected (if particulate give specific type):<br>Particulate Clay Based Rheological Material |               |                                   |              |                    |                |                       |
|------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------------|--------------|--------------------|----------------|-----------------------|
|                                                                                                                              |               |                                   |              |                    |                |                       |
| 23. Is there any $SO_3$ in the emission s                                                                                    | stream? [     | ⊠No □Y                            | es SO        | 3 conte            | ent:           | ppmv                  |
| 24. Emission rate of pollutant (specify                                                                                      | /) into and o | 1                                 | maximum<br>N | design<br>         |                | ditions:<br><b>UT</b> |
| Pollutant                                                                                                                    |               | lb/hr                             | grains/      | acf                | lb/hr          | grains/acf            |
| PM/PM10/PM2.5                                                                                                                |               | 4.71                              | NA           |                    | 0.0047         | NA                    |
|                                                                                                                              |               |                                   |              |                    |                |                       |
| 25. Complete the table:                                                                                                      | Particle S    | Size Distributior<br>to Collector | n at Inlet   | Frac               | tion Efficienc | y of Collector        |
| Particulate Size Range (microns)                                                                                             | Weig          | ht % for Size Ra                  | inge         | V                  | Veight % for S | ize Range             |
| 0 – 1                                                                                                                        |               | 0                                 |              |                    |                |                       |
| 1 – 5                                                                                                                        |               | 1.708                             |              |                    |                |                       |
| 5 - 10                                                                                                                       |               | 11.479                            |              | 99.99% to 1 micron |                |                       |
| 10 – 20                                                                                                                      |               | 33.924                            |              |                    |                |                       |
| 20 – 40                                                                                                                      |               | 34.726                            |              |                    |                |                       |
| 40 - 50                                                                                                                      |               | 8.795                             |              |                    |                |                       |
| >100                                                                                                                         |               | 2.785                             |              |                    |                |                       |
|                                                                                                                              |               |                                   |              |                    |                |                       |
|                                                                                                                              |               |                                   |              |                    |                |                       |
|                                                                                                                              |               |                                   |              |                    |                |                       |
|                                                                                                                              |               |                                   |              |                    |                |                       |
|                                                                                                                              |               |                                   |              |                    |                |                       |
|                                                                                                                              |               |                                   |              |                    |                |                       |
|                                                                                                                              |               |                                   |              |                    | -              |                       |
|                                                                                                                              |               |                                   |              |                    |                |                       |
|                                                                                                                              |               |                                   |              |                    |                |                       |
|                                                                                                                              |               |                                   |              | -                  |                |                       |

| 26. How is filter monitored for indications of deterioration (e.g., broken bags)?                                  |
|--------------------------------------------------------------------------------------------------------------------|
| Continuous Opacity                                                                                                 |
| Pressure Drop                                                                                                      |
| Alarms-Audible to Process Operator                                                                                 |
|                                                                                                                    |
| Visual opacity readings, Frequency:                                                                                |
| Other, specify: Broken Bag Detector                                                                                |
| 27. Describe any recording device and frequency of log entries:                                                    |
| None                                                                                                               |
|                                                                                                                    |
|                                                                                                                    |
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| 28. Describe any filter seeding being performed:                                                                   |
| None                                                                                                               |
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|                                                                                                                    |
| 20. Departing any air pollution control device inlet and suffer and conditioning processes (e.g., and cooling, and |
| 29. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas  |
| reheating, gas humidification):                                                                                    |
| None                                                                                                               |
|                                                                                                                    |
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|                                                                                                                    |
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|                                                                                                                    |
|                                                                                                                    |
| 30. Describe the collection material disposal system:                                                              |
| This is a bagging unit. The material collected is transferred to the bulk sack.                                    |
| This is a bagging unit. The material concelled is italistence to the bulk sack.                                    |
|                                                                                                                    |
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|                                                                                                                    |
| 31. Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet?                   |

| Please propose m<br>proposed operatin<br>proposed emission | g parameters. Please propose                                                                                | eporting in order to demonstrate compliance with the testing in order to demonstrate compliance with the   |  |  |  |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|--|--|
| MONITORING:<br>None                                        |                                                                                                             | RECORDKEEPING:<br>None                                                                                     |  |  |  |
| REPORTING:<br>None                                         |                                                                                                             | TESTING:<br>None                                                                                           |  |  |  |
| MONITORING:                                                |                                                                                                             | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process |  |  |  |
| RECORDKEEPING:<br>REPORTING:                               | Please describe the proposed red                                                                            | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air     |  |  |  |
| TESTING:                                                   | Please describe any proposed pollution control device.                                                      | emissions testing for this process equipment on air                                                        |  |  |  |
|                                                            | aranteed Capture Efficiency for eac                                                                         | ch air pollutant.                                                                                          |  |  |  |
| None                                                       |                                                                                                             |                                                                                                            |  |  |  |
|                                                            | aranteed Control Efficiency for eac                                                                         | h air pollutant.                                                                                           |  |  |  |
| 99.9%                                                      |                                                                                                             |                                                                                                            |  |  |  |
| 35. Describe all operation                                 | 35. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty. |                                                                                                            |  |  |  |
| NA                                                         |                                                                                                             |                                                                                                            |  |  |  |

Control Device ID No. (must match Emission Units Table): DC-780401

| Equipment Information | and Filter | Characteristics |
|-----------------------|------------|-----------------|
|-----------------------|------------|-----------------|

| 1.  | Manufacturer: Mikro-Pulsaire                                                                                                                                                                                                                               | 2. Total number of compartments: 1                                                                                                     |                                         |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
|     | Model No. 815-8-20                                                                                                                                                                                                                                         | 3. Number of compartment online for operation: 1                                                                                       | normal                                  |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state                                                                                                                                                   | m with duct arrangement and size of duct, air nood face velocity and hood collection efficiency.                                       | volume,                                 |
| 5.  | Baghouse Configuration:Image: Open Pressure(check one)Image: Electrostatically EnhanceImage: Other, SpecifyImage: Other, Specify                                                                                                                           | Closed Pressure Closed Suction                                                                                                         |                                         |
| 6.  | Filter Fabric Bag Material:         Nomex nylon       Wool         Polyester       Polypropylene         Acrylics       Ceramics         Fiber Glass       oz./sq.yd         Teflon       Thickness       in         Others, specify       Others, specify | <ul> <li>7. Bag Dimension:<br/>Diameter 4.625<br/>Length 8</li> <li>8. Total cloth area: 942</li> <li>9. Number of bags: 81</li> </ul> | in.<br>ft.<br>ft <sup>2</sup><br>ft/min |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                                                                                                                           | 10. Operating air to cloth ratio:       4.78:1       1         Automatic       Intermittent                                            |                                         |
| 12. | Method used to clean bags:         Mechanical Shaker       Sonic Cleaning         Pneumatic Shaker       Reverse Air Flow         Bag Collapse       Pulse Jet         Manual Cleaning       Reverse Jet                                                   | ⊠ Reverse Air Jet<br>☐ Other:                                                                                                          |                                         |
| 13. | Cleaning initiated by:<br>☐ Timer<br>☐ Expected pressure drop range in. of water                                                                                                                                                                           | <ul> <li>Frequency if timer actuated</li> <li>Other</li> </ul>                                                                         |                                         |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                                                                                                                      | 15. Collection efficiency:<br>Guaranteed minimum:Rating:<br>99.9999.99                                                                 | %<br>%                                  |
|     | Gas Stream C                                                                                                                                                                                                                                               | haracteristics                                                                                                                         |                                         |
| 16. | Gas flow rate into the collector:4,500ACFMACFM:Design:PSIAMaximum:                                                                                                                                                                                         |                                                                                                                                        | PSIA<br>PSIA                            |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                                                                                                                    | lb. Water/lb. Dry Air                                                                                                                  |                                         |
| 18. | Gas Stream Temperature: 100 °F                                                                                                                                                                                                                             |                                                                                                                                        | np<br>ft <sup>3</sup> /m <u>in</u>      |
| 20. | Stabilized static pressure loss across baghouse. Pre                                                                                                                                                                                                       |                                                                                                                                        | n. H₂O<br>n. H₂O                        |
| 21. | Particulate Loading: Inlet:                                                                                                                                                                                                                                | grain/scf Outlet: grair                                                                                                                | n/scf                                   |

| 22. | Type of Pollutant(s) to be collected (if particulate give specific type): |
|-----|---------------------------------------------------------------------------|
|     | Bentone <sup>TM</sup> product                                             |

| 23. Is there any $SO_3$ in the emission s |              |                                |               | 3 conte |                 | ppmv                   |  |
|-------------------------------------------|--------------|--------------------------------|---------------|---------|-----------------|------------------------|--|
| 24. Emission rate of pollutant (specify   | ) into and o | ut of collector a              |               | design  |                 | ditions:<br><b>)UT</b> |  |
| Pollutant                                 |              | lb/hr                          | IN<br>grains/ | acf     | lb/hr           | grains/act             |  |
| PM/PM10/PM2.5 (emissions include PV       | -780303)     | 13.85                          | NA            |         | 0.0138          | NA                     |  |
|                                           |              |                                |               |         |                 |                        |  |
| 25. Complete the table:                   | Particle S   | ize Distributio<br>to Collecto |               | Frac    | ction Efficienc | y of Collector         |  |
| Particulate Size Range (microns)          | Weigl        | nt % for Size F                | Range         | ١       | Neight % for \$ | Size Range             |  |
| 0 – 2                                     |              | 5.0                            |               |         | 99.9%           | /o                     |  |
| 2 – 4                                     |              | 8.8                            |               |         |                 |                        |  |
| 4 – 6                                     |              | 13.9                           |               |         |                 |                        |  |
| 6 – 8                                     |              | 17.5                           |               |         |                 |                        |  |
| 8 – 10                                    |              | 20.7                           |               |         |                 |                        |  |
| 10 – 12                                   |              | 22.7                           |               |         |                 |                        |  |
| 12 – 16                                   |              | 11.4                           |               |         |                 |                        |  |
| 16 – 20                                   |              |                                |               |         |                 |                        |  |
| 20 - 30                                   |              |                                |               | 100%    |                 | ,                      |  |
| 30 – 40                                   | 30 – 40      |                                |               |         | 100%            | 0                      |  |
| 40 – 50                                   |              |                                |               |         |                 |                        |  |
| 50 – 60                                   |              |                                |               |         |                 |                        |  |
| 60 – 70                                   |              | 0                              |               |         |                 |                        |  |
| 70 – 80                                   |              |                                |               |         |                 |                        |  |
| 80 – 90                                   |              |                                | :             |         |                 |                        |  |
| 90 – 100                                  |              |                                |               |         |                 |                        |  |
| >100                                      |              |                                |               |         |                 |                        |  |

| 26       | How in filter manitored for indications of deterioration (a.g., healen here)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 20       | . How is filter monitored for indications of deterioration (e.g., broken bags)?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|          | Continuous Opacity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|          | Pressure Drop                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1        | Alarms-Audible to Process Operator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|          | Visual opacity readings, Frequency:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 1        | Other, specify: Visually inspect bags once per year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 27       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 21       | Describe any recording device and frequency of log entries:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|          | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| 1        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| 28.      | Describe any filter seeding being performed:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|          | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| I .      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| I .      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| 29       | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>_</b> | reheating, gas humidification):                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|          | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|          | Noile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| 20       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 30.      | Describe the collection material disposal system:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|          | Recycled back into the process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 31       | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|          | The real measure bugned by burner in the Lines Vis Found out in a Vice I is the second bug of the seco |

| Please propose m                                    | g parameters. Please propose                                                                         | and Testing<br>eporting in order to demonstrate compliance with the<br>testing in order to demonstrate compliance with the<br>RECORDKEEPING:                  |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| None                                                |                                                                                                      | None                                                                                                                                                          |
| REPORTING:<br>None                                  |                                                                                                      | TESTING:<br>None                                                                                                                                              |
| MONITORING:<br>RECORDKEEPING:                       | monitored in order to demons<br>equipment or air control device.<br>Please describe the proposed red | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process<br>cordkeeping that will accompany the monitoring. |
| REPORTING:<br>TESTING:                              | pollution control device.                                                                            | emissions testing for this process equipment on air<br>emissions testing for this process equipment on air                                                    |
| None                                                | aranteed Capture Efficiency for eac                                                                  |                                                                                                                                                               |
| 34. Manufacturer's Gua<br>99.99 % less than 1 micro | ranteed Control Efficiency for eac<br>n.                                                             | n air pollutant.                                                                                                                                              |
| 35. Describe all operatir<br>NA                     | ng ranges and maintenance proce                                                                      | dures required by Manufacturer to maintain warranty.                                                                                                          |

Source: Soda Ash System Emission Point I.D.: 51

## Attachment M Air Pollution Control Device Sheet (BAGHOUSE)

Control Device ID No. (must match Emission Units Table): TK-720560/TK-720565

Equipment Information and Filter Characteristics

|     | 1. Manufacturer: Smoot Model No. 36FR7                                                                                                                       | 2. Total number of compartments: 1                                |                      |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------|
|     |                                                                                                                                                              | 3. Number of compartment online for operation: 1                  | normal               |
| 4.  | Provide diagram(s) of unit describing capture syste capacity, horsepower of movers. If applicable, state                                                     |                                                                   |                      |
| 5.  | Baghouse Configuration:                                                                                                                                      | Closed Pressure                                                   |                      |
| İ.  | (check one) Electrostatically Enha                                                                                                                           | anced Fabric                                                      |                      |
|     | Other, Specify                                                                                                                                               |                                                                   |                      |
| 6.  | Filter Fabric Bag Material:<br>Nomex nylon  Wool                                                                                                             | 7. Bag Dimension:                                                 |                      |
|     | Polyester Dolypropylene                                                                                                                                      | Diameter NA<br>Lenath 3                                           | in.<br>ft.           |
|     | Acrylics Ceramics                                                                                                                                            |                                                                   | ft <sup>2</sup>      |
|     | Cotton Weight 8 oz./sq.yd                                                                                                                                    | 8. Total cloth area: 187                                          | π                    |
|     | Teflon Thickness in                                                                                                                                          | 9. Number of bags: 7                                              |                      |
|     | Others, specify                                                                                                                                              | 10. Operating air to cloth ratio: NA                              | ft/min               |
| 11. | Baghouse Operation: 🛛 Continuous                                                                                                                             | Automatic Intermittent                                            |                      |
| 12. | Method used to clean bags:<br>Mechanical Shaker Sonic Cleaning<br>Pneumatic Shaker Reverse Air Flow<br>Bag Collapse Pulse Jet<br>Manual Cleaning Reverse Jet | ☐ Reverse Air Jet<br>☐ Other:                                     |                      |
| 13. | Cleaning initiated by:<br>Timer<br>Expected pressure drop range in. of water                                                                                 | Frequency if timer actuated Other                                 |                      |
| 14. | Operation Hours: Max. per day: 24<br>Max. per yr: 365                                                                                                        | 15. Collection efficiency:Rating: 99.99Guaranteed minimum:2μm99.9 | %<br>%               |
|     | Gas Stream C                                                                                                                                                 | haracteristics                                                    |                      |
| 16. | Gas flow rate into the collector: 262 ACFM                                                                                                                   | at 70 °F and NA                                                   | PSIA                 |
|     | ACFM: Design: PSIA Maximum:                                                                                                                                  | PSIA Average Expected:                                            | PSIA                 |
| 17. | Water Vapor Content of Effluent Stream:                                                                                                                      | lb. Water/lb. Dry Air                                             |                      |
| 18. | Gas Stream Temperature: Ambient °F                                                                                                                           | 19. Fan Requirements: NA                                          | hp                   |
|     |                                                                                                                                                              | OR                                                                | ft <sup>3</sup> /min |
| 20. | Stabilized static pressure loss across baghouse. Pres                                                                                                        | ssure Drop: High NA                                               | in. H <sub>2</sub> O |
|     |                                                                                                                                                              | Low                                                               | in. H₂O              |
| 21. | Particulate Loading: Inlet:                                                                                                                                  | grain/scf Outlet: gra                                             | iin/scf              |

| <ul><li>23. Is there any SO<sub>3</sub> in the emission s</li><li>24. Emission rate of pollutant (specify)</li></ul> |       |                                |         | 0₃ conte<br>design | operating con   | ppmv<br>ditions:<br>D <b>UT</b> |
|----------------------------------------------------------------------------------------------------------------------|-------|--------------------------------|---------|--------------------|-----------------|---------------------------------|
| Pollutant                                                                                                            |       | lb/hr                          | grains/ | acf                | lb/hr           | grains/acf                      |
| PM/PM10/PM2.5                                                                                                        |       | 4.71                           | NA      |                    | 0.005           | NA                              |
| 25. Complete the table:                                                                                              | I     | ize Distributio<br>to Collecto | r       |                    |                 | y of Collector                  |
| Particulate Size Range (microns)                                                                                     | Weigl | nt % for Size F                | ange    | W                  | leight % for \$ |                                 |
| 0 - 2                                                                                                                |       | 5.0                            |         |                    | 99.9%           |                                 |
| 2 - 4                                                                                                                |       | 8.8                            |         | _                  |                 |                                 |
| 4 - 6                                                                                                                |       | 13.9                           |         |                    |                 |                                 |
| 6 - 8                                                                                                                | -     | 17.5                           |         |                    |                 |                                 |
| 8 – 10                                                                                                               |       | 20.7                           |         |                    |                 |                                 |
| 10 – 12                                                                                                              |       | 22.7                           |         |                    |                 |                                 |
| 12 – 16                                                                                                              |       | 11.4                           |         |                    |                 |                                 |
| 16 – 20                                                                                                              |       |                                |         |                    |                 |                                 |
| 20 – 30                                                                                                              |       |                                |         |                    | 1000            |                                 |
| 30 – 40                                                                                                              |       |                                |         |                    | 100%            | )                               |
| 40 – 50                                                                                                              |       |                                |         |                    |                 |                                 |
| 50 – 60                                                                                                              |       |                                |         |                    |                 |                                 |
| 60 - 70                                                                                                              |       | 0                              |         |                    |                 |                                 |
| 70 – 80                                                                                                              |       |                                |         |                    |                 |                                 |
| 80 – 90                                                                                                              |       |                                |         |                    |                 |                                 |
| 90 – 100                                                                                                             |       |                                |         |                    |                 |                                 |
| >100                                                                                                                 |       |                                |         |                    |                 |                                 |

| 26.     | . How is filter monitored for indications of deterioration (e.g., broken bags)?                               |
|---------|---------------------------------------------------------------------------------------------------------------|
|         | Continuous Opacity                                                                                            |
|         | Pressure Drop                                                                                                 |
|         | Alarms-Audible to Process Operator                                                                            |
|         |                                                                                                               |
|         | Visual opacity readings, Frequency:                                                                           |
|         | Other, specify: Visually inspect bags once per year                                                           |
| 27.     | . Describe any recording device and frequency of log entries:                                                 |
|         | None                                                                                                          |
| 1       |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
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|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
| 28.     | Describe any filter seeding being performed:                                                                  |
| 1       | None                                                                                                          |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
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| [       |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
| 29.     | Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas |
|         | reheating, gas humidification):                                                                               |
|         | None                                                                                                          |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
| 30      | Describe the collection material disposal system:                                                             |
| 1 ° ° . | Recycled back into process.                                                                                   |
|         | Recycled back into process.                                                                                   |
| l       |                                                                                                               |
| ł       |                                                                                                               |
|         |                                                                                                               |
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|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
|         |                                                                                                               |
| 21      | Have you included <b>Baghouse Control Device</b> in the Emissions Points Data Summary Sheet? Yes              |
| 01.     | nave you moluded <b>Daynouse control Device</b> in the Emissions Points Data Summary Sneet? Yes               |

|                                | ing, Recordkeeping, Reporting,            |                                                                                                            |
|--------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------|
|                                | g parameters. Please propose              | eporting in order to demonstrate compliance with the testing in order to demonstrate compliance with the   |
| MONITORING:<br>None            |                                           | RECORDKEEPING:<br>None                                                                                     |
|                                |                                           |                                                                                                            |
|                                |                                           |                                                                                                            |
|                                | í                                         |                                                                                                            |
| REPORTING:<br>None             |                                           | TESTING:<br>None                                                                                           |
|                                |                                           |                                                                                                            |
|                                |                                           |                                                                                                            |
| MONITORING:                    |                                           | ocess parameters and ranges that are proposed to be<br>trate compliance with the operation of this process |
| RECORDKEEPING:<br>REPORTING:   | Please describe the proposed red          | cordkeeping that will accompany the monitoring.<br>emissions testing for this process equipment on air     |
| TESTING:                       | •                                         | emissions testing for this process equipment on air                                                        |
| 33. Manufacturer's Gua<br>None | aranteed Capture Efficiency for eac       | ch air pollutant.                                                                                          |
|                                |                                           |                                                                                                            |
|                                |                                           |                                                                                                            |
| 24 Manufacturar's Ous          | renteed Central Efficiency for eac        |                                                                                                            |
| 99.99 % less than 2 micro      | aranteed Control Efficiency for eac<br>n. | h air pollutant.                                                                                           |
|                                |                                           |                                                                                                            |
|                                |                                           |                                                                                                            |
| 35. Describe all operation     | ng ranges and maintenance proce           | dures required by Manufacturer to maintain warranty.                                                       |
|                                |                                           |                                                                                                            |
|                                |                                           |                                                                                                            |
|                                |                                           |                                                                                                            |

# ATTACHMENT N

# SUPPORTING EMISSIONS CALCULATIONS

| By: PEW                  | Checked By: CCS                       |
|--------------------------|---------------------------------------|
| Date: 9/23/2014          | Date: 9/23/2014                       |
| Revised: 02/17/17 by JJD | Revision Checked by: PEW on 2/22/2017 |

## **Change in Emissions**

|                          |                            | Proposed Permit Limit | · · · · · · · · · · · · · · · · · · · |
|--------------------------|----------------------------|-----------------------|---------------------------------------|
| Pollutant                | Current Permit Limit (TPY) | (TPY)                 | Difference (TPY)                      |
| PM*                      | 45.43                      | 11.49                 | -33.94                                |
| PM10                     | 31.20                      | 7.89                  | -23.31                                |
| PM2.5*                   | 27.92                      | 7.06                  | -20.86                                |
| CO                       | 6.83                       | 19.62                 | 12.79                                 |
| NOx                      | 29.11                      | 23.29                 | -5.82                                 |
| SO2                      | 0.16                       | 0.32                  | 0.16                                  |
| VOC                      | 96.36                      | 82.82                 | -13.54                                |
| Hazardous Air Pollutants |                            |                       |                                       |
| Methyl Chloride          | 0.43                       | 0.28                  | -0.15                                 |
| HCl                      | 4.60                       | 1.44                  | -3.16                                 |
| Benzyl Chloride          | 0.22                       | 0.22                  | 0.00                                  |
| Methanol                 | 0                          | 1.15                  | 1.15                                  |
| HAPS - VOC               | 0                          | 0.51                  | 0.51                                  |
| HAPS - Metal             | 0                          | 0.32                  | 0.32                                  |
| Total HAPS               | 5.25                       | 3.92                  | -1.33                                 |

|                | Current Permit Limit** | Proposed Permit Limit |                  |
|----------------|------------------------|-----------------------|------------------|
| Greenhouse Gas | (Metric Tons)          | (Metric Tons)         | Difference (TPY) |
| CO2e           | 27,257                 | 28,425                | 1,168            |

\* - Current PM and PM2.5 prorated based on Current PM10 limit and Proposed PM, PM10, and PM2.5 limits. PM and PM2.5 limits were not included in the current permit.

\*\* - Current CO2e prorated based on proposed CO2e emissions at 8,760 hours per year down to 8,400 hours per year based on the existing 350 day per year limit. CO2e emissions were not included in the current permit/permit application.

## POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

| By: PEW                  | Checked By: CCS                       |
|--------------------------|---------------------------------------|
| Date: 9/23/2014          | Date: 9/23/2014                       |
| Revised: 02/17/17 by JJD | Revision Checked by: PEW on 2/22/2017 |

# PTE of the currently permitted Process

| Emission |                        |       |       |       |       |       |
|----------|------------------------|-------|-------|-------|-------|-------|
| Point ID | Description            | NOX   | VOC   | PM10  | SO2   | со    |
|          |                        | lb/hr | lb/hr | lb/hr | lb/hr | lb/hr |
| 8        | 3x3 RD                 | 0     | 0.98  | 0.14  | 0     | 0     |
| 7-17B    | Oxidizer               | 0.38  | 11.96 | 2.28  | 0.01  | 0.08  |
| 10       | Pug Mill/51 Mill       | 0.1   | 0.1   | 0.17  | 0     | 0.02  |
| 9C       | Pug Mill Feed Hopper   | 0     | 0     | 2.5   | 0     | 0     |
| 7B       | St. Line               | 0     | 0     | 0.11  | 0     | 0     |
| 9A       | Silos                  | 0     | 0     | 2.5   | 0     | 0     |
| 9B       | Day Bin                | 0     | 0     | 2.5   | 0     | 0     |
| 13       | North DC               | 0     | 0     | 0.16  | 0     | 0     |
| 009      | FBD Pack               | 0     | 0     | 0.16  | 0     | 0     |
| 2A       | Dispersion Batch Tanks | 0     | 0.08  | 0.08  | 0     | 0     |
| 2        | Rx and Disp Tanks      | 0     | 0     | 0.08  | 0     | 0     |
| 3        | Flash Dryer            | 1.4   | 5.45  | 0.46  | 0.01  | 0.35  |
| 5        | AC #2                  | 0     | 0     | 0.12  | 0     | 0     |
| 18       | Kewanee Boiler         | 3.33  | 0.07  | 0.12  | 0.01  | 0.83  |
| 19       | Gas Heater             | 0.01  | neg.  | neg.  | neg.  | neg.  |
| 20       | Reagent                | 0     | 0     | neg.  | 0     | 0     |
| 007      | WRD                    | 0     | 1.16  | 0.14  | 0     | 0     |
| 008      | ERD                    | 0     | 1.16  | 0.14  | 0     | 0     |
| 16       | AC #1                  | 0     | 0     | 0.12  | 0     | 0     |
| 17B      | GIMCO B                | 0     | 0     | 0.11  | 0     | 0     |
| 017      | West 1st Stage         | 0.5   | 0.61  | 0.06  | neg.  | 0.1   |
| 018      | West 2nd Stage         | 0.5   | 0.61  | 0.06  | neg.  | 0.1   |
| 019      | East 1st Stage         | 0.5   | 0.61  | 0.06  | neg.  | 0.1   |
| 020      | East 2nd Stage         | 0.5   | 0.61  | 0.06  | neg.  | 0.1   |
| 28       | Quat Tank              | 0     | 0     | 0     | 0     | 0     |
| 29       | Quat Tank              | 0     | 0     | 0     | 0     | 0     |
| 30       | Quat Tank              | 0     | 0     | 0     | 0     | 0     |
| 32       | Quat Tank              | 0     | 0     | 0     | 0     | 0     |
| 33       | Quat Tank              | 0     | 0     | 0     | 0     | 0     |
| 34       | Quat Tank              | 0     | 0     | 0     | 0     | 0     |
| 36       | Central Vac            | 0     | 0     | neg.  | 0     | 0     |
| 40       | Bulk Sack Packer       | 0     | 0     | 0.07  | 0     | 0     |
|          |                        | 7.22  | 23.40 | 12.20 | 0.03  | 1.68  |

## POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

| By: PEW                  | Checked By: CCS                       |
|--------------------------|---------------------------------------|
| Date: 9/23/2014          | Date: 9/23/2014                       |
| Revised: 02/17/17 by JJD | Revision Checked by: PEW on 2/22/2017 |

## PTE of the currently permitted Process

| Emission |                        |       | 1     |       |      |      |
|----------|------------------------|-------|-------|-------|------|------|
| Point ID | Description            | NOX   | VOC   | PM10  | SO2  | со   |
|          |                        | TPY   | TPY   | TPY   | TPY  | TPY  |
| 8        | 3x3 RD                 | 0     | 4.12  | 0.54  | 0    | 0    |
| 7-17B    | Oxidizer               | 1.6   | 50.22 | 9.58  | 0.03 | 0.34 |
| 10       | Pug Mill/51 Mill       | 0.4   | 0.4   | 0.69  | 0    | 0.08 |
| 9C       | Pug Mill Feed Hopper   | 0     | 0     | 9.9   | 0    | 0    |
| 7B       | St. Line               | 0     | 0     | 0.46  | 0    | 0    |
| 9A       | Silos                  | 0     | 0     | 0.88  | 0    | 0    |
| 9B       | Day Bin                | 0     | 0     | 0.88  | 0    | 0    |
| 13       | North DC               | 0     | 0     | 0.67  | 0    | 0    |
| 009      | FBD Pack               | 0     | 0     | 0.67  | 0    | 0    |
| 2A       | Dispersion Batch Tanks | 0     | 0.34  | 0.34  | 0    | 0    |
| 2        | Rx and Disp Tanks      | 0     | 0     | 0.34  | 0    | 0    |
| 3        | Flash Dryer            | 5.88  | 23.87 | 1.93  | 0.03 | 1.47 |
| 5        | AC #2                  | 0     | 0     | 0.5   | 0    | 0    |
| 18       | Kewanee Boiler         | 13.99 | 0.29  | 0.5   | 0.06 | 3.49 |
| 19       | Gas Heater             | 0.04  | neg.  | neg.  | neg. | 0.01 |
| 20       | Reagent                | 0     | 0     | neg.  | 0    | 0    |
| 007      | WRD                    | 0     | 4.16  | 0.59  | 0    | 0    |
| 008      | ERD                    | 0     | 4.16  | 0.59  | 0    | 0    |
| 16       | AC #1                  | 0     | 0     | 0.5   | 0    | 0    |
| 17B      | GIMCO B                | 0     | 0     | 0.46  | 0    | 0    |
| 017      | West 1st Stage         | 1.8   | 2.2   | 0.22  | 0.01 | 0.36 |
| 018      | West 2nd Stage         | 1.8   | 2.2   | 0.22  | 0.01 | 0.36 |
| 019      | East 1st Stage         | 1.8   | 2.2   | 0.22  | 0.01 | 0.36 |
| 020      | East 2nd Stage         | 1.8   | 2.2   | 0.22  | 0.01 | 0.36 |
| 28       | Quat Tank              | 0     | 0     | 0     | 0    | 0    |
| 29       | Quat Tank              | 0     | 0     | 0     | 0    | 0    |
| 30       | Quat Tank              | 0     | 0     | 0     | 0    | 0    |
| 32       | Quat Tank              | 0     | 0     | 0     | 0    | 0    |
| 33       | Quat Tank              | 0     | 0     | 0     | 0    | 0    |
| 34       | Quat Tank              | 0     | 0     | 0     | 0    | 0    |
| 36       | Central Vac            | 0     | 0     | neg.  | 0    | 0    |
| 40       | Bulk Sack Packer       | 0     | 0     | 0.3   | 0    | 0    |
|          |                        | 29.11 | 96.36 | 31.20 | 0.16 | 6.83 |

## Hazardous Air Pollutants Emissions

| Emission |                    | Methyl Chloride |      | HCl   |     | Benzyl Chloride |      |
|----------|--------------------|-----------------|------|-------|-----|-----------------|------|
| Point ID | Description        | lb/hr           | TPY  | lb/hr | TPY | lb/hr           | TPY  |
| 7-17B    | Oxidizer           | 0.08            | 0.34 | 1.1   | 4.6 | 0               | 0    |
| 2        | Rx and Disp. Tanks | 0.03            | 0.09 | 0     | 0   | 0.05            | 0.22 |
|          | Totals             | 0.11            | 0.43 | 1.1   | 4.6 | 0.05            | 0.22 |

Based on R13-1847E

#### POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

Checked By: CCS

By: PEW Date: 9/23/2014 Revised: 02/17/17 by JJD

Date: 9/23/2014

Revision Checked by: PEW on 2/22/2017

### Revised Emissions (Controlled)

| Emission Point |                           |       |                 |                 |        |        |       |       |
|----------------|---------------------------|-------|-----------------|-----------------|--------|--------|-------|-------|
| D              | Description               | NOX   | VOC             | PM              | PM10   | PM2.5  | SO2   | CO    |
|                |                           | lb/hr | lb/hr           | lb/hr           | lb/hr  | lb/hr  | lb/hr | lb/hr |
| 8              | 3x3 RD                    | θ     | <del>0.98</del> | <del>0.14</del> |        |        | θ     | 0     |
| 7-17B          | Oxidizer                  | 0.29  | 29.30           | 0.03            | 0.03   | 0.03   | 0.01  | 0.25  |
| 10             | Pug Mill/51 Mill          | 0     | 0               | 0.0138          | 0.0138 | 0.0138 | 0     | 0     |
| 9C             | Pug Mill Feed Hopper      | 0     | 0               | 0.0069          | 0.0069 | 0.0069 | 0     | 0     |
| 7B             | St. Line                  | 0     | 0               | 0.18            | 0,18   | 0.18   | 0     | 0     |
| 9A             | Silos                     | 0     | 0               | 0.0785          | 0.0785 | 0.0785 | 0     | 0     |
| 9B             | Day Bin                   | 0     | Ó               | 0.0785          | 0.0785 | 0.0785 | 0     | 0     |
| 13             | Haver A Packer            | 0     | 0               | 0.0058          | 0.0058 | 0.0058 | 0     | 0     |
| 009            | Haver C Packer            | 0     | 0               | 0.0069          | 0.0069 | 0.0069 | 0     | 0     |
| 2A             | Dispersion Batch Tanks    | 0     | 0               | 0.08            | 0.08   | 0.08   | 0     | 0     |
| 2              | Rx and Disp Tanks         | 0     | 0               | 0.08            | 0.08   | 0.08   | 0     | 0     |
| 3              | Flash Dryer               | 0.98  | 3.06            | 0.44            | 0.44   | 0.44   | 0.01  | 0.82  |
| 5              | ACM #2                    | 0     | 0               | 0.0058          | 0.0058 | 0.0058 | 0     | 0     |
| 18             | Kewanee Boiler            | 1.97  | 0,11            | 0.15            | 0.15   | 0.15   | 0.01  | 1.65  |
| 19             | Gas Heater                | 0.04  | 0.01            | 0.01            | 0.01   | 0.01   | 0.01  | 0.04  |
| 20             | Anion Addition            | 0     | 0               | 0.0063          | 0.0063 | 0.0063 | 0     | 0     |
|                | West Rotary Vacuum        |       |                 |                 |        |        |       |       |
| 007            | Filter Vent               | 0     | 0,78            | 0.10            | 0.10   | 0.10   | 0     | 0     |
|                | East Rotary Vacuum        |       | 0,70            |                 | 0.10   | 0.10   | _ آ   |       |
| 008            | Filter Vent               | 0     | 0.78            | 0.10            | 0.10   | 0.10   | 0     | 0     |
| 16             | ACM #1                    | 0     | 0               | 0.0058          | 0.0058 | 0.0058 | 0     | 0     |
| 17B            | Eimco Filter B            | 0     | 0               | 0.18            | 0.18   | 0.18   | 0     | 0     |
| 17C            | Eimco Filter C            | 0     | 0               | 0.13            | 0.18   | 0.18   | 0     | 0     |
| 50             | Parkson C                 | 0     | 0               | 0.21            | 0.21   | 0.21   | 0     | 0     |
| 51             | Soda Ash System           | 0     | 0               | 0.21            | 0.0047 | 0.0047 | 0     | 0     |
| 017            | West 1st Stage            | 0.51  | 0.81            | 0.0047          | 0.13   | 0.13   | 0.01  | 0.43  |
| 017            | West 2nd Stage            | 0.51  | 0.81            | 0.13            | 0.13   | 0.13   | 0.01  |       |
| 019            | East 1st Stage            | 0.51  | 0.81            | 0.13            | 0.13   | 0.13   | 0.01  | 0.43  |
| 019            | East 2nd Stage            | 0.51  | 0.81            | 0.13            | 0.13   | 0.13   | 0.01  | 0.43  |
| 28             | Quat Tank*                | 0,31  | 0.81            | 0.13            | 0.13   | 0.13   |       |       |
| 29             | Quat Tank*                | 0     | 0.01            |                 | 0      | 0      | 0     | 0     |
| 30             | Quat Tank*                | 0     |                 | 0               |        |        | 0     | 0     |
| 30             | Quat Tank*                | 0     | 0.01            | 0               | 0      | 0      | 0     | 0     |
| 33             |                           | 0     |                 |                 |        | 0      | 0     | 0     |
| 34             | Quat Tank*                | 0     | 0.02            | 0               | 0      | 0      | 0     | 0     |
| 36             | Quat Tank*<br>Central Vac |       | 0.02            | 0               | 0      | 0      | 0     | 0     |
| 40             |                           | 0     | 0               | neg.            | neg.   | neg.   | 0     | 0     |
| 40             | Bulk Sack Packer          | -     | 0               | 0.0047          | 0.0047 | 0.0047 | 0     | 0     |
|                | AC1 Bin Vent              | 0     | 0               | 0.0058          | 0.0058 | 0.0058 | 0     | 0     |
| 42             | AC2 Bin Vent              | 0     | 0               | 0.0058          | 0.0058 | 0.0058 | 0     | 0     |
| 43             | 51 Recycle Bin            | 0     | 0               | 0.0069          | 0.0069 | 0.0069 | 0     | 0     |
| 44             | Haver A Hopper            | 0     | 0               | 0.0058          | 0.0058 | 0.0058 | 0     | 0     |
| 45             | Dump Station A            | 0     | 0               | 0.0058          | 0.0058 | 0.0058 | 0     | 0     |
| 46             | Dump Station C            | 0     | 0               | 0.0063          | 0.0063 | 0.0063 | 0     | 0     |
| 47             | Haver C Packing Hopper    | 0     | 0               | 0.0069          | 0.0069 | 0.0069 | 0     | 0     |
| 48             | CO2 transfer system       |       |                 | L               |        |        |       |       |
| 49             | Long Conveyor -Torrit     | 0     | 0               | 0.0058          | 0.0058 | 0.0058 | 0     | 0     |
| Fugitive       | Fugitive                  |       | 3.82            |                 |        |        |       |       |
| WWTP           | WWTP Emissions            |       | 11.68           |                 |        |        |       |       |
|                | Roadways                  |       |                 | 24.47           | 4.76   | 0.17   |       |       |
|                | Total                     | 5.32  | 52,86           | 27.03           | 7.32   | 2.73   | 0.08  | 4.48  |

\* - Quat Tank emissions (Emission Points 28, 29, 30, 32, 33, and 34) are for breathing losses only. Working losses are included as part of the oxidizer emissions.

## POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

By: PEW Date: 9/23/2014 Revised: 02/17/17 by JJD Checked By: CCS Date: 9/23/2014 Revision Checked by: PEW on 2/22/2017

### **Revised Emissions (Controlled)**

| mission Point<br>) | Description            | NOX   | voc   | РМ     | PM10   | PM2.5  | SO2  | со    | CO2e         |
|--------------------|------------------------|-------|-------|--------|--------|--------|------|-------|--------------|
|                    |                        | TPY   | TPY   | TPY    | TPY    | TPY    | TPY  | TPY   | Metric Tons  |
| 8                  | 3x3 RD                 | 0     | 4.12  | 0.54   |        |        | 0    | 0     | Wiedrie Ton. |
| 7-17B              | Oxidizer               | 1.27  | 17.53 | 0.10   | 0.10   | 0.10   | 0.04 | 1.10  | 1,434        |
| 10                 | Pug Mill/51 Mill       | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     | 1,101        |
| 90                 | Pug Mill Feed Hopper   | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     | 1            |
| 7B                 | St. Line               | 0     | 0     | 0.26   | 0.26   | 0.26   | 0    | 0     |              |
| 9A                 | Silos                  | 0     | 0     | 0.0316 | 0.0316 | 0.0316 | 0    | 0     |              |
| 9B                 | Day Bin                | 0     | 0     | 0.0316 | 0.0316 | 0.0316 | 0    | 0     |              |
| 13                 | Haver A Packer         | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     |              |
| 009                | Haver C Packer         | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     |              |
| 2A                 | Dispersion Batch Tanks | 0     | 0     | 0.35   | 0.35   | 0.35   | 0    | 0     |              |
| 2                  | Rx and Disp Tanks      | 0     | 0     | 0.35   | 0.35   | 0.35   | 0    | 0     |              |
| 3                  | Flash Dryer            | 4.29  | 7.59  | 1.21   | 1.21   | 1.21   | 0.04 | 3.59  | 4,780        |
| 5                  | ACM #2                 | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     |              |
| 18                 | Kewanee Boiler         | 8.63  | 0.48  | 0.66   | 0.66   | 0.66   | 0.04 | 7.23  | 9,599        |
| 19                 | Gas Heater             | 0.18  | 0.04  | 0.04   | 0.04   | 0.04   | 0.04 | 0.18  | 191          |
| 20                 | Anion Addition         | 0     | 0     | 0.0165 | 0.0165 | 0.0165 | 0    | 0     |              |
| 007                | WRD                    | 0     | 1.91  | 0.25   | 0.25   | 0.25   | 0    | 0     |              |
| 008                | ERD                    | 0     | 1.91  | 0.25   | 0.25   | 0.25   | 0    | 0     |              |
| 16                 | ACM #1                 | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     |              |
| 17B                | Eimco Filter B         | 0     | 0     | 0.26   | 0.26   | 0.26   | 0    | 0     |              |
| 17C                | Eimco Filter C         | 0     | 0     | 0.43   | 0.43   | 0.43   | 0    | 0     |              |
| 50                 | Parkson C              | 0     | 0     | 0.43   | 0.43   | 0.43   | 0    | 0     |              |
| 51                 | Soda Ash System        | 0     | 0     | 0.0005 | 0.0005 | 0.0005 | 0    | 0     | · · · ·      |
| 017                | West 1st Stage         | 2.23  | 3.31  | 0.54   | 0.54   | 0.54   | 0.04 | 1.88  | 2,509        |
| 018                | West 2nd Stage         | 2.23  | 3.31  | 0.54   | 0.54   | 0.54   | 0.04 | 1.88  | 2,509        |
| 019                | East 1st Stage         | 2.23  | 3.31  | 0.54   | 0.54   | 0.54   | 0.04 | 1.88  | 2,509        |
| 020                | East 2nd Stage         | 2.23  | 3.31  | 0.54   | 0.54   | 0.54   | 0.04 | 1.88  | 2,509        |
| 28                 | Quat Tank*             | 0     | 0.05  | 0      | 0      | 0      | 0    | 0     |              |
| 29                 | Quat Tank*             | 0     | 0.06  | 0      | 0      | 0      | 0    | 0     | · · ·        |
| 30                 | Quat Tank*             | 0     | 0.06  | 0      | 0      | 0      | 0    | 0     |              |
| 32                 | Quat Tank*             | 0     | 0,05  | 0      | 0      | 0      | 0    | 0     |              |
| 33                 | Quat Tank*             | 0     | 0.09  | 0      | 0      | 0      | 0    | 0     |              |
| 34                 | Quat Tank*             | 0     | 0.09  | 0      | 0      | 0      | 0    | 0     |              |
| 36                 | Central Vac            | 0     | 0     | neg.   | neg.   | neg.   | 0    | 0     |              |
| 40                 | Bulk Sack Packer       | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     |              |
| 41                 | AC1 Bin Vent           | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     |              |
| 42                 | AC2 Bin Vent           | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     |              |
| 43                 | 51 Recycle Bin         | 0     | 0     | 0.0076 | 0.0076 | 0.0076 | 0    | 0     |              |
| 44                 | Haver A Hopper         | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     | İ            |
| 45                 | Dump Station A         | 0     | 0     | 0.0063 | 0.0063 | 0.0063 | 0    | 0     | 1            |
| 46                 | Dump Station C         | 0     | 0     | 0.0069 | 0.0069 | 0.0069 | 0    | 0     |              |
| 47                 | Haver C Packing Hopper | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     |              |
| 48                 | CO2 transfer system    |       |       |        | 1      |        |      |       | 2,384        |
| 49                 | Long Conveyor - Torrit | 0     | 0     | 0.0141 | 0.0141 | 0.0141 | 0    | 0     |              |
| Fugitive           | Fugitive               |       | 16.73 |        |        |        |      |       |              |
| WWTP               | WWTP Emissions         |       | 23.00 |        |        |        |      |       |              |
|                    | Roadways               |       |       | 4.47   | 0,87   | 0.04   |      |       |              |
|                    | Total                  | 23.29 | 82.82 | 11.49  | 7.89   | 7.06   | 0.32 | 19.62 | 28,425       |

\* - Quat Tank emissions (Emission Points 28, 29, 30, 32, 33, and 34) are for breathing losses only. Working losses are included as part of the oxidizer emissions.

## POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

By: PEW Date: 9/23/2014 Revised: 02/17/17 by JJD

Date: 9/23/2014

Checked By: CCS

Revision Checked by: PEW on 2/22/2017

**Revised Emissions (Controlled)** 

| Hazardous Air Pollutants Emissions |
|------------------------------------|
|------------------------------------|

| Emission Point<br>ID | Description        | Methyl<br>Chloride | HCl   | Benzyl<br>Chloride | Methanol | HAPS<br>VOC | HAPS<br>METAL | Total<br>HAPS |
|----------------------|--------------------|--------------------|-------|--------------------|----------|-------------|---------------|---------------|
|                      |                    | lb/hr              | lb/hr | lb/hr              | lb/hr    | lb/hr       | lb/hr         | lb/hr         |
| 7-17B                | Oxidizer           | 0.06               | 0.65  |                    |          | 0.01        | 0,01          | 0.73          |
| 2                    | Rx and Disp. Tanks | 0.03               |       | 0.05               |          |             |               | 0.08          |
| 3                    | Flash Dryer        |                    |       |                    |          | 0.02        | 0.01          | 0.03          |
| 18                   | Kewanee Boiler     |                    |       |                    |          | 0.04        | 0.01          | 0.05          |
| 19                   | Gas Heater         |                    |       |                    |          | 0.01        | 0.01          | 0.02          |
| 017                  | W 1st              |                    |       |                    |          | 0.01        | 0.01          | 0.02          |
| 018                  | W 2nd              |                    |       |                    |          | 0.01        | 0.01          | 0.02          |
| 019                  | E 1st              |                    |       |                    |          | 0.01        | 0.01          | 0.02          |
| 020                  | E 2nd              |                    |       |                    |          | 0.01        | 0.01          | 0.02          |
|                      | WWTP Secondary     |                    |       |                    |          |             |               |               |
| WWTP                 | Emissions          |                    |       |                    | 3.18     |             |               | 3.18          |
|                      | Total              | 0.09               | 0.65  | 0.05               | 3.18     | 0.12        | 0.08          | 4.17          |

| Emission Point<br>ID | Description        | Methyl<br>Chloride | HCI  | Benzyl<br>Chloride | Methanol | HAPS<br>VOC | HAPS<br>METAL | Total<br>HAPS |
|----------------------|--------------------|--------------------|------|--------------------|----------|-------------|---------------|---------------|
|                      |                    | TPY                | TPY  | TPY                | TPY      | TPY         | TPY           | TPY           |
| 7-17B                | Oxidizer           | 0.15               | 1.44 |                    |          | 0.04        | 0.04          | 1.67          |
| 2                    | Rx and Disp. Tanks | 0.13               |      | 0.22               |          |             |               | 0.35          |
| 3                    | Flash Dryer        |                    |      |                    |          | 0.09        | 0.04          | 0.13          |
| 18                   | Kewanee Boiler     |                    |      |                    |          | 0.18        | 0.04          | 0.22          |
| 19                   | Gas Heater         |                    |      |                    |          | 0.04        | 0.04          | 0.08          |
| 017                  | W 1st              |                    |      |                    |          | 0.04        | 0.04          | 0.08          |
| 018                  | W 2nd              |                    |      |                    |          | 0.04        | 0.04          | 0.08          |
| 019                  | Elst               |                    |      |                    |          | 0.04        | 0.04          | 0.08          |
| 020                  | E 2nd              |                    |      |                    |          | 0.04        | 0.04          | 0.08          |
|                      | WWTP Secondary     |                    |      |                    |          |             |               |               |
| WWTP                 | Emissions          |                    |      |                    | 1.15     |             |               | 1.15          |
|                      | Total              | 0.28               | 1.44 | 0.22               | 1.15     | 0.51        | 0.32          | 3.92          |

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

| By: PEW                  | Checked By: CCS                       |
|--------------------------|---------------------------------------|
| Date: 9/23/2014          | Date: 9/23/2014                       |
| Revised: 02/17/17 by JJD | Revision Checked by: PEW on 2/22/2017 |

#### Rationale for Worst Case Emissions

Only two (2) of three (3) manufacturing processes can be used concurrently. Below is a calculation showing the total VOC for each process based on the percent of total VOC each process contributes to different emission points. The VOCs from the Pug Mill/51 Mill are controlled by the oxidizer, so the dry process generates more VOC through the oxidizer than the other two processes. However, dryer combustion and WWTP emissions are not generated during the dry process, so the two wet processes generate more VOC and are used as the worst case scenario emissions. See the calculations below.

| uid Bed Dryer<br>of Total VOC         | Flash Dryer<br>% of Total VOC | Dry Process                           | Emission<br>Point ID | Description               | VO    |
|---------------------------------------|-------------------------------|---------------------------------------|----------------------|---------------------------|-------|
| 0.1000.000                            | 700110001000                  |                                       | TOILT                | Description               |       |
| · · · · ·                             |                               |                                       | 8                    | 3x3 RD                    | - IP  |
| 48.7%                                 | 50.1%                         |                                       | 7-17B                | Oxidizer                  |       |
| 40.770                                | 50.170                        | 100.0%                                | 7-17B                | Pug Mill/51 Mill          | 17.5  |
|                                       |                               | 100.070                               | 9C                   | Pug Mill Feed Hopper      | 17.2  |
|                                       |                               |                                       | 7B                   | St. Line                  | 0.0   |
|                                       |                               |                                       | 9A                   |                           | 0.0   |
|                                       |                               |                                       | 9A<br>9B             | Silos<br>Day Bin          | 0.0   |
|                                       |                               |                                       |                      |                           | 0.0   |
|                                       |                               |                                       | 13                   | Haver A Packer            | 0.0   |
|                                       |                               | <u> </u>                              | 2A                   | Haver C Packer            | 0.0   |
|                                       |                               |                                       |                      | Dispersion Batch Tanks    | 0.00  |
|                                       | 100.00/                       | ·                                     | 2                    | Rx and Disp Tanks         | 0.00  |
|                                       | 100.0%                        |                                       | 3                    | Flash Dryer               | 7.59  |
| 50.00/                                | <u> </u>                      | <u> </u>                              | 5                    | ACM #2                    | 0.00  |
| 50.0%                                 | 50.0%                         |                                       | 18                   | Kewanee Boiler            | 0.48  |
|                                       |                               |                                       | 19                   | Gas Heater                | 0.04  |
|                                       |                               |                                       | 20                   | Anion Addition            | 0.00  |
| 100.0%                                |                               |                                       | 007                  | WRD                       | 1.93  |
| 100.0%                                |                               |                                       | 008                  | ERD                       | 1.91  |
|                                       |                               |                                       | 16                   | ACM #1                    | 0.00  |
|                                       |                               |                                       | 17B                  | Eimco Filter B            | 0.00  |
|                                       |                               |                                       | 17C                  | Eimco Filter C            | 0.00  |
|                                       |                               |                                       | 50                   | Parkson C                 | 0.00  |
|                                       |                               |                                       | 51                   | Soda Ash System           | 0.00  |
| 100.0%                                |                               |                                       | 017                  | West 1st Stage            | 3.31  |
| 100.0%                                |                               |                                       | 018                  | West 2nd Stage            | 3.31  |
| 100.0%                                |                               |                                       | 019                  | East 1st Stage            | 3.31  |
| 100.0%                                |                               |                                       | 020                  | East 2nd Stage            | 3.31  |
|                                       |                               |                                       | 28                   | Quat Tank*                | 0.05  |
|                                       |                               |                                       | 29                   | Quat Tank*                | 0.06  |
|                                       |                               |                                       | 30                   | Quat Tank*                | 0.06  |
|                                       |                               |                                       | 32                   | Quat Tank*                | 0.05  |
|                                       |                               |                                       | 33                   | Quat Tank*                | 0.09  |
|                                       |                               |                                       | 34                   | Quat Tank*                | 0.05  |
|                                       |                               |                                       | 36                   | Central Vac               | 0.00  |
|                                       |                               | · · · · · · · · · · · · · · · · · · · | 40                   | Bulk Sack Packer          | 0.00  |
|                                       |                               |                                       | 41                   | AC1 Bin Vent              | 0.00  |
|                                       | 1                             |                                       | 42                   | AC2 Bin Vent              | 0.00  |
|                                       |                               | <u> </u>                              | 43                   | 51 Recycle Bin            | 0.00  |
|                                       |                               |                                       | 44                   | Haver A Hopper            | 0.00  |
|                                       |                               | —                                     | 45                   | Dump Station A            | 0.00  |
| · · · · · · · · · · · · · · · · · · · |                               |                                       | 46                   | Dump Station C            | 0.00  |
|                                       |                               |                                       | 47                   | Haver C Packing Hopper    | 0.00  |
|                                       | †                             |                                       | 48                   | CO2 transfer system       | 0.00  |
|                                       |                               |                                       | 49                   | Long Conveyor - Torrit    | 0.00  |
| 50.0%                                 | 50.0%                         |                                       | Fugitive             | Fugitive                  | 16.72 |
| 50.0%                                 | 50.0%                         |                                       | WWTP                 | WWTP Emissions            |       |
| 50.070                                | 50.070                        |                                       | ** ** 11             | Roadways                  | 23.00 |
|                                       |                               |                                       | 1                    | Total for all 3 Processes | 0.00  |

Total VOC for FBD process = 46.14

Total VOC for FD process = 36.91

Total VOC for Dry Process = 17.69

## POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

## By: PEW Date: 9/23/2014 Revised: 02/17/17 by JJD

Checked By: CCS Date: 9/23/2014 Revision Checked by: PEW on 2/22/2017

## **Greenhouse Gas Summary**

|                       |                | Methane |               | CO2e    | CO2e   | Short       |
|-----------------------|----------------|---------|---------------|---------|--------|-------------|
|                       | Carbon Dioxide | (Metric | Nitrous Oxide | (Metric | (Short | tons/metric |
| Source                | (Metric Tons)  | Tons)   | (Metric Tons) | Tons)   | Tons)  | ton         |
| Catalytic Oxidizer    | 1,432          | 0.03    | 0.003         | 1,434   | 1,581  | 1.1023      |
| Flash Dryer           | 4,775          | 0.09    | 0.01          | 4,780   | 5,268  |             |
| Kewanee Boiler        | 9,590          | 0.18    | 0.02          | 9,599   | 10,581 |             |
| Gas Fired Heater Vent | 191            | 0.00    | 0.0004        | 191     | 210    |             |
| West 1st Stage        | 2,507          | 0.05    | 0.005         | 2,509   | 2,766  |             |
| West 2nd Stage        | 2,507          | 0.05    | 0.005         | 2,509   | 2,766  |             |
| East 1st Stage        | 2,507          | 0.05    | 0.005         | 2,509   | 2,766  |             |
| East 2nd Stage        | 2,507          | 0.05    | 0.005         | 2,509   | 2,766  |             |
| CO2 Process Emissions | 2,384          |         |               | 2,384   | 2,628  |             |
| Total                 | 28,398         | 0.49    | 0.05          | 28,425  | 31,333 |             |

1 - 1 metric ton = 1.1023 short tons

CO2, Methane and N2O are not over 100,000 metric tons

|                       | CO2          | Methane      | N2O          |
|-----------------------|--------------|--------------|--------------|
| Emission Unit         | (short tons) | (short tons) | (short tons) |
| Catalytic Oxidizer    | 1,579        | 0.03         | 0.003        |
| Flash Dryer           | 5,263        | 0.10         | 0.010        |
| Kewanee Boiler        | 10,571       | 0.20         | 0.020        |
| Gas Fired Heater Vent | 210          | 0.00         | 0.001        |
| West 1st Stage        | 2,763        | 0.05         | 0.005        |
| West 2nd Stage        | 2,763        | 0.05         | 0.005        |
| East 1st Stage        | 2,763        | 0.05         | 0.005        |
| East 2nd Stage        | 2,763        | 0.05         | 0.005        |
| CO2 Process Emissions | 2,628        |              |              |
| Total                 | 31,303       | 0.53         | 0.054        |

CO2 emissions are over 100 short tons.

| Elementis Specialties - Charleston Facility<br>R13-1847E Modification Application | POTESTA & ASSOCIATES, INC.<br>Project No: 0101-12-0404 |
|-----------------------------------------------------------------------------------|--------------------------------------------------------|
| By: PEW                                                                           | Checked By: CCS                                        |
| Date: 9/23/2014                                                                   | Date: 9/23/2014                                        |
| Revised: 02/17/17 by JJD                                                          | Revision Checked by: PEW on 2/22/2017                  |

#### Particulate Matter Sources

The following emissions estimate is intended to represent emissions of particulate matter and VOC (007 and 008 only) from the operations of the sources with clay or clay based materials throughout the system at Elementis. The emissions are based on an estimated emissions factor that was developed from the permitted emissions limitations of the previous permit revisions. The yearly throughput and emissions are based on 8,760 hours of operation per year. PM, PM10, and PM2.5 are assumed to be equal.

| Convert metric tons to short tons multiply by: | 1.10231  |
|------------------------------------------------|----------|
| Convert short tons to metric tons multiply by: | 0.907184 |

|        |                                  |        |       |              |         |         |          |       | Emissions | (PM, PM10 a | ind PM2.5) |        |
|--------|----------------------------------|--------|-------|--------------|---------|---------|----------|-------|-----------|-------------|------------|--------|
|        |                                  |        |       |              |         |         | Emission |       |           | Control     |            |        |
|        |                                  |        | (     | Operating Ra | te      |         | Factor   | Uncon | trolled   | Efficiency  | Cont       | rolled |
| Source | Description                      | pph    | mtph  | tph          | mtpy    | tpy     | lb/ton   | pph   | tpy       | %           | pph        | tpy    |
| 7B     | Straight Line Vacuum Filter Hood | 3,675  | 1.67  | 1.8375       | 4,899   | 5,400   | 0.096    | 0.18  | 0.26      | 0           | 0.18       | 0.26   |
| 007    | West Vacuum Filter Vent          | 2,205  | 1.00  | 1.1025       | 4,899   | 5,400   | 0.093    | 0.10  | 0.25      | 0           | 0.10       | 0.25   |
| 008    | East Vacuum Filter Vent          | 2,205  | 1.00  | 1.1025       | 4,899   | 5,400   | 0.093    | 0.10  | 0.25      | 0           | 0.10       | 0.25   |
| 2A     | Dispersion Batch Tanks           | 84,000 | 38.10 | 42           | 333,771 | 367,919 | 0.002    | 0.08  | 0.35      | 0           | 0.08       | 0.35   |
| 2      | Rx & Disp. Tank                  | 84,000 | 38.10 | 42           | 333,771 | 367,919 | 0.002    | 0.08  | 0.35      | 0           | 0.08       | 0.35   |
| 17B    | Eimco B Filter Hood Vent         | 3,675  | 1.67  | 1,8375       | 4,899   | 5,400   | 0.096    | 0.18  | 0.26      | 0           | 0.18       | 0.26   |
| 17C    | Eimco C Filter Hood Vent         | 4,410  | 2.00  | 2.205        | 8,165   | 9,000   | 0.096    | 0.21  | 0.43      | 0           | 0.21       | 0.43   |
| 50     | Parkson C Filter Hood Vent       | 4,410  | 2.00  | 2.205        | 8,165   | 9,000   | 0.096    | 0.21  | 0.43      | 0           | 0.21       | 0.43   |

| Estimated PM Emissions Factor Based on Past Permit Applications |                                  |             |                                     |          |        |  |  |  |
|-----------------------------------------------------------------|----------------------------------|-------------|-------------------------------------|----------|--------|--|--|--|
| Source                                                          | Description                      | Permitted ' | Permitted Throughput Permitted Emis |          |        |  |  |  |
|                                                                 |                                  |             |                                     | Emission | Factor |  |  |  |
|                                                                 |                                  |             |                                     | Limit    |        |  |  |  |
|                                                                 |                                  | lb/hr       | tph                                 | lb/hr    | lb/ton |  |  |  |
| 7B                                                              | Straight Line Vacuum Filter Hood | 2,292       | 1.146                               | 0.11     | 0.096  |  |  |  |
| 007                                                             | West Vacuum Filter Vent          | 3,000       | 1.5                                 | 0.14     | 0.093  |  |  |  |
| 008                                                             | East Vacuum Filter Vent          | 3,000       | 1.5                                 | 0.14     | 0.093  |  |  |  |
| 2A                                                              | Dispersion BatchTanks            | 84,000      | 42                                  | 0.08     | 0.002  |  |  |  |
| 2                                                               | Rx & Disp. Tank                  | 84,000      | 42                                  | 0.08     | 0.002  |  |  |  |
| 17B                                                             | Eimco B Filter Hood Vent         | 2,292       | 1.146                               | 0,11     | 0,096  |  |  |  |
| 17C                                                             | Eimco C Filter Hood Vent         | 2,292       | 1.146                               | 0.11     | 0.096  |  |  |  |
| 50                                                              | Parkson C Filter Hood Vent       | 2,292       | 1.146                               | 0.11     | 0.096  |  |  |  |

|        |                         |       |      |              |       |       |          |       | Eı      | nissions (VO | C)   |        |
|--------|-------------------------|-------|------|--------------|-------|-------|----------|-------|---------|--------------|------|--------|
|        |                         |       |      |              |       |       | Emission |       |         | Control      |      |        |
|        |                         |       | (    | Operating Ra | te    |       | Factor   | Uncon | trolled | Efficiency   | Cont | rolled |
| Source | Description             | pph   | mtph | tph          | mtpy  | tpy   | lb/ton   | pph   | tpy     | %            | pph  | tpy    |
| 007    | West Vacuum Filter Vent | 2,205 | 1.00 | 1.1025       | 8,762 | 5,400 | 0.707    | 0.78  | 1.91    | 0            | 0.78 | 1.91   |
| 008    | East Vacuum Filter Vent | 2,205 | 1.00 | 1.1025       | 8,762 | 5,400 | 0.707    | 0.78  | 1.91    | 0            | 0.78 | 1.91   |

| Estimated VOC Emissions Factor Based on Past Permit Applications |                         |                                      |     |          |          |  |  |
|------------------------------------------------------------------|-------------------------|--------------------------------------|-----|----------|----------|--|--|
| Source                                                           | Description             | Permitted Throughput Permitted Emiss |     |          | Emission |  |  |
|                                                                  |                         |                                      |     | Emission | Factor   |  |  |
|                                                                  |                         |                                      |     | Limit    |          |  |  |
|                                                                  |                         | lb/hr                                | tph | lb/hr    | lb/ton   |  |  |
| 007                                                              | West Vacuum Filter Vent | 3,000                                | 1.5 | 1.06     | 0.707    |  |  |
| 008                                                              | East Vacuum Filter Vent | 3,000                                | 1.5 | 1.06     | 0,707    |  |  |

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|-----------------------------------------------------------------------------------|--------------------------------------------------------|
| By: PEW                                                                           | Checked By: CCS                                        |
| Date: 9/23/2014                                                                   | Date: 9/23/2014                                        |
| Revised: 02/17/17 by JJD                                                          | Revision Checked by: PEW on 2/22/2017                  |

#### Particulate Matter Sources Continued

The following emissions estimate is intended to represent emissions of particulate matter from the transfer of clay or clay based materials throughout the system at Elementis. The transfers are pneumatic and are controlled by dust collectors. A specific emissions factor does not exist for the clay/clay based materials. The pneumatic transfer of cement supplements from AP-42 Section 11.12, Table 11-12-2 has been selected as a representative emissions factor. PM, PM10, and PM2.5 are assumed to be equal. Yearly throughputs are based on yearly production or 8,760 hours per year unless noted.

| Convert metric tons to short tons multiply by: | 1.10231  |  |
|------------------------------------------------|----------|--|
| Convert short tons to metric tons multiply by: | 0.907184 |  |

|        |                        |        |       |              |        |        |          |       | Emissions | (PM, PM10 a | and PM2.5) |        |
|--------|------------------------|--------|-------|--------------|--------|--------|----------|-------|-----------|-------------|------------|--------|
|        |                        |        |       |              |        |        | Emission |       |           | Control     |            |        |
|        |                        |        | - (   | Operating Ra | te     |        | Factor   | Uncon | trolled   | Efficiency  | Cont       | rolled |
| Source | Description            | pph    | mtph  | tph          | mtpy   | tpy    | lb/ton   | pph   | tpy       | %           | pph        | tpy    |
| 9A     | Silos                  | 50,000 | 22.68 | 25.00        | 18,243 | 20,109 | 3.14     | 78,50 | 31.57     | 99.9        | 0.0785     | 0.0316 |
| 9B     | Day Bin                | 50,000 | 22.68 | 25.00        | 18,243 | 20,109 | 3.14     | 78.50 | 31.57     | 99.9        | 0.0785     | 0.0316 |
| 13     | Haver A Packer         | 3,675  | 1.67  | 1.84         | 8,165  | 9,000  | 3.14     | 5.77  | 14.13     | 99.9        | 0.0058     | 0.0141 |
| 009    | Haver C Packer         | 4,410  | 2.00  | 2.21         | 8,165  | 9,000  | 3.14     | 6.92  | 14.13     | 99.9        | 0.0069     | 0.0141 |
| 16     | ACM #1 Mill            | 3,675  | 1.67  | 1.84         | 8,165  | 9,000  | 3.14     | 5.77  | 14.13     | 99.9        | 0.0058     | 0.0141 |
| 40     | Bulk Sack Packer       | 3,000  | 1.36  | 1.50         | 8,165  | 9,000  | 3.14     | 4.71  | 14.13     | 99.9        | 0.0047     | 0.0141 |
| 5      | ACM #2 Mill            | 3,675  | 1.67  | 1.84         | 8,165  | 9,000  | 3.14     | 5.77  | 14.13     | 99.9        | 0.0058     | 0.0141 |
| 41     | AC1 Feed Bin           | 3,675  | 1.67  | 1.84         | 8,165  | 9,000  | 3.14     | 5.77  | 14.13     | 99.9        | 0.0058     | 0.0141 |
| 42     | AC2 Feed Bin           | 3,675  | 1.67  | 1.84         | 8,165  | 9,000  | 3.14     | 5.77  | 14.13     | 99.9        | 0.0058     | 0.0141 |
| 43     | 51 Recycle Bin         | 4,410  | 2.00  | 2.21         | 4,381  | 4,829  | 3.14     | 6.92  | 7.58      | 99.9        | 0.0069     | 0.0076 |
| 44     | Haver A Hopper         | 3,675  | 1.67  | 1.84         | 8,165  | 9,000  | 3.14     | 5.77  | 14.13     | 99.9        | 0.0058     | 0.0141 |
| 45     | Dump Station A         | 3,675  | 1.67  | 1.84         | 3,651  | 4,024  | 3.14     | 5.77  | 6.32      | 99.9        | 0.0058     | 0.0063 |
| 46     | Dump Station C         | 4,000  | 1.81  | 2.00         | 3,973  | 4,380  | 3.14     | 6.28  | 6.88      | 99.9        | 0.0063     | 0.0069 |
| 47     | Haver C Packing Hopper | 4,410  | 2.00  | 2.21         | 8,165  | 9,000  | 3.14     | 6.92  | 14.13     | 99.9        | 0.0069     | 0.0141 |
| 10     | Pug Mill/51 Mill (1)   | 8,820  | 4.00  | 4.41         | 8,165  | 9,000  | 3.14     | 13.85 | 14.13     | 99.9        | 0.0138     | 0.0141 |
| 9C     | Pug Mill Feed Hopper   | 4,410  | 2.00  | 2.21         | 8,165  | 9,000  | 3.14     | 6.92  | 14.13     | 99.9        | 0.0069     | 0.0141 |
| 20     | Anion Addition         | 4,000  | 1.81  | 2.00         | 9,536  | 10,512 | 3.14     | 6.28  | 16.5      | 99.9        | 0.0063     | 0.0165 |
| 49     | Long Conveyor - Torrit | 3,675  | 1.67  | 1.84         | 8,165  | 9,000  | 3.14     | 5.77  | 14.13     | 99.9        | 0.0058     | 0.0141 |
| 51     | Soda Ash System        | 3,000  | 1.36  | 1.50         | 318    | 350    | 3.14     | 4.71  | 0.55      | 99.9        | 0.0047     | 0.0005 |

Anion based on 60% operations.

Based on Running 1/4th of Year (2,190 hrs/yr)

1. The Pug Mill and 51 Mill vent through emission point 10 or 7-17B. Each source has a throughput of 4,410 pph.

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By: PEW Date: 9/23/2014 Revised: 02/17/17 by JJD

Checked By: CCS Date: 9/23/2014 Revision Checked by: PEW on 2/22/2017

**Oxidizer** Combustion Emissions - Source 7-17B

| Fuel Use =              | 3,000     | scf/hr                       | Calculated |
|-------------------------|-----------|------------------------------|------------|
| Heat Content of Fuel =  | 1,000     | Btu/scf                      | Standard   |
| Maximum Burner Rating = | 3,000,000 | Btu/hr                       | Provided   |
| Hours of Operation =    | 8,760     | hrs/year                     |            |
| Fuel Usage =            | 0.0030    | 10 <sup>6</sup> scf per hour |            |
|                         | 26.28     | 10 <sup>6</sup> scf/year     |            |

|                             |                        | Criteria and HAP Emission | 5             |           |             |
|-----------------------------|------------------------|---------------------------|---------------|-----------|-------------|
| Emission                    | E                      | EF <sup>(5)</sup>         | Em            | issions   | EF          |
| Туре                        | lb/10 <sup>6</sup> scf | lb/MMBtu <sup>(4)</sup>   | lb/hr         | tons/year | Reference   |
| РМ                          | 7.6                    | 0.00745098                | 0.02          | 0.09      | Table 1.4-2 |
| PM10 <sup>(1)</sup>         | 7.6                    | 0.00745098                | 0.02          | 0.09      | See Note 1  |
| PM2.5 <sup>(1)</sup>        | 7.6                    | 0.00745098                | 0.02          | 0.09      | See Note 1  |
| $SO_2$                      | 0.6                    | 0.000588235               | 0.01          | 0.04      | Table 1.4-2 |
| NOx                         | 100                    | 0.098039216               | 0.29          | 1.27      | Table 1.4-1 |
| CO                          | 84                     | 0.082352941               | 0.25          | 1.10      | Table 1.4-1 |
| VOC                         | 5,5                    | 0.005392157               | 0.02          | 0.09      | Table 1,4-2 |
| lazardous Air Pollutants    |                        | ······                    |               |           |             |
| HAPS- VOC <sup>(2)</sup>    | 1,88                   | 0.001843137               | 0.01          | 0.04      | Table 1.4-3 |
| HAPS - METAL <sup>(3)</sup> | 0.00556                | 5.45098E-06               | 0.01          | 0.04      | Table 1.4-4 |
| Total HAPS                  | NA                     | NA                        | 0.02          | 0.08      | NA          |
| lotes:                      |                        | · ·                       | Rounding to * | 2         |             |

1 - It is assumed that PM10 and PM2.5 are equal to TSP (PM).

2 - Total VOC HAPS as listed in Table 1.4-3 (AP-42).

3 - Total METAL HAPS as listed in Table 1.4-4 (AP-42).

4 - To convert from lb/106 scf to lb/MMBtu divide by 1020 per AP-42, Table 1.4.-1, Footnote a.

5 - Emission factors from AP-42, Section 1.4 dated 7/98.

| G           | HG Potential Emissions (Me | etric Tons)   |       |
|-------------|----------------------------|---------------|-------|
| Fuel Type   | CO2                        | CH4           | N2O   |
| Natural Gas | 1,432.38                   | 0.03          | 0.003 |
| 100 yr GWP* | 1                          | 25            | 298   |
| CO2e        | 1,432.38                   | 0.68          | 0.81  |
| Total CO2e  |                            | Metric Tons = | 1,434 |
|             |                            | Short Tons =  | 1,581 |

\*Global Warming Potentials (GWP) Referenced from 40CFR§98 Subpart A Table A-1

#### $CO2 = 1 \times 10^{-3}$ \*mass of fuel\*HHV\*EF (Eq. C-2a)

CH4 or N2O =  $1 \times 10^{-3}$  mass of fuel\*HHV\*EF (Eq. C-9a)

#### Natural Gas Combustion

| 1.00E-03   | conversion factor from kilograms to metric tons |
|------------|-------------------------------------------------|
| 26,280,000 | cubic feet of natural gas burned annually       |
| 1.028E-03  | HHV MMBtu/scf                                   |
| 53.02      | kg CO2/MMBtu                                    |
| 1.00E-03   | kg CH4/MMBtu                                    |
| 1.00E-04   | kg N2O/MMBtu                                    |

Equations, HHV, and emission factors from 40CFR§98 Subpart C unless otherwise noted.

natural gas high heating value (HHV) from Table C-1 natural gas emission factor from Table C-1 natural gas emission factor from Table C-2 natural gas emission factor from Table C-2

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

Calculated Standard Provided

By: PEW Date: 9/23/2014 Revised: 02/17/17 by JJD

Checked By: CCS Date: 9/23/2014 Revision Checked by: PEW on 2/22/2017

Kewanee Boiler - Source 18

| Fuel Use =              | 20,085     | scf/hr                       |
|-------------------------|------------|------------------------------|
| Heat Content of Fuel =  | 1,000      | Btu/scf                      |
| Maximum Burner Rating = | 20,085,000 | Btu/hr                       |
| Hours of Operation =    | 8,760      | hrs/year                     |
| Fuel Usage =            | 0.0201     | 10 <sup>6</sup> scf per hour |
|                         | 176.08     | 10 <sup>6</sup> scf/year     |

|                             |                            | Criteria and HAP Emission | IS            |           |             |
|-----------------------------|----------------------------|---------------------------|---------------|-----------|-------------|
| Emission                    | Emission EF <sup>(5)</sup> |                           | Em            | issions   | EF          |
| Туре                        | lb/10 <sup>6</sup> scf     | lb/MMBtu <sup>(4)</sup>   | lb/hr         | tons/year | Reference   |
| PM                          | 7.6                        | 0.00745098                | 0,15          | 0.66      | Table 1.4-2 |
| PM10 <sup>(1)</sup>         | 7.6                        | 0.00745098                | 0.15          | 0.66      | See Note 1  |
| PM2.5 <sup>(1)</sup>        | 7.6                        | 0.00745098                | 0.15          | 0.66      | See Note 1  |
| SO <sub>2</sub>             | 0.6                        | 0.000588235               | 0.01          | 0.04      | Table 1.4-2 |
| NOx                         | 100                        | 0.098039216               | 1.97          | 8.63      | Table 1.4-1 |
| CO                          | 84                         | 0.082352941               | 1.65          | 7.23      | Table 1.4-1 |
| VOC                         | 5.5                        | 0.005392157               | 0,11          | 0.48      | Table 1.4-2 |
| lazardous Air Pollutants    |                            |                           |               |           |             |
| HAPS- VOC <sup>(2)</sup>    | 1.88                       | 0.001843137               | 0.04          | 0.18      | Table 1.4-3 |
| HAPS - METAL <sup>(3)</sup> | 0.00556                    | 5.45098E-06               | 0.01          | 0.04      | Table 1.4-4 |
| Total HAPS                  | NA                         | NA                        | 0.05          | 0.22      | NA          |
| otes:                       |                            |                           | Rounding to = | 2         |             |

1 - It is assumed that PM10 and PM2.5 are equal to TSP (PM).

2 - Total VOC HAPS as listed in Table 1.4-3 (AP-42).

3 - Total METAL HAPS as listed in Table 1.4-4 (AP-42).

4 - To convert from lb/106 scf to lb/MMBtu divide by 1020 per AP-42, Table 1.4.-1, Footnote a.

5 - Emission factors from AP-42, Section 1.4 dated 7/98.

| GHG Potential Emissions (Metric Tons) |          |               |        |
|---------------------------------------|----------|---------------|--------|
| Fuel Type                             | CO2      | CH4           | N2O    |
| Natural Gas                           | 9,589.53 | 0.18          | 0.02   |
| 100 yr GWP*                           | 1        | 25            | 298    |
| CO2e                                  | 9,589.53 | 4.52          | 5.39   |
| Total CO2e                            |          | Metric Tons = | 9,599  |
|                                       |          | Short Tons =  | 10,581 |

\*Global Warming Potentials (GWP) Referenced from 40CFR§98 Subpart A Table A-1

#### $CO2 = 1 \times 10^{-3} \text{ mass of fuel} \text{ HHV} \text{ EF (Eq. C-2a)}$

CH4 or N2O =  $1 \times 10^{-3}$  mass of fuel\*HHV\*EF (Eq. C-9a)

#### Natural Gas Combustion

| 1.00E-03    | conversion factor from kilograms to metric tons |
|-------------|-------------------------------------------------|
| 175,940,000 | cubic feet of natural gas burned annually       |
| 1.028E-03   | HHV MMBtu/scf                                   |
| 53.02       | kg CO2/MMBtu                                    |
| 1.00E-03    | kg CH4/MMBtu                                    |
| 1.00E-04    | kg N2O/MMBtu                                    |

natural gas high heating value (HHV) from Table C-1 natural gas emission factor from Table C-1 natural gas emission factor from Table C-2 natural gas emission factor from Table C-2

Equations, HHV, and emission factors from 40CFR§98 Subpart C unless otherwise noted.

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By: PEW Date: 9/23/2014 Revised: 02/17/17 by JJD

Checked By: CCS Date: 9/23/2014

#### Revision Checked by: PEW on 2/22/2017

#### Gas Fired Heater Vent - Source 19

Used when the boiler is not in operation to heat water for Quat

| Fuel Use =400sct/hrHeat Content of Fuel =1,000Btu/scfMaximum Burner Rating =400,000Btu/hrHours of Operation =8,760hrs/yearFuel Usage =0.00040 $10^6$ scf g3.51 $10^6$ scf/y | per hour |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|

|                             |                        | Criteria and HAP Emission | 18          |           |             |  |
|-----------------------------|------------------------|---------------------------|-------------|-----------|-------------|--|
| Emission                    | EF <sup>(5)</sup>      |                           | Em          | Emissions |             |  |
| Туре                        | lb/10 <sup>6</sup> scf | lb/MMBtu <sup>(4)</sup>   | lb/hr       | tons/year | Reference   |  |
| PM                          | 7.6                    | 0.00745098                | 0.01        | 0.04      | Table 1.4-2 |  |
| PM10 <sup>(1)</sup>         | 7.6                    | 0.00745098                | 0.01        | 0.04      | See Note 1  |  |
| PM2.5 <sup>(1)</sup>        | 7.6                    | 0.00745098                | 0.01        | 0.04      | See Note 1  |  |
| $SO_2$                      | 0.6                    | 0.000588235               | 0.01        | 0.04      | Table 1.4-2 |  |
| NOx                         | 100                    | 0.098039216               | 0.04        | 0.18      | Table 1.4-1 |  |
| CO                          | 84                     | 0.082352941               | 0.04        | 0.18      | Table 1.4-1 |  |
| VOC                         | 5.5                    | 0.005392157               | 0.01        | 0.04      | Table 1.4-2 |  |
| lazardous Air Pollutants    |                        |                           |             |           |             |  |
| HAPS- VOC <sup>(2)</sup>    | 1.88                   | 0.001843137               | 0.01        | 0.04      | Table 1.4-3 |  |
| HAPS - METAL <sup>(3)</sup> | 0,00556                | 5.45098E-06               | 0.01        | 0.04      | Table 1.4-4 |  |
| Total HAPS                  | NA                     | NA                        | 0.02        | 0.09      | NA          |  |
| lotes:                      |                        |                           | Rounding to | 2         |             |  |

1 - It is assumed that PM10 and PM2.5 are equal to TSP (PM).

2 - Total VOC HAPS as listed in Table 1.4-3 (AP-42).

3 - Total METAL HAPS as listed in Table 1.4-4 (AP-42).

4 - To convert from lb/106 scf to lb/MMBtu divide by 1020 per AP-42, Table 1.4.-1, Footnote a.

5 - Emission factors from AP-42, Section 1.4 dated 7/98.

| GHG Potential Emissions (Metric Tons) |        |               |        |
|---------------------------------------|--------|---------------|--------|
| Fuel Type                             | CO2    | CH4           | N2O    |
| Natural Gas                           | 190.77 | 0.004         | 0.0004 |
| 100 yr GWP*                           | 1      | 25            | 298    |
| CO2e                                  | 190.77 | 0.09          | 0.11   |
| Total CO2e                            |        | Metric Tons = | 191    |
| · · · · · · · · · · · · · · · · · · · |        | Short Tons =  | 210    |

\*Global Warming Potentials (GWP) Referenced from 40CFR \$98 Subpart A Table A-1

 $CO2 = 1 \times 10^{-3}$ \*mass of fuel\*HHV\*EF (Eq. C-2a) CH4 or N2O =  $1 \times 10^{-3}$ \*mass of fuel\*HHV\*EF (Eq. C-9a)

#### Natural Gas Combustion

| 1.00E-03  | conversion factor from kilograms to metric tons |
|-----------|-------------------------------------------------|
| 3,500,000 | cubic feet of natural gas burned annually       |
| 1.028E-03 | HHV MMBtu/scf                                   |
| 53.02     | kg CO2/MMBtu                                    |
| 1.00E-03  | kg CH4/MMBtu                                    |
| 1.00E-04  | kg N2O/MMBtu                                    |

Equations, HHV, and emission factors from 40CFR§98 Subpart C unless otherwise noted.

natural gas high heating value (HHV) from Table C-1 natural gas emission factor from Table C-1 natural gas emission factor from Table C-2 natural gas emission factor from Table C-2

| By: PEW                  | Checked By: CCS                       |
|--------------------------|---------------------------------------|
| Date: 9/23/2014          | Date: 9/23/2014                       |
| Revised: 02/17/17 by JJD | Revision Checked by: PEW on 2/22/2017 |

#### Fluid Bed Dryers' Non-Combustion Particulate Emissions

| Émission Unit ID | 017 | West 1st Stage FBD |
|------------------|-----|--------------------|
|                  | 018 | West 2nd Stage FBD |
|                  | 019 | East 1st Stage FBD |
|                  | 020 | East 2nd Stage FBD |

The following emissions estimate is intended to represent non-combustion emissions of particulate matter and VOC from the operations of the four (4) Fluid Bed Dryers. The dryers are identical in makeup and are estimated to have the same emissions from drying the products. The emissions are based on an estimated emissions value that was developed in the previous permit revisions. PM, PM10, and PM2.5 are assumed to be equal.

| Processing Rate                                | 2,205    | lb/hr |
|------------------------------------------------|----------|-------|
| Operating Hours                                | 8,760    | hours |
| Convert metric tons to short tons multiply by: | 1.10231  |       |
| Convert short tons to metric tons multiply by: | 0.907184 |       |
|                                                |          |       |

| VOC | Production Rate/Uncontrolled Emissions |       |       | Controlled | Emissions |      |
|-----|----------------------------------------|-------|-------|------------|-----------|------|
|     | mtph                                   | pph   | mtpy  | tpy        | pph       | tpy  |
|     | 0.68                                   | 1,500 | 5,960 | 6,570      | 0.53      | 2.32 |
|     | 1.00                                   | 2,205 | 8,165 | 9,000      | 0.78      | 3.18 |

| PM/PM10/PM2.5 | Production Rate/Uncontrolled Emissions |       |       |       | Controlled | Emissions |
|---------------|----------------------------------------|-------|-------|-------|------------|-----------|
|               | mtph                                   | pph   | mtpy  | tpy   | pph        | tpy       |
|               | 0.68                                   | 1,500 | 5,960 | 6,570 | 0.06       | 0.26      |
|               | 1.00                                   | 2,205 | 8,165 | 9,000 | 0.09       | 0.36      |

Rounding to

2

#### By: PEW Date: 9/23/2014 Revised: 02/17/17 by JJD

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

> Checked By: CCS Date: 9/23/2014

Revision Checked by: PEW on 2/22/2017

West 1st Stage FBD - Source 017

| Fuel Use =              | 5,250     | scf/hr                       | Calculated |
|-------------------------|-----------|------------------------------|------------|
| Heat Content of Fuel =  | 1,000     | Btu/scf                      | Standard   |
| Maximum Burner Rating = | 5,250,000 | Btu/hr                       | Provided   |
| Hours of Operation =    | 8,760     | hrs/year                     |            |
| Fuel Usage =            | 0.005     | 10 <sup>6</sup> scf per hour |            |
|                         | 46.43     | 10 <sup>6</sup> scf/year     |            |

|                             |                        | Criteria and HAP Emission             | \$            |           |             |
|-----------------------------|------------------------|---------------------------------------|---------------|-----------|-------------|
| Emission                    | E                      | ( <sup>5)</sup>                       | Em            | issions   | EF          |
| Туре                        | lb/10 <sup>6</sup> scf | lb/MMBtu <sup>(4)</sup>               | lb/hr         | tons/year | Reference   |
| PM                          | 7.6                    | 0.00745098                            | 0.04          | 0,18      | Table 1.4-2 |
| PM10 <sup>(1)</sup>         | 7.6                    | 0.00745098                            | 0.04          | 0.18      | See Note 1  |
| PM2.5 <sup>(1)</sup>        | 7.6                    | 0.00745098                            | 0.04          | 0.18      | See Note 1  |
| SO <sub>2</sub>             | 0.6                    | 0.000588235                           | 0.01          | 0.04      | Table 1.4-2 |
| NOx                         | 100                    | 0.098039216                           | 0.51          | 2.23      | Table 1.4-1 |
| CO                          | 84                     | 0.082352941                           | 0.43          | 1.88      | Table 1.4-1 |
| VOC                         | 5.5                    | 0.005392157                           | 0.03          | 0.13      | Table 1.4-2 |
| azardous Air Pollutants     |                        |                                       |               |           |             |
| HAPS- VOC <sup>(2)</sup>    | 1.88                   | 0.001843137                           | 0.01          | 0.04      | Table 1.4-3 |
| HAPS - METAL <sup>(3)</sup> | 0.00556                | 5.45098E-06                           | 0.01          | 0.04      | Table 1.4-4 |
| Total HAPS                  | NA                     | NA                                    | 0.02          | 0.08      | NA          |
| otes:                       |                        | · · · · · · · · · · · · · · · · · · · | Rounding to = | 2         |             |

1 - It is assumed that PM10 and PM2.5 are equal to TSP (PM).

2 - Total VOC HAPS as listed in Table 1.4-3 (AP-42).

3 - Total METAL HAPS as listed in Table 1.4-4 (AP-42).

4 - To convert from lb/106 scf to lb/MMBtu divide by 1020 per AP-42, Table 1.4.-1, Footnote a.

5 - Emission factors from AP-42, Section 1.4 dated 7/98.

|             | GHG Potential Emissions (Me | etric Tons)   |       |
|-------------|-----------------------------|---------------|-------|
| Fuel Type   | CO2                         | CH4           | N2O   |
| Natural Gas | 2,506.66                    | 0.05          | 0.005 |
| 100 yr GWP* | 1                           | 25            | 298   |
| CO2e        | 2,506.66                    | 1.18          | 1.41  |
| Total CO2e  |                             | Metric Tons = | 2,509 |
|             |                             | Short Tons =  | 2,766 |

\*Global Warming Potentials (GWP) Referenced from 40CFR§98 Subpart A Table A-1

#### CO2 = 1 x10<sup>-3</sup>\*mass of fuel\*HHV\*EF (Eq. C-2a)

CH4 or N2O =  $1 \times 10^{-3}$  mass of fuel\*HHV\*EF (Eq. C-9a)

#### Natural Gas Combustion

| 1.00E-03   | conversion factor from kilograms to metric tons |
|------------|-------------------------------------------------|
| 45,990,000 | cubic feet of natural gas burned annually       |
| 1.028E-03  | HHV MMBtu/scf                                   |
| 53.02      | kg CO2/MMBtu                                    |
| 1.00E-03   | kg CH4/MMBtu                                    |
| 1.00E-04   | kg N2O/MMBtu                                    |

natural gas emission factor from Table C-1 natural gas emission factor from Table C-2 natural gas emission factor from Table C-2

natural gas high heating value (HHV) from Table C-1

Equations, HHV, and emission factors from 40CFR§98 Subpart C unless otherwise noted.

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

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Checked By: CCS Date: 9/23/2014

Revision Checked by: PEW on 2/22/2017

West 2nd Stage FBD - Source 018

| Fuel Use =              | 5,250     | scf/hr                       | Calculated |
|-------------------------|-----------|------------------------------|------------|
| Heat Content of Fuel =  | 1,000     | Btu/scf                      | Standard   |
| Maximum Burner Rating = | 5,250,000 | Btu/hr                       | Provided   |
| Hours of Operation =    | 8,760     | hrs/year                     |            |
| Fuel Usage =            | 0.005     | 10 <sup>6</sup> scf per hour |            |
|                         | 46.43     | 10 <sup>6</sup> scf/year     |            |

|                             |                        | Criteria and HAP Emission             | 5             |           |             |
|-----------------------------|------------------------|---------------------------------------|---------------|-----------|-------------|
| Emission                    | E                      | F <sup>(5)</sup>                      | Em            | issions   | EF          |
| Туре                        | lb/10 <sup>6</sup> scf | lb/MMBtu <sup>(4)</sup>               | lb/hr         | tons/year | Reference   |
| PM                          | 7.6                    | 0.00745098                            | 0.04          | 0.18      | Table 1.4-2 |
| PM10 <sup>(1)</sup>         | 7.6                    | 0.00745098                            | 0.04          | 0.18      | See Note 1  |
| PM2.5 <sup>(1)</sup>        | 7.6                    | 0.00745098                            | 0.04          | 0.18      | See Note 1  |
| SO <sub>2</sub>             | 0.6                    | 0.000588235                           | 0.01          | 0.04      | Table 1.4-2 |
| NOx                         | 100                    | 0.098039216                           | 0.51          | 2.23      | Table 1.4-1 |
| CO                          | 84                     | 0.082352941                           | 0.43          | 1.88      | Table 1.4-1 |
| VOC                         | 5.5                    | 0.005392157                           | 0.03          | 0.13      | Table 1.4-2 |
| azardous Air Pollutants     |                        | · · · · · · · · · · · · · · · · · · · |               |           |             |
| HAPS- VOC <sup>(2)</sup>    | 1.88                   | 0.001843137                           | 0.01          | 0.04      | Table 1.4-3 |
| HAPS - METAL <sup>(3)</sup> | 0.00556                | 5.45098E-06                           | 0.01          | 0.04      | Table 1.4-4 |
| Total HAPS                  | NA                     | NA                                    | 0.02          | 0.08      | NA          |
| otes:                       | •                      |                                       | Rounding to = |           |             |

1 - It is assumed that PM10 and PM2.5 are equal to TSP (PM).

2 - Total VOC HAPS as listed in Table 1.4-3 (AP-42).

3 - Total METAL HAPS as listed in Table 1.4-4 (AP-42).

4 - To convert from lb/106 scf to lb/MMBtu divide by 1020 per AP-42, Table 1.4.-1, Footnote a.

5 - Emission factors from AP-42, Section 1.4 dated 7/98.

|             | GHG Potential Emissions (Me | etric Tons)   |       |
|-------------|-----------------------------|---------------|-------|
| Fuel Type   | CO2                         | CH4           | N2O   |
| Natural Gas | 2,506.66                    | 0.05          | 0.005 |
| 100 yr GWP* | I                           | 25            | 298   |
| CO2e        | 2,506.66                    | 1.18          | 1.41  |
| Total CO2e  |                             | Metric Tons = | 2,509 |
|             |                             | Short Tons =  | 2,766 |

\*Global Warming Potentials (GWP) Referenced from 40CFR§98 Subpart A Table A-1

 $CO2 = 1 \times 10^{-3}$ \*mass of fuel\*HHV\*EF (Eq. C-2a)

CH4 or N2O =  $1 \times 10^{-3}$  mass of fuel\*HHV\*EF (Eq. C-9a)

#### Natural Gas Combustion

| 1.00E-03   | conversion factor from kilograms to metric tons |
|------------|-------------------------------------------------|
| 45,990,000 | cubic feet of natural gas burned annually       |
| 1.028E-03  | HHV MMBtu/scf                                   |
| 53.02      | kg CO2/MMBtu                                    |
| 1.00E-03   | kg CH4/MMBtu                                    |
| 1.00E-04   | kg N2O/MMBtu                                    |

Equations, HHV, and emission factors from 40CFR§98 Subpart C unless otherwise noted.

natural gas high heating value (HHV) from Table C-1 natural gas emission factor from Table C-1 natural gas emission factor from Table C-2 natural gas emission factor from Table C-2

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

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Checked By: CCS Date: 9/23/2014

Revision Checked by: PEW on 2/22/2017

# East 1st Stage FBD - Source 019

| Fuel Use =              | 5,250     | scf/hr                       | Calculated |
|-------------------------|-----------|------------------------------|------------|
| Heat Content of Fuel =  | 1,000     | Btu/scf                      | Standard   |
| Maximum Burner Rating = | 5,250,000 | Btu/hr                       | Provided   |
| Hours of Operation =    | 8,760     | hrs/year                     |            |
| Fuel Usage =            | 0.005     | 10 <sup>6</sup> scf per hour |            |
|                         | 46.43     | 10 <sup>6</sup> scf/year     |            |

|                             |                        | Criteria and HAP Emission             | S             |           |             |
|-----------------------------|------------------------|---------------------------------------|---------------|-----------|-------------|
| Emission                    | E                      | F <sup>(5)</sup>                      | Em            | issions   | EF          |
| Туре                        | lb/10 <sup>6</sup> scf | lb/MMBtu <sup>(4)</sup>               | lb/hr         | tons/year | Reference   |
| PM                          | 7.6                    | 0.00745098                            | 0.04          | 0.18      | Table 1.4-2 |
| PM10 <sup>(1)</sup>         | 7.6                    | 0.00745098                            | 0.04          | 0.18      | See Note 1  |
| PM2.5 <sup>(I)</sup>        | 7.6                    | 0.00745098                            | 0.04          | 0.18      | See Note 1  |
| SO <sub>2</sub>             | 0.6                    | 0.000588235                           | 0.01          | 0.04      | Table 1.4-2 |
| NOx                         | 100                    | 0.098039216                           | 0.51          | 2.23      | Table 1.4-1 |
| СО                          | 84                     | 0.082352941                           | 0,43          | 1.88      | Table 1.4-1 |
| VOC                         | 5.5                    | 0.005392157                           | 0.03          | 0.13      | Table 1.4-2 |
| lazardous Air Pollutants    |                        | · · · · · · · · · · · · · · · · · · · |               |           |             |
| HAPS- VOC <sup>(2)</sup>    | 1.88                   | 0.001843137                           | 0.01          | 0.04      | Table 1.4-3 |
| HAPS - METAL <sup>(3)</sup> | 0.00556                | 5.45098E-06                           | 0.01          | 0.04      | Table 1.4-4 |
| Total HAPS                  | NA                     | NA                                    | 0.02          | 0.08      | NA          |
| otes:                       |                        | •                                     | Rounding to = |           |             |

1 - It is assumed that PM10 and PM2.5 are equal to TSP (PM).

2 - Total VOC HAPS as listed in Table 1.4-3 (AP-42).

3 - Total METAL HAPS as listed in Table 1.4-4 (AP-42).

4 - To convert from lb/106 scf to lb/MMBtu divide by 1020 per AP-42, Table 1.4.-1, Footnote a.

5 - Emission factors from AP-42, Section 1.4 dated 7/98.

|             | GHG Potential Emissions (Me | etric Tons)   |       |
|-------------|-----------------------------|---------------|-------|
| Fuel Type   | CO2                         | CH4           | N2O   |
| Natural Gas | 2,506.66                    | 0.05          | 0.005 |
| 100 yr GWP* | 1                           | 25            | 298   |
| CO2e        | 2,506.66                    | 1.18          | 1.41  |
| Total CO2e  |                             | Metric Tons = | 2,509 |
|             |                             | Short Tons =  | 2.766 |

\*Global Warming Potentials (GWP) Referenced from 40CFR§98 Subpart A Table A-1

#### $CO2 = 1 \times 10^{-3}$ \*mass of fuel\*HHV\*EF (Eq. C-2a)

CH4 or N2O =  $1 \times 10^{-3}$  mass of fuel\*HHV\*EF (Eq. C-9a)

#### Natural Gas Combustion

| 1.00E-03   | conversion factor from kilograms to metric tons |
|------------|-------------------------------------------------|
| 45,990,000 | cubic feet of natural gas burned annually       |
| 1.028E-03  | HHV MMBtu/scf                                   |
| 53.02      | kg CO2/MMBtu                                    |
| 1.00E-03   | kg CH4/MMBtu                                    |
| 1.00E-04   | kg N2O/MMBtu                                    |

natural gas high heating value (HHV) from Table C-1 natural gas emission factor from Table C-1 natural gas emission factor from Table C-2 natural gas emission factor from Table C-2

Equations, HHV, and emission factors from 40CFR§98 Subpart C unless otherwise noted.

By: PEW Date: 9/23/2014 Revised: 02/17/17 by JJD POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

> Checked By: CCS Date: 9/23/2014

Revision Checked by: PEW on 2/22/2017

East 2nd Stage FBD - Source 020

| Fuel Use =<br>Heat Content of Fuel = | 5,250<br>1,000 | scf/hr<br>Btu/scf            | Calculated<br>Standard |
|--------------------------------------|----------------|------------------------------|------------------------|
| Maximum Burner Rating =              | 5,250,000      | Btu/hr                       | Provided               |
| Hours of Operation =                 | 8,760          | hrs/year                     |                        |
| Fuel Usage =                         | 0.005          | 10 <sup>6</sup> sef per hour |                        |
|                                      | 46.43          | 10 <sup>6</sup> scf/year     |                        |

|                             |                        | Criteria and HAP Emission | \$            |           |             |
|-----------------------------|------------------------|---------------------------|---------------|-----------|-------------|
| Emission                    | E                      | EF <sup>(5)</sup>         | Em            | issions   | EF          |
| Туре                        | lb/10 <sup>6</sup> scf | lb/MMBtu <sup>(4)</sup>   | lb/hr         | tons/year | Reference   |
| PM                          | 7.6                    | 0.00745098                | 0,04          | 0.18      | Table 1.4-2 |
| PM10 <sup>(1)</sup>         | 7.6                    | 0.00745098                | 0.04          | 0.18      | See Note 1  |
| PM2.5 <sup>(1)</sup>        | 7.6                    | 0.00745098                | 0.04          | 0,18      | See Note 1  |
| SO <sub>2</sub>             | 0.6                    | 0.000588235               | 0.01          | 0.04      | Table 1.4-2 |
| NOx                         | 100                    | 0.098039216               | 0.51          | 2.23      | Table 1.4-1 |
| СО                          | 84                     | 0.082352941               | 0.43          | 1.88      | Table 1.4-1 |
| VOC                         | 5.5                    | 0.005392157               | 0.03          | 0.13      | Table 1.4-2 |
| azardous Air Pollutants     |                        |                           | · · ·         |           |             |
| HAPS- VOC <sup>(2)</sup>    | 1.88                   | 0.001843137               | 0.01          | 0.04      | Table 1.4-3 |
| HAPS - METAL <sup>(3)</sup> | 0.00556                | 5.45098E-06               | 0.01          | 0.04      | Table 1.4-4 |
| Total HAPS                  | NA                     | NA                        | 0.02          | 0.08      | NA          |
| otes:                       |                        | •                         | Rounding to = |           | .1          |

1 - It is assumed that PM10 and PM2.5 are equal to TSP (PM).

2 - Total VOC HAPS as listed in Table 1.4-3 (AP-42).

3 - Total METAL HAPS as listed in Table 1.4-4 (AP-42).

4 - To convert from lb/106 scf to lb/MMBtu divide by 1020 per AP-42, Table 1.4.-1, Footnote a.

5 - Emission factors from AP-42, Section 1.4 dated 7/98.

|             | <b>GHG Potential Emissions (Me</b> | etric Tons)   |       |
|-------------|------------------------------------|---------------|-------|
| Fuel Type   | CO2                                | CH4           | N2O   |
| Natural Gas | 2,506.66                           | 0.05          | 0.005 |
| 100 yr GWP* | 1                                  | 25            | 298   |
| CO2e        | 2,506.66                           | 1.18          | 1.41  |
| Total CO2   |                                    | Metric Tons = | 2,509 |
|             |                                    | Short Tons =  | 2,766 |

\*Global Warming Potentials (GWP) Referenced from 40CFR§98 Subpart A Table A-1

 $CO2 = 1 \times 10^{-3}$  mass of fuel\*HHV\*EF (Eq. C-2a)

CH4 or N2O =  $1 \times 10^{-3}$ \*mass of fuel\*HHV\*EF (Eq. C-9a)

#### Natural Gas Combustion

| 1.00E-03   | conversion factor from kilograms to metric tons |
|------------|-------------------------------------------------|
| 45,990,000 | cubic feet of natural gas burned annually       |
| 1.028E-03  | HHV MMBtu/scf                                   |
| 53.02      | kg CO2/MMBtu                                    |
| 1.00E-03   | kg CH4/MMBtu                                    |
| 1.00E-04   | kg N2O/MMBtu                                    |

Equations, HHV, and emission factors from 40CFR§98 Subpart C unless otherwise noted.

natural gas high heating value (HHV) from Table C-1 natural gas emission factor from Table C-1 natural gas emission factor from Table C-2 natural gas emission factor from Table C-2

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

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Checked By: CCS Date: 9/23/2014

Revision Checked by: PEW on 2/22/2017

#### Flash Dryer - Source 3

| Fuel Use =              | 10,000     | scf/hr                       | Calculated |
|-------------------------|------------|------------------------------|------------|
| Heat Content of Fuel =  | 1,000      | Btu/scf                      | Standard   |
| Maximum Burner Rating = | 10,000,000 | Btu/hr                       | Provided   |
| Hours of Operation =    | 8,760      | hrs/year                     |            |
| Fuel Usage =            | 0.0100     | 10 <sup>6</sup> scf per hour |            |
|                         | 87.60      | 10 <sup>6</sup> scf/year     |            |

|                             |                        | Criteria and HAP Emission             | s             |           |             |
|-----------------------------|------------------------|---------------------------------------|---------------|-----------|-------------|
| Emission                    | E                      | EF <sup>(5)</sup>                     | Em            | issions   | EF          |
| Туре                        | lb/10 <sup>6</sup> scf | lb/MMBtu <sup>(4)</sup>               | lb/hr         | tons/year | Reference   |
| PM                          | 7.6                    | 0.00745098                            | 0.07          | 0.31      | Table 1.4-2 |
| PM10 <sup>(1)</sup>         | 7.6                    | 0.00745098                            | 0.07          | 0.31      | See Note 1  |
| PM2.5 <sup>(1)</sup>        | 7.6                    | 0.00745098                            | 0.07          | 0.31      | See Note 1  |
| SO <sub>2</sub>             | 0.6                    | 0.000588235                           | 0.01          | 0.04      | Table 1.4-2 |
| NOx                         | 100                    | 0.098039216                           | 0.98          | 4,29      | Table 1.4-1 |
| СО                          | 84                     | 0.082352941                           | 0.82          | 3.59      | Table 1.4-1 |
| VOC                         | 5.5                    | 0.005392157                           | 0.05          | 0.22      | Table 1.4-2 |
| lazardous Air Pollutants    |                        | · · · · · · · · · · · · · · · · · · · |               |           |             |
| HAPS- VOC <sup>(2)</sup>    | 1.88                   | 0.001843137                           | 0.02          | 0,09      | Table 1.4-3 |
| HAPS - METAL <sup>(3)</sup> | 0.00556                | 5.45098E-06                           | 0.01          | 0.04      | Table 1.4-5 |
| Total HAPS                  | NA                     | NA                                    | 0.03          | 0.13      | NA          |
| otes:                       |                        | · · · · ·                             | Rounding to = |           | 1 101       |

1 - It is assumed that PM10 and PM2.5 are equal to TSP (PM).

2 - Total VOC HAPS as listed in Table 1.4-3 (AP-42).

3 - Total METAL HAPS as listed in Table 1.4-4 (AP-42).

4 - To convert from lb/106 scf to lb/MMBtu divide by 1020 per AP-42, Table 1.4.-1, Footnote a.

5 - Emission factors from AP-42, Section 1.4 dated 7/98.

|             | GHG Potential Emissions (Me | etric Tons)   |       |
|-------------|-----------------------------|---------------|-------|
| Fuel Type   | CO2                         | CH4           | N2O   |
| Natural Gas | 4,774.60                    | 0.09          | 0.01  |
| 100 yr GWP* | 1                           | 25            | 298   |
| CO2e        | 4,774.60                    | 2.25          | 2,68  |
| Total CO2e  |                             | Metric Tons = | 4,780 |
|             |                             | Short Tons =  | 5,268 |

\*Global Warming Potentials (GWP) Referenced from 40CFR§98 Subpart A Table A-1

#### $CO2 = 1 \times 10^{-3}$ \*mass of fuel\*HHV\*EF (Eq. C-2a)

CH4 or N2O =  $1 \times 10^{-3}$  mass of fuel\*HHV\*EF (Eq. C-9a)

#### Natural Gas Combustion

| 1.00E-03   | conversion factor from kilograms to metric tons |
|------------|-------------------------------------------------|
| 87,600,000 | cubic feet of natural gas burned annually       |
| 1.028E-03  | HHV MMBtu/sef                                   |
| 53.02      | kg CO2/MMBtu                                    |
| 1.00E-03   | kg CH4/MMBtu                                    |
| 1.00E-04   | kg N2O/MMBtu                                    |

Equations, HHV, and emission factors from 40CFR§98 Subpart C unless otherwise noted.

natural gas high heating value (HHV) from Table C-1 natural gas emission factor from Table C-1 natural gas emission factor from Table C-2 natural gas emission factor from Table C-2

### By: PEW Date: 9/23/2014

Rounding to

Revised: 02/17/17 by JJD

#### Flash Dryer VOC Emissions - Source 3

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

#### Checked By: CCS Date: 9/23/2014

Revision Checked by: PEW on 2/22/2017

| •                                                                 |                          |                                               |
|-------------------------------------------------------------------|--------------------------|-----------------------------------------------|
| Product                                                           | SD-1                     | SD-1                                          |
| Production Rate (metric tons per day)                             | 40                       | 8,165 Metric Tons per year                    |
| Hours of operation                                                | 8,760                    | 9,000 Short Tons per year                     |
| Total lb/hr rate                                                  | 3,675                    | ,                                             |
| Quat Rate (lb/hr)                                                 | 1,540.00                 | 7,542,857 Quat Rate (lb/yr)                   |
| Quat Activity                                                     | 86%                      | 86% Quat Activity                             |
| Quat Received (lb/hr) = Quat Rate/                                | Quat Activity            |                                               |
| Quat Used (lb/hr)                                                 | 1,790.7                  | 8,770,764 Quat Used (lb/yr)                   |
| Ethanol to Reactor = Quat Received $x$ (10)                       | 00%-Quat Activity)       |                                               |
| Ethanol to RX (lb/hr)                                             | 250.7                    | 1,227,907 Ethanol to RX (lb/yr)               |
| Ethanol to the Sewer Vacuum #1                                    | 97%                      | 97% Ethanol to the Sewer V                    |
| Ethanol to Sewer Vacuum #1 = Ethanol Received x %                 | to Sewer                 |                                               |
| Ethanol lb/hr to Sewer Vacuum #1 (lb/hr)                          | 243.18                   | 1,191,070 Ethanol lb/hr to Sewer              |
|                                                                   |                          | Ethanol to press = Etha                       |
| Ethanol to press = Ethanol received - Ethanol to Sewer            | Vacuum #1                | Sewer Vacuum #1                               |
| Ethanol to Press (lb/hr)                                          | 7.52                     | 36,837.21 Ethanol to Press (lb/yr)            |
| % of Ethanol to Filtrate Press                                    | 60%                      | 60.00% % of Ethanol to Filtrate               |
| Ethanol to Filtrate Press = % Ethanol to Filtrate                 | Press x Ethanol to Press |                                               |
| Ethanol to Filtrate Press (lb/hr)                                 | 4.51                     | 22,102 Ethanol to Filtrate Pres               |
| Ethanol to the Sewer Recovery Filter                              | 71.4%                    | 71.4% Ethanol to the Sewer R                  |
| Ethanol to the Sewer Recovery Filter (lb/hr) = % Ethan            |                          | 71.470 Entanoi to the Sewei K                 |
| Ethanol to Filtrate Press                                         |                          |                                               |
| Ethanol to Sewer Recovery Filter (lb/hr)                          | 3.22                     | 15,781 Ethanol to Sewer Recov                 |
| Ethanol to Atmosphere Recovery Filter                             | 14.30%                   | 14.30% Ethanol to Atmosphere                  |
|                                                                   |                          | 14.5070 Enhanor to Atmosphere                 |
| Ethanol to Atmosphere Recovery Filter $(lb/hr) = Eth$             |                          | ,                                             |
| Filter % x Ethanol to Filtrate                                    |                          |                                               |
| Ethanol to Atmosphere Recovery Filter (lb/hr)                     | 0.64                     | 3,161 Ethanol to Atmosphere                   |
| Ethanol lb/hr to Atmosphere from Dryers                           |                          |                                               |
| (lb/hr) = Ethanol to Press - Ethanol to Filtrate<br>Press (lb/hr) |                          |                                               |
|                                                                   | 2.01                     |                                               |
| Ethanol lb/hr to Atmosphere from Dryers (lb/hr)                   | 3.01                     | 14,734.88 Ethanol lb/hr to Atmost<br>7.37 TPY |
|                                                                   |                          |                                               |

2

,857 Quat Rate (lb/yr) 86% Quat Activity ,764 Quat Used (lb/yr) ,907 Ethanol to RX (lb/yr) 97% Ethanol to the Sewer Vacuum #1 ,070 Ethanol lb/hr to Sewer Vacuum #1 (lb/hr) Ethanol to press = Ethanol received - Ethanol to Sewer Vacuum #1 7.21 Ethanol to Press (lb/yr) 00% % of Ethanol to Filtrate Press 102 Ethanol to Filtrate Press (lb/yr) .4% Ethanol to the Sewer Recovery Filter

781 Ethanol to Sewer Recovery Filter (lb/yr) 80% Ethanol to Atmosphere Recovery Filter

161 Ethanol to Atmosphere Recovery Filter (lb/yr)

1.88 Ethanol lb/hr to Atmosphere from Dryers (lb/yr) 7.37 TPY

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| R13-1847E Modification Application          | Project No: 0101-12-0404   |
| By: PEW                                     | Checked By: CCS            |

Date: 9/23/2014 Revised: 02/17/17 by JJD Date: 9/23/2014 Revision Checked by: PEW on 2/22/2017

Revision Checked by: PEW on 2/22/2017

# Flash Dryer PM Emissions - Source 3

The following emissions estimate is intended to represent non-combustion emissions of particulate matter from the operations of the flash dryer. The emissions are based on an estimated emissions developed for the previous permit revisions. PM, PM10, and PM2.5 are assumed to be equal.

Emission Unit ID

3

| This unit only operates                        | 100% of the time |
|------------------------------------------------|------------------|
| Processing Rate                                | 3,675 lb/hr      |
| Operating Hours                                | 8,760 hours      |
| Convert metric tons to short tons multiply by: | 1.10231          |
| Convert short tons to metric tons multiply by: | 0.907184         |

| PM/PM10/PM2.5 | Production Rate/Uncontrolled Emissions |       |        | Controlled Emissions |      |      |
|---------------|----------------------------------------|-------|--------|----------------------|------|------|
|               | mtph                                   | pph   | mtpy   | tpy                  | pph  | tpy  |
|               | 2.08                                   | 4,583 | 8,165  | 20,074               | 0.46 | 2.01 |
|               | 1.67                                   | 3,675 | 14,603 | 9,000                | 0.37 | 0.90 |

2

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#### A-Side Vacuum Pump VOC and HAPs - Source 7-17B

Catalytic Oxidizer VOC and HAP Calculations (A-Side Vacuum Pump is the source of emissions) and the emissions are sent to the oxidizer from control. The emissions are based on the operations when making product SD-1 which yields the highest emissions from this source.

| De La                                                                                 |                       |                   |                                                |                  |
|---------------------------------------------------------------------------------------|-----------------------|-------------------|------------------------------------------------|------------------|
| Product                                                                               |                       | SD-1              |                                                | SD-1             |
| Metric Tons per day<br>Total lb/hr rate                                               |                       | 40                | Metric Tons per year                           | ,                |
| Quat Rate (lb/hr)                                                                     |                       | 3,675             | Short Tons per year                            |                  |
| Quat Rate (IDMF)<br>Quat Activity                                                     |                       | 1,883.40          | Quat Rate (lb/yr)                              | , ,              |
|                                                                                       | A                     | 86%               | Quat Activity                                  | 86%              |
| Quat Received = Quat Rate/Quat<br>Quat Used (lb/hr)                                   | Activity              |                   |                                                |                  |
| Ethanol in Quat (%)                                                                   |                       | 2,190.00          | Quat Used (lb/yr)                              | 10,726,531       |
|                                                                                       |                       | 14%               | Ethanol in Quat (%)                            | 14%              |
| Ethanol to Reactor (lb/hr) = Ethanol in Quat * Quat Received<br>Ethanol to RX (lb/hr) |                       | 306.60            | Ethano! to RX (lb/yr)                          | 1,501,714        |
| Ethanol in the Product to Flash Dryer = 3% x Ethanol to RX                            |                       |                   |                                                | 1,001,711        |
| Ethanol Output (lb/hr)                                                                | 3%                    | 9.20              | Ethanol Output (lb/yr)                         | 45,051           |
| Quat in the Filtrate = Quat Received x 14%                                            |                       |                   |                                                | 45,051           |
| Quat in Filtrate                                                                      | 14%                   | 305.60            | Quat in Filtrate                               | 1,501,714        |
| Ethanol in Filtrate = Ethanol to RX - Ethanol to Flash Dryer                          |                       |                   | <                                              | 1,001,711        |
| Ethanol in Filtrate                                                                   |                       | 297.40            | Ethanol in Filtrate                            | 1,456,663        |
| Ethanol Removed by Vacuum Pump = 76% x Ethanol in Filtrate                            |                       |                   | Estimator in Children                          | 1,400,005        |
| Ethanol Removed by Vacuum Pump (lb/hr)                                                | 76%                   | 226.03            | Ethanol Removed by Vacuum Pump (lb/yr)         | 1,107,064        |
| Ethanol (%) to the Oxidizer = 100%-Vacuum Pump Removal %                              |                       |                   |                                                | 1,107,004        |
|                                                                                       | 24%                   |                   |                                                |                  |
| Ethanol to Oxidizer = % Ethanol to Oxidizer * Ethanol in Filtrate                     |                       |                   |                                                |                  |
| Ethanol to Oxidizer from Vacuum Pumps 7-17A                                           | 24%                   | 71.38 lb/hr       | Ethanol to Oxidizer from Vacuum Pumps 7-17A    | 174.80 tpy       |
| Catalytic Oxidizer Efficiency                                                         | 95%                   |                   | Edianoi to Oxidizer Hom Vacuum Fumps /-1/A     | 174.80 tpy       |
| Ethanol from Oxidizer (lb/hr) = Ethanol to Oxidizer * (100% - Cont                    | rol Efficiency)       |                   |                                                |                  |
| Ethanol from Oxidizer (lb/hr)                                                         |                       | 3.57 lb/hr        | Ethanol from Oxidizer (tpy)                    | 8.74 tpy         |
| Operating Hours                                                                       |                       | 4,380             | Zinanor nom Oxidizer (ipy)                     | 8.74 thy         |
|                                                                                       |                       |                   |                                                |                  |
| Methyl Chloride to Filter (300 ppm in Quat) = Quat Received x 300,                    | /1,000,000            |                   |                                                |                  |
| Methyl Chloride to Filter (lb/hr)                                                     |                       | 0.66              | Methyl Chloride to Filter (lb/yr)              | 3217.96          |
| Methyl Chloride to Oxidizer (lb/hr)                                                   | 100%                  | 0.66 lb/hr        | Methyl Chloride to Oxidizer (lb/yr)            | 3217.96          |
|                                                                                       |                       |                   | Methyl Chloride to Oxidizer (tpy)              | 1.61 tpy         |
| Methyl Chloride from the Oxidizer (lb/hr)                                             |                       | 0.03 lb/hr        | Methyl Chloride from the Oxidizer (lb/yr)      | 160.90           |
|                                                                                       |                       |                   | Methyl Chloride from the Oxidizer (toy)        | 0.08 tpy         |
| Hydrochloric Acid formed in Catalytic Oxidizer                                        |                       |                   | , · · · · · · · · · · · · · · · · · · ·        | 0.00 <b>(</b> p) |
| lbs per mole Methyl Chloride (CH3Cl)                                                  |                       | 50.488            | lbs per mole Methyl Chloride (CH3Cl)           | 50.488           |
| lbs per mole Cl                                                                       |                       | 35 453            | lbs per mole Cl                                | 35.453           |
| mole fraction of Cl in Methyl Chloride (CH3Cl) = lbs per mole Cl / lb                 | s per mole Methyl Chl | oride             | los per mole er                                | 33.433           |
| mole fraction of Cl in Methyl Chloride (CH <sub>3</sub> Cl)                           | 1                     | 0.702206          | mole fraction of CI in Methyl Chloride (CH3Cl) | 0.702206         |
| lbs per mole HCl                                                                      |                       | 36,46094          | ibs per mole HCl                               | 36.46094         |
| mole fraction of Cl in HCl = ibs per mole Cl / ibs per mole HCl                       |                       | 50.10051          | los per mole HCI                               | 30.40094         |
| Mole fraction of Cl in HCl                                                            |                       | 0.972355622       | Mole fraction of Cl in HCl                     | 0.972355622      |
| HCl created (lb/hr) = (Methyl Chloride in - Methyl Chloride out) *                    |                       | 3Cl/ lbs per mole |                                                |                  |
| CH <sub>3</sub> Cl * lbs per mole HCl/ mole fraction                                  | on Cl in HCl          |                   |                                                |                  |
| HCl created (lb/hr) =                                                                 |                       | 0.33 lb/hr        | HCl created (lb/yr)                            | 1594.35          |
| Dounding to                                                                           |                       |                   | HC! (tpy)                                      | 0.80 tpy         |
| Rounding to                                                                           | 2                     |                   |                                                |                  |
|                                                                                       |                       |                   |                                                |                  |

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### C-Side Vacuum Pump VOC and HAPs - Source 7-17B

Catalytic Oxidizer VOC and HAP Calculations (C-Side Vacuum Pump is the source of emissions). These emissions are calculated for worst case hourly emissions. These emissions are based on production of B3000 which is worse case for this source.

| Product                                                                                                                                            |                    | B3000       |                                                | B3000       |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------|------------------------------------------------|-------------|
| Metric Tons per day                                                                                                                                |                    | 48          |                                                |             |
| Tons per day                                                                                                                                       |                    | 52.92       | Metric Tons per year                           | 8,165       |
| Total lb/hr rate                                                                                                                                   |                    | 4,410.00    | Short Tons per year                            | 9,000       |
| Quat Rate (lb/hr)                                                                                                                                  |                    | 1,831.80    | Quat Rate (lb/yr)                              | 7,476,735   |
| Quat Activity                                                                                                                                      |                    | 86%         | Quat Activity                                  | 86%         |
| Quat Received = Quat Rate/Quat Activit                                                                                                             | у                  |             |                                                |             |
| Quat Used (lb/hr)                                                                                                                                  |                    | 2,130.00    | Quat Used (lb/yr)                              | 8,693,878   |
| Ethanol in Quat (%)                                                                                                                                | 14%                |             | Ethanol in Quat (%)                            | 14%         |
| Ethanol to Reactor (lb/hr) = Ethanol in Quat * Quat Received                                                                                       |                    |             |                                                |             |
| Ethanol to RX (lb/hr)                                                                                                                              |                    | 298.20      | Ethanol to RX (lb/yr)                          | 1,217,143   |
| Palaced in the Dark of PL LD 2011 Fill to DW                                                                                                       |                    |             |                                                |             |
| Ethanol in the Product to Flash Dryer = 3% x Ethanol to RX<br>Ethanol Output (lb/hr)                                                               | 201                |             |                                                |             |
|                                                                                                                                                    | 3%                 | 8.95        | Ethanol Output (lb/yr)                         | 36,514      |
| Quat in the Filtrate = Quat Received x 14%<br>Quat in Filtrate                                                                                     | 1.407              |             |                                                |             |
|                                                                                                                                                    | 14%                | 298.20      | Quat in Filtrate                               | 1,217,143   |
| Ethanol in Filtrate = Ethanol to RX - Ethanol to Flash Dryer<br>Ethanol in Filtrate                                                                |                    |             |                                                |             |
|                                                                                                                                                    |                    | 289.25      | Ethanol in Filtrate                            | 1,180,629   |
| Ethanol Removed by Vacuum Pump = $76\%$ x Ethanol in Filtrate                                                                                      | <b>-</b> - 4 /     |             |                                                |             |
| Ethanol Removed by Vacuum Pump (lb/hr)                                                                                                             | 76%                | 219.83      | Ethanol Removed by Vacuum Pump (tpy)           | 897,278     |
| Ethanol (%) to the Oxidizer = 100%-Vacuum Pump Removal %                                                                                           | 0.467              |             |                                                |             |
| Etheral to Oviding a 94 Etheral to Oviding the Col.                                                                                                | 24%                |             |                                                |             |
| Ethanol to Oxidizer = % Ethanol to Oxidizer * Ethanol in Filtrate<br>Ethanol to Oxidizer from C-Side Vacuum Pumps                                  | 240/               | · · · · · · |                                                |             |
| Curanor to Oxfulzer from C-Side Vactium Pumps                                                                                                      | 24%                | 69.42 lb/hr | Ethanol to Oxidizer from Vacuum Pumps 7-17A    | 141.68 tpy  |
| Catalystic Oxidizer Efficiency                                                                                                                     | 95%                |             |                                                |             |
| Ethanol from Oxidizer (lb/hr) = Ethanol to Oxidizer * (100% - Control                                                                              |                    |             |                                                |             |
| Ethanol from Oxidizer (10/hr) = Ethanol to Oxidizer + (100% - Control<br>Ethanol from Oxidizer (1b/hr)                                             | Efficiency)        | 3.47 lb/hr  |                                                |             |
| Operating Hours                                                                                                                                    |                    |             | Ethanol from Oxidizer (tpy)                    | 7.08 tpy    |
| Methyl Chloride to Filter (300 ppm in Quat) = Quat Received x $300/1$ ,                                                                            | 000 000            | 4,380       |                                                |             |
| Methyl Chloride to Filter (1b/hr)                                                                                                                  | 000,000            | 0.64        | Method Olds idea (Pile 41.6.)                  |             |
| Methyl Chloride to Oxidizer (ib/hr)                                                                                                                | 100%               | 0.64 lb/hr  | Methyl Chloride to Filter (lb/yr)              | 2,608.16    |
| Methyl Chloride to Oxidizer (TPY)                                                                                                                  | 10070              | 1.40        | Methyl Chloride to Oxidizer (lb/yr)            | 2,608.16    |
| Methyl Chloride from the Oxidizer (lb/hr)                                                                                                          |                    | 0.03 lb/hr  | Methyl Chloride to Oxidizer (tpy)              | 1.30 tpy    |
| Methyl Chloride from the Oxidizer (tpy)                                                                                                            |                    | 0.03 10/11  | Methyl Chloride from the Oxidizer (lb/yr)      | 130.41      |
| Hydrochloric Acid formed in Catalytic Oxidizer                                                                                                     |                    | 0.07        | Methyl Chloride from the Oxidizer (tpy)        | 0.07 tpy    |
| lbs per mole Methyl Chloride (CH <sub>3</sub> Cl)                                                                                                  |                    | 50,488      |                                                |             |
| lbs per mole Cl                                                                                                                                    |                    |             | lbs per mole Methyl Chloride (CH3Cl)           | 50          |
| •                                                                                                                                                  |                    | 35.453      | lbs per mole CI                                | 35.453      |
| mole fraction of Cl in Methyl Chloride (CH <sub>3</sub> Cl) = lbs per mole Cl / lbs<br>mole fraction of Cl in Methyl Chloride (CH <sub>4</sub> Cl) | per mole Methyl    |             |                                                |             |
| lbs per mole HCl                                                                                                                                   |                    | 0.702206    | mole fraction of Cl in Methyl Chloride (CH3Cl) | 0.702206    |
| 1                                                                                                                                                  |                    | 36.46094    | lbs per mole HCi                               | 36.46094    |
| mole fraction of Cl in HCl = lbs per mole Cl / lbs per mole HCl<br>Mole fraction of Cl in HCl                                                      |                    |             |                                                |             |
| More traction of CI in HCI                                                                                                                         |                    | 0.972355622 | Mole fraction of Cl in HCl                     | 0.972355622 |
| HCl created (lb/hr) = (Methyl Chloride in - Methyl Chloride out) * mol                                                                             | e fraction Cl in C | 'H.Cl/lbe   |                                                |             |
| per mole CH <sub>3</sub> Cl * lbs per mole HCl/ mole fraction Cl in HCl                                                                            |                    | 11301/105   |                                                |             |
| HCl created (lb/hr) =                                                                                                                              |                    | 0.22 11 0-  |                                                |             |
| HCl (tpy)                                                                                                                                          |                    | 0.32 lb/hr  | HCl created (lb/yr)                            | 1,292.22    |
|                                                                                                                                                    |                    | 0.70        | HCl (tpy)                                      | 0.65 tpy    |
| Rounding to                                                                                                                                        | 2                  |             |                                                |             |
| U ···                                                                                                                                              | 4                  |             |                                                |             |

| Total Vac | Total Vacuum Pumps Uncontrolled |        |  |
|-----------|---------------------------------|--------|--|
|           | lb/hr                           | TPY    |  |
| VOC       | 140.80                          | 316.47 |  |
| M-C       | 1.30                            | 2.91   |  |

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

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| Dry Process - Source 7-17B |                                       |

| Product                                                         | B-910 or B920            |       | Product                                   | B-910 or B920 |     |
|-----------------------------------------------------------------|--------------------------|-------|-------------------------------------------|---------------|-----|
| Metric Tons per Day                                             | 21.8                     |       | Metric Ton per Year                       | 5,443         |     |
| Production Rate (lb/hr)                                         | 1,999                    |       | Short Tons per Year                       | 6.000         |     |
| Bentonite Clay Feed Rate (lb/hr)                                | 1,400                    |       | ·                                         | -,            |     |
| Quat Feed Rate (lb/hr)                                          | 819                      |       | Quat (lb/yr)                              | 4,916,458     |     |
| Ethanol Content in Quat                                         | 14%                      |       | Ethanol Content in Quat                   | 14%           |     |
| Ethanol to Oxidizer                                             | 114.66                   | lb/hr | Ethanol to Oxidizer                       | 344,15        | tpy |
| Catalystic Oxidizer Efficiency                                  | 95%                      |       | Catalystic Oxidizer Efficiency            | 95%           | 15  |
| Ethanol from Oxidizer                                           | 5.73                     | lb/hr | Ethanol from Oxidizer                     | 17.21         | tpy |
| Methyl Chloride to Filter (300 ppm in Quat) = Quat              | t Received x             |       |                                           |               |     |
| Methyl Chloride to Oxidizer (lb/hr)                             | 0.25                     | lb/hr | Methyl Chloride to Oxidizer (lb/yr)       | 1,475,00      |     |
| Methyl Chloride from the Oxidizer (lb/hr)                       | 0.01                     | lb/hr | Methyl Chloride to Oxidizer (tpy)         | 0.74          | tpy |
| Hydrochloric Acid formed in Catalytic Oxidizer                  |                          |       | Methyl Chloride from the Oxidizer (lb/yr) | 73.75         |     |
| lbs per mole Methyl Chloride (CH <sub>3</sub> Cl)               | 50.488                   |       | Methyl Chloride from the Oxidizer (tpy)   | 0.04          | tpy |
| lbs per mole CI                                                 | 35.453                   |       | lbs per mole Methyl Chloride (CH3Cl)      | 50.488        | -FJ |
| mole fraction of Cl in Methyl Chloride (CH <sub>3</sub> Cl) = 1 | os per mole Cl / lbs per |       | lbs per mole Cl                           | 35.453        |     |
| mole fraction of Cl in Methyl Chloride                          |                          |       |                                           |               |     |
| (CH <sub>3</sub> Cl)                                            | 0.702206                 |       |                                           |               |     |
|                                                                 |                          |       | mole fraction of Cl in Methyl Chloride    |               |     |
| lbs per mole HCl                                                | 36,46094                 |       | (CH3Cl)                                   | 0.702206      |     |
| mole fraction of Cl in HCl = lbs per mole Cl / lbs pe           | er mole HCl              |       | lbs per mole HCl                          | 36,46094      |     |
| Mole fraction of Cl in HCl                                      | 0.972355622              |       | I                                         |               |     |
|                                                                 |                          |       | Mole fraction of Cl in HCl                | 0.97235562    |     |
| HCl created (lb/hr) = (Methyl Chloride in - Methyl              | Chloride out) * mole     |       |                                           |               |     |
| HCl created (lb/hr) =                                           | 0.12                     | lb/hr |                                           |               |     |
|                                                                 |                          |       | HCl created (lb/yr) =                     | 731.00        |     |
| Rou                                                             | nding to: 2              |       | HCl created (tpy) =                       | 0.37          | tpy |
|                                                                 |                          |       |                                           |               |     |

Wet and Dry Process Emissions Summary

|                    | Uncor  | ıtrolled | Controlled |       |
|--------------------|--------|----------|------------|-------|
| SD-1 (Wet)         | lb/hr  | tpy      | lb/hr      | tpy   |
| VOC                | 72.04  | 176.41   | 3,60       | 8.82  |
| Methyl Chloride    | 0.66   | 1.61     | 0.03       | 0.08  |
| HCI                | 0.33   | 0.80     | 0.33       | 0.80  |
| Total HAPs         | 0.99   | 2.41     | 0.36       | 0.88  |
| B3000 (Wet)        |        |          |            |       |
| VOC                | 70.06  | 142.98   | 3.50       | 7.15  |
| Methyl Chloride    | 0.64   | 1.30     | 0.03       | 0.07  |
| HCI                | 0.32   | 0.65     | 0.32       | 0.65  |
| Total HAPs         | 0.96   | 1.95     | 0.35       | 0.71  |
| B910 or B920 (Dry) |        |          |            | -     |
| VOC                | 114,91 | 344.89   | 5.75       | 17.25 |
| Methyl Chloride    | 0,25   | 0.74     | 0.01       | 0.04  |
| HCI                | 0.12   | 0.37     | 0.12       | 0.37  |
| Total HAPs         | 0.37   | 1,11     | 0.13       | 0.41  |

| By: PEW                  | Checked By: CCS                       |
|--------------------------|---------------------------------------|
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# Quat Tanks C, D, B, S3, S1, & S2 Breathing Losses

The following emissions are estimated for the Quat Tanks (28, 29, 30, 32, 33, 34) using Tanks 4.09. The breathing losses are vented to atmosphere uncontrolled. Working losses during filling of the tanks are vented to the oxidizer and the controlled working losses are shown on the following page.

| Emission Unit |            | Working Loss | Breathing Loss | Breathing Loss | Breathing Loss |
|---------------|------------|--------------|----------------|----------------|----------------|
| ID            | Quat Tanks | (lb/yr)      | (lb/yr)        | (lb/hr)        | (tpy)          |
| 28            | D          | 565.32       | 105.56         | 0.01           | 0.05           |
| 29            | С          | 599.06       | 116.92         | 0.01           | 0.06           |
| 30            | В          | 599.06       | 116.92         | 0.01           | 0.06           |
| 32            | S3         | 565.23       | 105.56         | 0.01           | 0.05           |
| 33            | S1         | 801.87       | 175.28         | 0.02           | 0.09           |
| 34            | S2         | 816.18       | 186.46         | 0.02           | 0.09           |

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|--------------------------|---------------------------------------|
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### Quat Tanks to Oxidizer

Tanks vent working losses to the Catalytic Oxidizer. Working losses from the Quat Tanks to the Catalytic Oxidizer are controlled at 95%. (28,29,30,32,33,34)

| Quat received (lb/hr) = | 1,791.45 |
|-------------------------|----------|
| Operating hours =       | 8,760    |

| <u> </u>   |                  |                   | Original           | Heated             |
|------------|------------------|-------------------|--------------------|--------------------|
|            | Estimated        | Estimated         | Tanks 4.09 Working | Tanks 4.09 Working |
| Quat Tanks | Throughput (lbs) | Throughput (gals) | Loss (lb/yr)       | Loss (lb/yr)       |
| S1         | 15,693,092.60    | 2,384,874.25      | 565.23             | 12,114.98          |
| S2         | 15,693,092.60    | 2,384,874.25      | 815.18             | 12,112.49          |
| \$3        | 15,693,092.60    | 2,384,874.25      | 801.87             | 8,388.04           |
| B          | 15,693,092.60    | 2,384,874.25      | 565.32             | 8,890.16           |
| С          | 15,693,092.60    | 2,384,874.25      | 599.06             | 8,890.16           |
| D          | 15,693,092.60    | 2,384,874.25      | 599.06             | 8,369.40           |
| Total      |                  |                   | 3,945.72           | 58,765.23          |

Catalystic Oxidizer Efficiency =

#### 95%

|                                           | Original | Heated    |       |
|-------------------------------------------|----------|-----------|-------|
| Ethanol to the oxidizer from Quat Tanks   | 3,945.72 | 58,765.23 | lb/yr |
| Ethanol to the oxidizer from Quat Tanks   | 1.97     | 29.38     | TPY   |
| Fill rate of each tank                    | 300      | 300       | gpm   |
| Hours to fill each tank                   | 132.49   | 132.49    | hours |
| Ethanol to the oxidizer from Quat Tanks   | 29.78    | 443.54    | lb/hr |
| Ethanol from the oxidizer from Quat Tanks | 197.29   | 2,938.26  | lb/yr |
| Ethanol from the oxidizer from Quat Tanks | 1.49     | 22.18     | lb/hr |
| Ethanol from the oxidizer from Quat Tanks | 0.10     | 1.47      | TPY   |

Rounding to

2

| By: PEW                                                                                                                                                  |                                                 |               |                                                                   |                                                     |               |                             | Checked By: CCS              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------|-------------------------------------------------------------------|-----------------------------------------------------|---------------|-----------------------------|------------------------------|
| Date: 9/23/2014                                                                                                                                          |                                                 | Date: 9/23/2  |                                                                   |                                                     |               |                             |                              |
| Revised: 02/17/1                                                                                                                                         | 7 by JJD                                        |               |                                                                   |                                                     | Re            | vision Checked by           | y: PEW on 2/22/2017          |
| CO <sub>2</sub> Process En                                                                                                                               | nissions                                        |               |                                                                   |                                                     |               |                             |                              |
| $CO_2$ is used to co                                                                                                                                     | ool product in                                  | the site.     |                                                                   |                                                     |               |                             |                              |
| 2007                                                                                                                                                     | 2008                                            | 2009          | 2010                                                              | 2011                                                | 2012          | 2013                        |                              |
| 0.07                                                                                                                                                     | 0.08                                            | 0.09          | 0.06                                                              | 0.06                                                | 0.07          | 0.06                        |                              |
| To account for po                                                                                                                                        | otential emiss                                  |               |                                                                   |                                                     |               | Bentone <sup>™</sup> produc | ced.                         |
| To account for po<br>0.18 lb/l                                                                                                                           | otential emiss<br>b                             |               |                                                                   |                                                     |               | Bentone <sup>™</sup> produc | ced.                         |
| To account for po<br>0.18 lb/l<br>SD-1 production                                                                                                        | otential emiss<br>b<br>rate =                   |               | he maximum o<br>40 tons                                           | emission facto<br>s/day                             |               | Bentone™ produc             | ced.                         |
| To account for po<br>0.18 lb/T<br>SD-1 production<br>SD-1 production                                                                                     | otential emiss<br>b<br>rate =                   |               | 40 ton:<br>3,333.33 lb/h                                          | emission facto<br>s/day                             |               | Bentone <sup>™</sup> produc | ced.                         |
| To account for po<br>0.18 lb/l<br>SD-1 production<br>SD-1 production<br>Operating Hours                                                                  | otential emiss<br>b<br>rate =<br>rate =         |               | 40 ton:<br>3,333.33 lb/r<br>8,760                                 | emission facto<br>s/day<br>m                        |               | Bentone™ produc             | ced.                         |
| To account for po<br>0.18 lb/l<br>SD-1 production<br>SD-1 production<br>Operating Hours<br>CO <sub>2</sub> emissions fa                                  | otential emiss<br>b<br>rate =<br>rate =<br>ctor | ions assume t | 40 ton:<br>3,333.33 lb/r<br>8,760<br>0.18 lb/l                    | emission facto<br>s/day<br>pr<br>b                  | or is double. |                             |                              |
| To account for po<br>0.18 lb/l<br>SD-1 production<br>SD-1 production<br>Operating Hours<br>CO <sub>2</sub> emissions fa                                  | otential emiss<br>b<br>rate =<br>rate =<br>ctor | ions assume t | 40 ton:<br>3,333.33 lb/r<br>8,760<br>0.18 lb/l<br>àctor (lb/lb) x | emission facto<br>s/day<br>pr<br>b<br>s SD-1 produc | or is double. |                             | ced.<br>rs(hr) / 2000 lb/ton |
| To account for po<br>0.18 lb/l<br>SD-1 production<br>SD-1 production<br>Operating Hours<br>CO <sub>2</sub> emissions fa                                  | otential emiss<br>b<br>rate =<br>rate =<br>ctor | ions assume t | 40 ton:<br>3,333.33 lb/r<br>8,760<br>0.18 lb/l                    | emission facto<br>s/day<br>pr<br>b<br>s SD-1 produc | or is double. |                             |                              |
| To account for po<br>0.18 lb/T<br>SD-1 production<br>SD-1 production<br>Operating Hours<br>CO <sub>2</sub> emissions fa<br>CO <sub>2</sub> emissions (to | otential emiss<br>b<br>rate =<br>rate =<br>ctor | ions assume t | 40 ton:<br>3,333.33 lb/r<br>8,760<br>0.18 lb/l<br>àctor (lb/lb) x | emission facto<br>s/day<br>pr<br>b<br>s SD-1 produc | or is double. |                             |                              |

CO2 emissions (metric tons/year) = CO2 Short Tons / 1.1023 short tons/metric ton 2,384 Metric Tons per Year

Potesta & Associates, Inc. Project No. 0101-12-0404

By: JAG Date: 12/5/2013 Checked By: CCS Date: 9/23/2014

#### Preliminary Water9 Results

- Yearly based on average temperature and average ethanol/methanol

|                                             | M        | MODEL 1 - EQ1 |         | MODEL 1A - EQ2, DAF1 |          |        |       |              |
|---------------------------------------------|----------|---------------|---------|----------------------|----------|--------|-------|--------------|
|                                             |          |               |         | VOC                  |          |        |       |              |
|                                             |          | VOC           |         |                      | VOC      | EQ2 to | from  |              |
|                                             | Lift to  | from EQ1      |         | EQ1 to               | from EQ2 | DAF1   | DAF1  | DAF1 outlet  |
| Description                                 | EQ1 Tank | Tank          | Output  | EQ2 Tank             | Tank     | Tank   | Tank  | waste stream |
| WATER9 INPUT                                |          |               |         |                      |          |        |       |              |
| waste stream                                |          |               |         |                      |          |        |       |              |
| Ethanol, ppm                                | 1000.3   |               |         | 663.459              |          |        |       |              |
| Methanol, ppm                               | 11.1     |               |         | 8.23947              |          |        |       |              |
| Ethanol K <sub>max</sub> , hr <sup>-1</sup> | 188.9693 |               |         | 203.5467             |          |        |       |              |
| Ethanol K <sub>1</sub> , L/gm-hr            | 102.9942 |               |         | 70.148               |          |        |       |              |
| Active Biomass, g/L                         | 0.138    |               |         | 0.138                |          |        |       |              |
| Water Flow Rate, GPM                        | 350      |               |         | 350                  |          | 350    |       | 350          |
| Air Flow Rate, SCFM                         | 300      |               |         | 300                  |          | 300    |       |              |
| Average Temperature, F                      | 89.8     |               |         | 89.8                 |          | 89.8   |       |              |
| WATER9 OUTPUT                               |          |               |         |                      |          |        |       |              |
| Ethanol, g/s                                |          | 0.412         |         |                      | 0.195    |        | 0.021 |              |
| Methanol, g/s                               |          | 0.007         |         |                      | 0.005    |        | 0.001 |              |
| Isopropanol, g/s                            |          | 0             |         |                      | 0        |        | 0     |              |
| tert-Butanol, g/s                           |          | 0             |         |                      | 0        |        | 0     |              |
| Ethanol, ppm                                |          |               | 663.459 |                      |          | 312.58 |       | 311.63       |
| Methanol, ppm                               | _        |               | 8.23947 |                      |          | 6.0777 |       | 6.05347      |
| Ethanol, Mg/yr                              |          | 12.987        |         |                      | 6.144    |        | 0.662 |              |
| Methanol, Mg/yr                             |          | 0.217         |         |                      | 0.161    |        | 0.017 |              |
| Isopropanol, Mg/yr                          |          | 0.000         |         |                      | 0.000    |        | 0.000 |              |
| tert-Butanol, Mg/yr                         |          | 0.000         |         |                      | 0.000    |        | 0.000 |              |
| Ethanol, lb/hr                              | 175.90   | 3.269         |         | 116.26               | 1.546    | 54.77  | 0.166 | 54.61        |
| Methanol, lb/hr                             | 1.95     | 0.055         |         | 1.44                 | 0.041    | 1.07   | 0.004 | 1.06         |
| Ethanol, TPY                                |          | 14.316        |         |                      | 6.773    |        | 0.729 |              |
| Methanol, TPY                               |          | 0.240         | 1       |                      | 0.177    |        | 0.019 |              |
| Total VOC, lb/hr                            | 177.85   | 3.323         |         |                      | 1.587    |        | 0.171 |              |
| Total VOC, TPY                              | 778.96   | 14.556        |         |                      | 6.950    |        | 0.748 |              |

Potesta & Associates, Inc. Project No. 0101-12-0404

#### By: JAG Date: 12/5/2013

Checked By: CCS Date: 9/23/2014

# Preliminary Water9 Results

- Yearly based on average temperature and average ethanol/methanol

|                                             |          | MODEL 2 - AB1, AB2, DAF2 |                    |          |             |           |                   |  |
|---------------------------------------------|----------|--------------------------|--------------------|----------|-------------|-----------|-------------------|--|
|                                             |          | voc                      |                    | voc      |             |           |                   |  |
|                                             | DAF1 to  | from AB1                 | AD1 to             | 1        | AB2 to DAF2 | NOOR      |                   |  |
| Description                                 | AB1 Tank |                          | AB1 to<br>AB2 Tank |          | Tank        |           | DAF2 outlet waste |  |
| WATER9 INPUT                                |          | 1 4116                   | AD2 Talik          | Tank     | Тапк        | DAF2 Tank | stream            |  |
| waste stream                                |          |                          |                    |          |             |           |                   |  |
| Ethanol, ppm                                | 311.63   |                          |                    |          |             |           |                   |  |
| Methanol, ppm                               | 6.05347  |                          |                    |          |             |           |                   |  |
| Niemanoi, ppin                              | 0.05347  |                          |                    |          |             |           |                   |  |
| Ethanol K <sub>max</sub> , hr <sup>-1</sup> | 281.812  |                          |                    |          |             |           |                   |  |
| Ethanol K <sub>1</sub> , L/gm-hr            | 24.77061 |                          |                    |          |             |           |                   |  |
| Active Biomass, g/L                         | 0.595    |                          |                    |          |             |           |                   |  |
| Water Flow Rate, GPM                        | 350      |                          | 350                |          | 350         |           | 350               |  |
| Air Flow Rate, SCFM                         | 300      |                          | 300                |          | 300         |           |                   |  |
| Average Temperature, F                      | 89.8     |                          | 89.8               |          | 89.8        |           |                   |  |
| WATER9 OUTPUT                               |          |                          |                    |          |             |           |                   |  |
| Ethanol, g/s                                |          | 0.001                    |                    | 0.000001 |             | 0.0000001 |                   |  |
| Methanol, g/s                               |          | 0.002                    |                    | 0.000319 |             | 0.000012  |                   |  |
| Isopropanol, g/s                            |          | 0                        |                    | 0        |             | 0         |                   |  |
| tert-Butanol, g/s                           |          | 0                        |                    | 0        |             | 0         |                   |  |
| Ethanol, ppm                                |          |                          | 0.425              |          | 0.001       |           | 0.001             |  |
| Methanol, ppm                               |          |                          | 0.836              |          | 0.136       |           | 0.135             |  |
| Ethanol, Mg/yr                              |          | 0.023                    |                    | 0.000037 |             | 0.0000017 |                   |  |
| Methanol, Mg/yr                             |          | 0.062                    |                    | 0.010    |             | 0.000392  |                   |  |
| Isopropanol, Mg/yr                          |          | 0.000                    |                    | 0.000    |             | 0.000     |                   |  |
| tert-Butanol, Mg/yr                         |          | 0.000                    |                    | 0.000    |             | 0.000     |                   |  |
| Ethanol, lb/hr                              | 79.57    | 0.0059                   | 0.07               | 0.00001  | 0.0001      | 0.0000004 | 0.0001            |  |
| Methanol, lb/hr                             | 0.60     | 0.0156                   | 0.15               | 0.003    | 0.02        | 0.000099  | 0.02              |  |
| Ethanol, TPY                                |          | 0.0257                   |                    | 0.00004  |             | 0.000002  |                   |  |
| Methanol, TPY                               |          | 0.0683                   |                    | 0.011    |             | 0.000432  |                   |  |
| Total VOC, lb/hr                            |          | 0.0215                   |                    | 0.003    |             | 0.000099  |                   |  |
| Total VOC, Ton/yr                           |          | 0.0940                   |                    | 0.011    |             | 0.000434  |                   |  |

Potesta & Associates, Inc. Project No. 0101-12-0404

By: JAG Date: 12/5/2013

Checked By: CCS Date: 9/23/2014

### Preliminary Water9 Results

- Yearly based on average temperature and average ethanol/methanol

| MODEL 3 - Sludge Tank |                 | TOTAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       | VOC from Sludge |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Sludge Tank           | Tank            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 174.7                 |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 180.4                 |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 198.8079              |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 14.81906              |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1.0674                |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 77                    |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 300                   |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 89.8                  |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       | 0.00017         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       | 0.018           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       | 0               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       | 0               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       |                 | _                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                       | 0.005           | 19.822                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                       | 0.572           | 1.040                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                       | 0.000           | 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                       | 0.000           | 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 6.73                  | 0.001           | 4.99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 6.95                  | 0.144           | 0.26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                       | 0.006           | 21.85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                       | 0.631           | 1.15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                       | 0.145           | 5.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                       | 0.637           | 23.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                       | Sludge Tank     | Sludge Tank         VOC from Sludge<br>Tank           174.7         1           180.4         1           198.8079         1           14.81906         1           10674         1           0         0           0         0.00017           0.00017         0.00017           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0           0         0.005           0.572         0.0001           0.000         0.0001           6.95         0.144           0.006         0.631           0.145         0.145 |

#### Elementis Specialties Charleston Facility

Potesta & Associates, Inc. Project No. 0101-12-0404

By: JAG Date: 12/5/2013

Checked By: CCS Date: 9/23/2014

# Preliminary Water9 Results

- Hourly based on maximum temperature and maximum ethanol/methanol feed plus 10%

|                                             | M        | MODEL 1 - EQ1 |         |          | MODEL 1A - EQ2, DAF1 |         |          |              |
|---------------------------------------------|----------|---------------|---------|----------|----------------------|---------|----------|--------------|
|                                             |          | VOC           |         |          | VOC                  | EQ2 to  | VOC from |              |
|                                             | Lift to  | from EQ1      |         | EQ1 to   | from EQ2             | DAF1    | DAF1     | DAF1 outlet  |
| Description                                 | EQ1 Tank | Tank          |         | EQ2 Tank | Tank                 | Tank    | Tank     | waste stream |
| WATER9 INPUT                                |          |               |         |          |                      |         |          |              |
| waste stream                                |          |               |         |          |                      |         |          |              |
| Ethanol, ppm                                | 1386     |               |         | 653.417  |                      |         |          |              |
| Methanol, ppm                               | 58.3     |               |         | 40.923   |                      |         |          |              |
| Ethanol K <sub>max</sub> , hr <sup>-1</sup> | 188.9693 |               |         | 203.5467 |                      |         |          |              |
| Ethanol K <sub>1</sub> , L/gm-hr            | 102.9942 |               |         | 70.148   |                      |         |          |              |
| Active Biomass, g/L                         | 0.138    |               |         | 0.138    |                      |         |          |              |
| Water Flow Rate, GPM                        | 350      |               |         | 350      |                      | 350     |          | 35           |
| Air Flow Rate, SCFM                         | 300      |               |         | 300      | -                    | 300     |          |              |
| Average Temperature, F                      | 108.7    |               |         | 108.7    |                      | 108.7   |          |              |
| WATER9 OUTPUT                               | ·        |               |         |          |                      |         |          |              |
| Ethanol, g/s                                |          | 0.94837       |         |          | 0.10176              |         | 0.019432 |              |
| Methanol, g/s                               |          | 0.047253      |         |          | 0.03224              |         | 0.00411  |              |
| Ethanol, ppm                                |          |               | 653.417 |          |                      | 165.035 |          | 164.15       |
| Methanol, ppm                               |          |               | 40.923  |          |                      | 27.921  |          | 27.73        |
| Ethanol, Mg/yr                              |          | 18.814        |         |          | 4.752                |         | 0.613    |              |
| Methanol, Mg/yr                             |          | 1.490         | _       |          | 1.017                |         | 0.130    |              |
| Ethanol, lb/hr                              | 242.87   | 7.527         |         | 114.50   | 0.808                | 28.92   | 0.154    | 28.7         |
| Methanol, Ib/hr                             | 10.22    | 0.375         |         | 7.17     | 0.256                | 4.89    | 0.033    | 4.8          |
| Ethanol, TPY                                |          | 32.968        |         |          | 3.537                |         | 0.676    |              |
| Methanol, TPY                               |          | 1.643         |         |          | 1.121                |         | 0.143    |              |
| Fotal VOC, lb/hr                            | 253.09   | 7.902         |         |          | 1.064                |         | 0.187    |              |
| Total VOC, Ton/yr                           | 1108.54  | 34.610        |         |          | 4.658                |         | 0.818    |              |

#### Elementis Specialties Charleston Facility

Potesta & Associates, Inc. Project No. 0101-12-0404

By: JAG Date: 12/5/2013

Checked By: CCS Date: 9/23/2014

### Preliminary Water9 Results

- Hourly based on maximum temperature and maximum ethanol/methanol feed plus 10%

|                                             |          |          | EL 2 - AB1, A | 1        |             |                 |              |
|---------------------------------------------|----------|----------|---------------|----------|-------------|-----------------|--------------|
|                                             | DAF1 to  | VOC from | AB1 to AB2    | VOC from | AB2 to DAF2 | VOC from        | DAF2 outlet  |
| Description                                 | AB1 Tank | AB1 Tank | Tank          | AB2 Tank | Tank        | DAF2 Tank       | waste stream |
| WATER9 INPUT                                |          |          |               |          |             |                 |              |
| waste stream                                |          |          |               |          |             |                 |              |
| Ethanol, ppm                                | 164.154  |          |               |          |             |                 |              |
| Methanol, ppm                               | 27.735   |          |               |          |             |                 |              |
| Ethanol K <sub>max</sub> , hr <sup>-1</sup> | 281.812  |          |               |          |             |                 |              |
| Ethanol K <sub>1</sub> , L/gm-hr            | 24.77061 |          |               |          |             |                 |              |
| Active Biomass, g/L                         | 0.595    |          |               |          |             |                 |              |
| Water Flow Rate, GPM                        | 350      |          | 350           |          | 350         |                 | 350          |
| Air Flow Rate, SCFM                         | 300      |          | 300           |          | 300         |                 |              |
| Average Temperature, F                      | 108.7    |          | 108.7         |          | 108.7       |                 |              |
| WATER9 OUTPUT                               |          |          |               |          |             |                 |              |
| Ethanol, g/s                                |          | 3.46E-04 |               | 3.44E-07 |             | <u>1.85E-08</u> |              |
| Methanol, g/s                               |          | 0.008331 |               | 0.00090  |             | 0.00004         |              |
| Ethanol, ppm                                |          |          | 0.13553       |          | 1.35E-04    |                 | 22.906       |
| Methanol, ppm                               |          |          | 2.56777       |          | 0.27763     |                 | 0.27568      |
| Ethanol, Mg/yr                              |          | 0.010915 |               | 0.000001 |             | 0.000001        |              |
| Methanol, Mg/yr                             |          | 0.263    |               | 0.028    | _           | 0.001           |              |
| Ethanol, Ib/hr                              | 79.57    | 0.0027   | 0.02          | 0.000003 | 0.00002     | 0.0000001       | 4.01         |
| Methanol, lb/hr                             | 0.60     | 0.0661   | 0.45          | 0.007    | 0.05        | 0.000340        | 0.05         |
| Ethanol, TPY                                |          | 0.0120   |               | 0.00001  |             | 0.000001        |              |
| Methanol, TPY                               |          | 0.2896   |               | 0.031    |             | 0.001488        |              |
| Total VOC, lb/hr                            |          | 0.069    |               | 0.007    |             | 0.000340        | -            |
| Total VOC, Ton/yr                           |          | 0.3016   |               | 0.031    |             | 0.001489        |              |

| Elementis Specialties | Potesta & Associates, Inc. |
|-----------------------|----------------------------|
| Charleston Facility   | Project No. 0101-12-0404   |
|                       |                            |

| By: JAG         | Checked By: CCS |
|-----------------|-----------------|
| Date: 12/5/2013 | Date: 9/23/2014 |

Preliminary Water9 Results - Hourly based on maximum temperature and maximum ethanol/methanol feed plus 10%

| MODEL 3                                     | - SLUDGE TANK         | TOTAL  |
|---------------------------------------------|-----------------------|--------|
|                                             |                       |        |
| Description                                 | VOC from Sludge Tenls |        |
| WATER9 INPUT                                | VOC from Sludge Tank  |        |
| waste stream                                |                       |        |
|                                             |                       |        |
| Ethanol, ppm                                |                       |        |
| Methanol, ppm                               |                       |        |
| Ethanol K <sub>max</sub> , hr <sup>-1</sup> |                       |        |
| Ethanol K <sub>1</sub> , L/gm-hr            |                       |        |
| Active Biomass, g/L                         |                       |        |
| Water Flow Rate, GPM                        |                       |        |
| Air Flow Rate, SCFM                         |                       |        |
| Average Temperature, F                      |                       |        |
| WATER9 OUTPUT                               |                       |        |
| Ethanol, g/s                                | 1.26E-03              |        |
| Methanol, g/s                               | 0.30739               |        |
| Ethanol, ppm                                |                       |        |
| Methanol, ppm                               |                       |        |
| Ethanol, Mg/yr                              | 0.040                 | 24.229 |
| Methanol, Mg/yr                             | 9.694                 | 12.623 |
| Ethanol, Ib/hr                              | 0.010                 | 8.50   |
| Methanol, lb/hr                             | 2.440                 | 3.18   |
| Total VOC, 1b/hr                            | 2.450                 | 11.68  |
|                                             |                       |        |

# By: PEW Date: 9/23/2014

Revised: 02/17/17 by JJD

Potesta & Associates, Inc. Project No: 0101-12-0404

# Checked By: CCS

Date: 9/23/2014

Revision Checked by: PEW on 2/22/2017

# **Fugitive Emission Calculations**

|                                 | Emission             |                |        |               |               |
|---------------------------------|----------------------|----------------|--------|---------------|---------------|
|                                 | Factor (kg/hr/       | Emission       |        |               |               |
| Fugitive Emission Source        | source) <sup>1</sup> | Factor (lb/hr) | Number | Total (lb/hr) | Total (lb/yr) |
| Pump Seals - Light Liquids      | 0.0199               | 0.04387154     | 0      | 0             | -             |
| Pump Seals - Heavy Liquids      | 0.00862              | 0.019003652    | 3      | 0.057         | 499.4         |
| Valves (in-line) - Gas          | 0.00597              | 0.013161462    | 0      | 0             |               |
| Valves (in-line) - Light Liquid | 0.00403              | 0.008884538    | 0      | 0             |               |
| Valves (in-line) - Heavy Liquid | 0.00023              | 0.000507058    | 50     | 0.025         | 222.1         |
| Gas-Safety Relief Valves        | 0.104                | 0.2292784      | 0      | 0             |               |
| Open-Ended Lines                | 0.0017               | 0.00374782     | 0      | 0             | -             |
| Flanges                         | 0.00183              | 0.004034418    | 877    | 3.538         | 30,994.5      |
| Sampling Connections            | 0.015                | 0.033069       | 6      | 0.198         | 1,738         |
| Compressor Seals                | 0.228                | 0.5026488      | 0      | 0             |               |

| Total hourly VOC from fugitive emissions: | 3.82 lb/hr |           |
|-------------------------------------------|------------|-----------|
| kg/hr to lb/hr conversion factor          | 2.2046     |           |
| Annual operating hours                    | 8,760      |           |
| Annual VOC from fugitive emissions:       |            |           |
| (lb/hr x 8,760 hr/yr / 2,000 lb/ton)      |            | 16.73 TPY |

1. US EPA Protocol for Equipment Leak Emission Estimates EPA-453/R-95-077 November 1995 Table 2-1 SOCMI Average Emission Factors

Rounding to 2

| By: PEW                  | Checked By: CCS                       |
|--------------------------|---------------------------------------|
| Date: 9/23/2014          | Date: 9/23/2014                       |
| Revised: 02/17/17 by JJD | Revision Checked by: PEW on 2/22/2017 |

### Vehicle Activity

|                            | Trucks |
|----------------------------|--------|
| Load Weight (tons)         | 33.75  |
| Vehicle Weight (tons)      | 6.25   |
| Vehicles Per Hour          | 7      |
| Vehicles Per Year          | 2,555  |
| Mean Vehicle Weight (tons) | 23.13  |
| Round Trip Distance        | 0.8    |

### **Paved Haulroads**

Emission Factor Equation from AP-42 Section 13.2.1, Paved Roads (January 2011):  $E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] * (1 - (P/4*N) = lb / Vehicle Mile Traveled (VMT)$ 

|                     | PM      | $PM_{10}$ | PM <sub>2.5</sub> |                                                   |
|---------------------|---------|-----------|-------------------|---------------------------------------------------|
| $\mathbf{k} =$      | 0.082   | 0.016     | 0.00054           | dimensionless, particle size multiplier           |
| sL =                | 9.7     | 9.7       | 9.7               | surface material silt content (g/m <sup>2</sup> ) |
| Wtruck=             | 23.13   | 23.13     | 23.13             | tons, mean vehicle weight                         |
| $\mathbf{P} =$      | 157     | 157       | 157               | no. days/year with 0.01 in of rain                |
| C=                  | 0.00047 | 0.00047   | 0.00047           | factor for exhaust, brake wear and tire wear      |
| e <sub>truck=</sub> | 4.37    | 0.85      | 0.03              | lb/VMT                                            |

Trucks

Rounding to 2

|                   | N        | No. Miles Control Em |          | Emis   | ssions     |         |         |         |       |
|-------------------|----------|----------------------|----------|--------|------------|---------|---------|---------|-------|
| Pollutant         | of Ve    | hicles               | Per Trip | Device | Efficiency | Uncon   | trolled | Contr   | olled |
|                   | Per Hour | Per Year             | (mi)     | Туре   | (%)        | (lb/hr) | (tpy)   | (lb/hr) | (tpy) |
| PM                | 7        | 2,555                | 0.80     | Ň      | 0          | 24.47   | 4.47    | 24.47   | 4.47  |
| PM <sub>10</sub>  | 7        | 2,555                | 0.80     | N      | 0          | 4.76    | 0.87    | 4.76    | 0.87  |
| PM <sub>2.5</sub> | 7        | 2,555                | 0.80     | N      | 0          | 0.17    | 0.04    | 0.17    | 0.04  |

| Pollutant         | Uncontrolle | d Emissions | Controlled Emissions |       |  |
|-------------------|-------------|-------------|----------------------|-------|--|
|                   | (lb/hr)     | (TPY)       | (lb/hr)              | (TPY) |  |
| PM                | 24.47       | 4.47        | 24.47                | 4.47  |  |
| PM <sub>10</sub>  | 4.76        | 0.87        | 4.76                 | 0.87  |  |
| PM <sub>2.5</sub> | 0.17        | 0.04        | 0.17                 | 0.04  |  |

# ATTACHMENT O

# MONITORING, RECORDKEEPING, REPORTING, TESTING PLANS

# ATTACHMENT O

# MONITORING/RECORDKEEPING/REPORTING/TESTING PLANS

# Wastewater Treatment

Elementis Specialties, Inc. will monitor the following parameters and maintain the following records:

- Flow to WWTP
- Flow from WWTP
- Incoming VOC (ES COD and BOD) concentration
- Outgoing VOC (ES COD and BOD) concentration
- Air flow to the equalization and aeration basins

# Processes

Elementis Specialties, Inc. will follow the monitoring, recordkeeping, reporting, and testing requirements as currently required in the permit:

- Annual operating hours
- Annual production
- Annual CO2 usage
- Annual raw material usage
- Total natural gas use for the site on a monthly and annual basis based on natural gas billing from the supplier

Elementis Specialties, Inc. is requesting that the requirement for opacity readings be removed from Emission Point 40 since the dust collector is equipped with broken bag detectors.

# ATTACHMENT P

# **PUBLIC NOTICE**

# ATTACHMENT P

# AIR QUALITY PERMIT NOTICE Notice of Application

Notice is given that Elementis Specialties, Inc. has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a modification to Regulation 13 Permit R13-1874E for its chemical manufacturing facility located at 1003 MacCorkle Avenue, SW, Charleston, in Kanawha County, West Virginia. The latitude and longitude coordinates are: 38.3600 N and -81.26615 W.

The applicant estimates that, as a result of the proposed modification, emissions of Regulated Air Pollutants will change by the following amounts: Carbon Monoxide 12.79 tons per year (TPY), Particulate Matter -33.94 TPY, Particulate Matter 10 -23.31 TPY, Particulate Matter 2.5 -20.86 TPY, Nitrogen Oxides -5.82 TPY, Sulfur Dioxide 0.16 TPY and Volatile Organic Compounds -13.54 TPY, Methyl Chloride -0.15 TPY, Hydrochloric Acid -3.16 TPY, and Methanol 1.15 TPY.

The facility is operating and will begin operating under the revised permit when issued on or about April 15, 2017. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57<sup>th</sup> Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the (INSERT DATE) day of March, 2017.

By: Elementis Specialties, Inc. John Snodgrass Plant Manager 1003 MacCorkle Avenue, SW Charleston WV 25303-1323 **APPENDIX I** 

# PRELIMINARY EMISSION CALCULATIONS REPORT

Prepared for:

**Elementis Specialties, Inc.** 1003 MacCorkle Avenue, SW Charleston, West Virginia 25303

Prepared by:

# Potesta & Associates, Inc.

7012 MacCorkle Avenue, SE Charleston, West Virginia 25304 Phone: (304) 342-1400 Fax: (304) 343-9031 Email: potesta@potesta.com

Project No. 0101-12-0404

February 28, 2014



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Preliminary Emission Calculations Report - Elementis Specialties, Inc. (0101-12-0404), February 28, 2014

# **EMISSION CALCULATIONS REPORT**

# **1.0 INTRODUCTION**

Elementis Specialties, Inc. (Elementis) was requested by the West Virginia Department of Environmental Protection, Division of Air Quality (DAQ), to determine potential to emit (PTE) and actual emissions from the Charleston facility due to addition of wastewater treatment plant (WWTP) equipment.

# 2.0 PURPOSE

The Elementis facility in Charleston is permitted under R13-1874E. The permit includes both the Dry and Wet Bentone processes. The facility is not permitted as a major source of Criteria or Hazardous Air Pollutants. Volatile organic compounds (VOC) emissions are permitted at 96.63 tons per year (TPY). The PTE for the VOC emissions was calculated conservatively to account for the range of products that are manufactured at the facility.

Prior to April 2009, the facility discharged wastewater to the Charleston Sanitary Board's (Board) Publicly Owned Treatment Works (POTW) under the terms of an Industrial User Permit. At the request of the Charleston Sanitary Board, pre-treatment equipment was installed in 2003 to pretreat the wastewater before discharge. Two tanks were installed to treat the wastewater as Sequencing Batch Reactors (SBR). Even with pretreatment, the facility was unable to meet the chloride and other limits in its permit and the Board was imposing more stringent limits in the 2007 permit renewal. Elementis and the Board entered into a consent order that required Elementis to develop a plan to comply with the new limits, and Elementis proposed to discontinue its wastewater discharge to the POTW in 2009 and construct additional treatment to allow direct discharge to the Kanawha River. The full treatment facility has been in operation since April 2009 and discharges directly to the Kanawha River under National Pollutant Discharge Elimination System (NPDES) Permit No. WV0051560. The two tanks that acted as SBRs now serve as Equalization Tanks. Two dissolved air flotation (DAF) units, two aeration basins (AB) and a sludge tank were added to the facility under the final design.

For business reasons, the production of Dry Bentone decreased at the Charleston facility. In July 2010, the last Dry Bentone was produced at the Charleston facility. The facility can no longer produce Dry Bentone because the process equipment was removed from the facility and sent to other Elementis sites (See Appendix A).

# 3.0 METHODS

# 3.1 Wastewater PTE

To determine the overall PTE of the Elementis facility for the time in question, two configurations of the WWTP (pretreatment and direct discharge) must be included in the calculations.

# 3.1.1 Direct Discharge Unit (April 2009 to Current)

- 1. Four (4) WATER9 models were developed by Potesta & Associates, Inc. (POTESTA).
  - a. Model 1 included Equalization Tank 1 (EQ1)
  - b. Model 1A included Equalization Tank 2 (EQ2) and Dissolved Air Flotation 1 (DAF1).
  - c. Model 2 included Aeration Basin 1 (AB1), Aeration Basin 2 (AB2) and Dissolved Air Flotation 2 (DAF2).
  - d. Model 3 included the Sludge Tank (ST).
- 2. Wastewater stream sampling results at various locations in the treatment system were provided by Elementis. Ethanol and methanol were above detection limits and ethanol is the primary component of the waste stream.
  - a. Samples were taken on ten days between August 20 and August 31, 2012.
  - b. Samples were collected in eight locations (EQ1 inlet, EQ1 outlet, EQ2 outlet, AB1 inlet, AB1 outlet, AB2 outlet, ST inlet, and ST outlet).
  - c. The average ethanol and methanol concentrations were determined for each sample location.
- 3. Elementis sampled Equalization Tank 1, Equalization Tank 2, Aeration Basin 1 and the Sludge Tank to determine biological uptake of ethanol.
- 4. EnviTreat conducted respirometer testing of the samples from the four units (See Appendix B).
- 5. The biological kinetic constants K<sub>max</sub> (zero-order substrate removal constant) and K<sub>1</sub> (first-order substrate removal constant) were calculated using the EnviTreat results. The methodology for this calculation was taken from "Determination of Biological Kinetic Constants Using Respirometry for the WATER9 Air Emissions Model" by Richard A. DiMenna, PE and Lawrence R. Sandeen published in 2004 by the Water Environment Federation (See Appendix C).
  - a. EnviTreat Excel Workbook ELEMENTIS #2 112-18-13 AEROBIC which had raw data was used.
  - b. A new worksheet was created for each test run.
  - c. Time (in hours) and S (Substrate) in mg/L were copied into the new worksheet.
  - d. Rate (mg/L-hr) was calculated (change in S/change in time).
  - e. Log-mean S, mg/L was calculated (change in S/ change in Ln S).

Preliminary Emission Calculations Report – Elementis Specialties, Inc. (0101-12-0404), February 28, 2014 Page 2

- f. Ratio Rate/ Log-mean S was calculated (Rate/Log-mean S).
- g. Reciprocal Rate was calculated (1/Ratio Rate/Log-mean S).
- h. A graph of Log-mean S (x) versus Reciprocal Rate (y) was created.
- i. A graph of the Log-mean S versus Log-Mean S near the y-intercept was created.
- j. The trend line was added to determine the slope of the line.
- k. Kmax was calculated: Kmax = <u>1</u> Slope near intercept x MLVSS x HSF
- K1 was calculated
   K1 = ratio of removal rate to Log-Mean S

MLVSS x HSF

HSF = headspace factor based on Henry's Law Constant and headspace and liquid volumes  $\sim 1$ 

- m. In WATER9 under the Waste menu, the Edit Compound Properties was selected. Ethanol was selected and the calculated Kmax and K1 values were entered.
- 6. United States Environmental Protection Agency (USEPA) WATER9 Version 2 utilized for calculations.
- 7. The four WATER9 models were run for a maximum temperature/ethanol/methanol concentration (based on highest sample value increased by 10%) case and an average temperature/ethanol/methanol case. The inflow to EQ1's model was based on the wastewater testing. The effluent from each model was input into the next downstream model; therefore, EQ1's effluent was inserted in the EQ2's model as the influent stream.
- 8. WATER9 provided results in grams/second (g/s). These results were converted into pound per hour (lb/hr) values.
- 9. Based on year round operation (8,760 hours), emissions were calculated in (TPY).

# 3.1.2 Sequencing Bath Reactors (2003 to April 2009)

WATER9 does not contain a specific model for SBR emissions. However, as a result of an internet search, POTESTA identified a method to estimate air emissions from a SBR using WATER9 in the article "Estimating Wastewater Treatment Emissions Using EPA's WATER9 Modeling Software by S. Eheikh and et. CH2M Hill (See Appendix D). In WATER9, an activated sludge aeration basin and clarifier are used. The aeration basin models the emissions during the filling and aeration portion of the batch reactors system. The clarifier models the emissions during the settling and decant phases of the batch reactor system.

Elementis typically used a four hour cycle time - one hour for filling, one hour for aeration, one hour for settling, and one hour for decanting. Aeration is not used during the settling and decanting process. Elementis typically had six batches per day. This resulted in 12 hours of aeration and 12 hours of no aeration during a 24- hour period.

Preliminary Emission Calculations Report – Elementis Specialties, Inc. (0101-12-0404), February 28, 2014 Page 3

The WATER9 model was set up with an activated sludge aeration basin and clarifier. The Kmax and K1 determined from AB1 were used in the model along with the same wastewater flow rate, air flow rate, and average ethanol and methanol concentrations.

The activated sludge results were multiplied by 12 hours/24 hours in the day and the primary clarifier results were multiplied by 12 hours/24 hours in the day to account for the time in each stage. Since there are two SBR units, the results were then multiplied by two.

### **3.2** Actual Emissions

E-Metrics data was provided to POTESTA by Elementis. E-Metrics is an internal report of environmental metrics that includes VOC, SOx, and NOx emissions from process and combustion sources. Combustion emissions were calculated for CO and PM based on estimated natural gas use from the NOx emissions.

The PM calculation does not include any PM from dust collectors or material handling equipment.

### 3.2.1 2003 – 2008 Actual Emissions

The actual emissions from 2003-2008 were based on the E-Metrics emissions plus the WATER9 results for the SBRs. The SBR emissions were not prorated because the SBR only emissions represented 1% of the total PTE.

# 3.2.2 2009 – 2010 Actual Emissions

The actual emissions for 2009 and 2010 were based on the E-Metrics emissions plus a pro-rate of the WATER9 results for the WWTP. Production of Dry Bentone was limited in 2009 and ceased altogether in July 2010. Based on the PTE, the process emissions with Dry Bentone accounted for 81% of emissions and the WWTP accounted for 19%. The actual E-Metrics VOC emissions were divided by 81% to determine the total VOC emissions and then multiplied by 19% to determine the WWTP portion.

### 3.2.3 2011 – 2013 Actual Emissions

The actual emissions for 2011 through 2013 were based on the E-Metrics emissions plus a pro-rate of the WATER9 results for the WWTP. Based on the PTE, the process emissions accounted for 60% of emissions and the WWTP accounted for 40%. The actual E-Metrics VOC emissions were divided by 60% to determine the total VOC emissions and then multiplied by 40% to determine the WWTP portion.

# 3.3 PTE

Monthly PTE calculations were made for the years which had changes in the process or WWTP operations (2009 and 2010). The monthly PTE values were multiplied by the appropriate number of months for each of the operating scenarios for the year to determine an annual PTE.

# 4.0 **RESULTS**

A printed copy of the Excel workbook Elementis Emission estimation 2003 - 2013 is provided as **Appendix E**.

Actual emissions for VOCs ranged from 27 TPY to 44.6 TPY, well below the permitted level of 96.63 TPY.

**APPENDIX** A

## **Process Timeline**

### Elementis Specialties - Charleston Facility Historical Emission Calculations

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

> Revised By: JAG Date: 2/27/2014

Checked by: PEW Date: 2/27/2014

| Diy Process       Image: selected |                  | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |         | 2009      | 2(       | 2010    | 2011 | 2012 | 2013 Comments                           |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------|------|------|------|------|------|---------|-----------|----------|---------|------|------|-----------------------------------------|------------|
| Process         Process <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>Jan-Mar</th><th>April-Dec</th><th>Jan-July</th><th>Aug-Dec</th><th></th><th></th><th></th><th></th></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |      |      |      |      |      |      | Jan-Mar | April-Dec | Jan-July | Aug-Dec |      |      |                                         |            |
| Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |      |      |      |      |      |      |         |           |          |         |      |      |                                         |            |
| Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process         Process <t< td=""><td>Dry Process</td><td></td><td>ł</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>July 2010 end of Dry Bentone</td><td>2</td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Dry Process      |      | ł    |      |      |      |      |         |           |          |         |      |      | July 2010 end of Dry Bentone            | 2          |
| Process     Process       Another     Image: Section of the section o                |                  |      |      |      |      |      |      |         |           |          |         |      |      |                                         |            |
| ated Studge     Vource     Vour                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Wet Process      |      |      |      |      |      |      |         |           |          |         |      |      | No changes                              |            |
| rated Shudge     Value     Value <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |      |      |      |      |      |      |         |           |          |         |      |      |                                         |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | SBR              |      |      |      |      |      |      |         |           |          |         |      |      | SBR ended in April 2009                 |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |      |      |      |      |      |      |         |           |          |         |      |      | 4                                       |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Activated Sludge |      |      |      |      |      |      |         |           |          |         |      |      | Activiated sludge started in April 2009 | April 2009 |
| Title V source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |      |      |      |      |      |      |         |           |          |         |      |      |                                         |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Title V source   |      |      |      |      |      |      |         |           |          |         | T    |      |                                         |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |      |      |      |      |      |      |         |           |          |         |      |      |                                         |            |

**APPENDIX B** 

Springdale, AR 72764



124 Woodcliff Rd.

### **Final Report**

### Testing Biodegradation of Ethanol in an Aerobic Activated Sludge Environment for Elementis Specialties, Charleston, WV

December 10, 2013

### **OBJECTIVE AND SCOPE OF TEST PROGRAM**

Tests were conducted to assess aerobic biodegradation characteristics of ethanol in an activated sludge plant at Elementis Specialties' facility in Charleston, WV. Tests were conducted using aerobic respirometers to measure oxygen uptake and kinetic models to determine biodegradation kinetic parameters. The Elementis Specialties treatment plant is shown schematically in Figure 1.

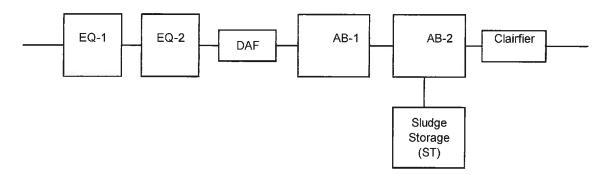


Figure 1. Schematic diagram of Elementis Specialties plant in Charleston, WV. (Recycle lines are not shown).

The test program measured biodegradation rates for ethanol in samples from the EQ-1, EQ-2, AB-1 and ST tanks. Overall, there should be only one set of biodegradation kinetic parameters that will be entered by Elementis Specialties personnel into EPA's Water-9 model to determine the fate of the ethanol throughout the process, that is, biodegradation versus volatilization, versus loss in the final effluent.

### **TEST PLAN**

### Sample Characterization

Analytical characteristics of each test sample are shown in Table 1.

| Parameter                 | Symbo | l Units     | Sludge<br>Tank    | Basin-1 | EQ-1  | EQ-2  |
|---------------------------|-------|-------------|-------------------|---------|-------|-------|
| Total suspended solids    | TSS   | mg/L        | 15774             | 2084    | 474   | 534   |
| Volatile suspended solids | VSS   | mg/L        | 5 <del>9</del> 30 | 1010    | 10    | 10    |
| Soluble COD               | sCOD  | mg/L        | 164               | 18      | 1208  | 772   |
| Soluble Ammonium-N        | sNH3  | mg/L as N   | 11.5              | 2.92    | 0.33  | 1.27  |
| Soluble Kjeldahl Nitrogen | sTKN  | mg/L as N   | 19                | 4       | 4     | 4     |
| Total Kjeldahl Nitrogen   | tTKN  | mg/L as N   | 371               | 131     | 11    | 15    |
| Soluble phosphorus        | sP    | mg/L as P   | 0.003             | 0.301   | 0.003 | 0.003 |
| Total phosphorus          | tP    | mg/L as P   | 65.4              | 15.7    | 1.8   | 0.9   |
| Ethanol                   | Eth   | mg/L as eth | ND                | ND      | 638   | 352   |

Table 1. Analytical characteristics of test samples.

### **Test Protocol**

The test procedure involved the following major steps (see Appendix A for a description of the respirometric test method and Appendix B for an expanded test protocol):

- Aliquots of each sample were placed in respective respirometer bottles as indicated in Table
   Nutrients, trace minerals, and buffer were added to insure that no deficiencies occur. Trichloromethyl pyridine (TCMP) was added to eliminate oxygen uptake due to nitrification. The tests were conducted at 25°C.
- 2. The reactors were allowed to aerate in the respirometer bottles with measurement of oxygen uptake to provide indications of the amount of residual readily biodegradable material in each sample.
- 3. After the readily biodegradable organics in the initial test reactors were degraded, reactors #9 through 24 were dosed with 200  $\mu$ L of ethanol per liter or 330 mg/L as COD followed by measurement of oxygen uptake.
- 4. The data were analyzed to determine biodegradation kinetic coefficients.

| Set<br>No. | REACTOR ID                                | Replicates | Bottle<br>No. | mL of<br>E-S<br>Sample | mL<br>ethanol<br>feedstock | Min I,<br>mL | Min II,<br>mL | Nutrient,<br>mL | mL Resp.<br>PO4 Buffer | тсмр |
|------------|-------------------------------------------|------------|---------------|------------------------|----------------------------|--------------|---------------|-----------------|------------------------|------|
| - 1        | Culture Blank, EQ-1                       | 2          | 1,2           | 500                    | 0                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 2          | Culture Blank, EQ-2                       | 2          | 3, 4          | 500                    | 0                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 3          | Culture Blank, AS-1                       | 2          | 5, 6          | 500                    | 0                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 4          | Culture Blank, Sludge tank                | 2          | 7, 8          | 500                    | 0                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 5          | EQ-1 + ethanol - 1                        | 3          | 9, 10, 11     | 500                    | 2                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 6          | EQ-1 + ethanol - 2 (for ethaoni analysis) | 1          | 12            | 500                    | 2                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 7          | EQ-2 + ethanol - 1                        | 3          | 13, 14, 15    | 500                    | 2                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 8          | EQ-2 + ethanol - 2 (for ethanol analysis) | 1          | 16            | 500                    | 2                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 9          | AB1 + ethanol-1                           | 3          | 17, 18, 19    | 500                    | 2                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 10         | AB1 + ethanol-2 (for ethanol analysis)    | 1          | 20            | 500                    | 2                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 11         | ST + ethanol - 1                          | 3          | 21, 22, 23    | 500                    | 2                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 12         | ST + ethanol - 2 (for ethanol analysis)   | 1          | 24            | 500                    | 2                          | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |
| 13         | AB-1 Activity                             | 2          | 25, 26        | 500                    | 0.75 acetate               | 1.0          | 1.0           | 1.0             | 4.0                    | yes  |

Table 2. Respirometer set-up tables for ethanol biodegradation tests.

The kinetic model was based on the widely used Monod kinetics relationship expressed mathematically as follows (see Appendices A and D for an expanded view of the model format and references):

$$R_{S} = \frac{q_{m} S X_{a}}{K_{S} + S} = \frac{(\mu_{max}/Y_{g}) S X_{a}}{K_{S} + S} , = mg COD/L-hr$$
(1)

and

$$OUR = (1 - \beta Y_g) R_s + \beta b X_a, \quad mg O_2/L-hr$$
(2)

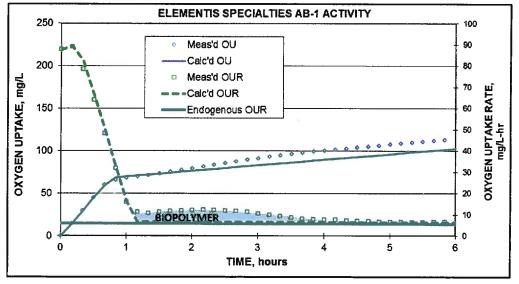
where:

| Rs                         | =   | specific substrate removal rate, mg COD/L-hr                |
|----------------------------|-----|-------------------------------------------------------------|
|                            | =   | active biomass, mg VSS/L                                    |
| qm                         | =   | maximum specific substrate removal rate, mg COD/mg VSS-hr   |
| ∐ma                        | x = | maximum specific growth rate, mg VSS/mg VSS-hr              |
| $\mathbf{S}^{\mathrm{ma}}$ | =   | Substrate (ethanol) concentration, mg/L as COD              |
| Ks                         | =   | half-saturation coefficient, mg COD/L                       |
| β                          | =   | COD of biomass $(= 1.42)$                                   |
| Yg                         | =   | Biomass yield coefficient, mg VSS/mg COD <sub>removed</sub> |
| b                          | =   | active biomass decay rate, hr                               |
| OUI                        | R=  | oxygen uptake rate, mg/L-hr                                 |

### **TEST RESULTS**

### **Biomass Activity**

Tests were included in the initial test run to make sure the biomass from AB-1 was healthy. The procedure including adding 300 mg/L of acetate COD to two respirometer bottles that contained mixed liquor from AB-1. Oxygen uptake was measured by respirometer as shown in Figure 1.





The OU and OUR were modeled using the same kinetic model applied to the ethanol biodegradation. This analysis indicated that the sample contained 293 mg/L of active acetate-consuming biomass or 29% of the VSS concentration. This percent activity is toward the high end of the scale for most activated sludge processes. The amount of slowly degradable biopolymeric material (blue shaded zone) was small. Therefore, it was concluded that the biomass was healthy and suitable for conducting the ethanol biodegradation tests.

### **Initial Respirometer Tests**

The initial respirometer tests showed that the EQ-1 sample contained two major readily biodegradable constituents as indicated by the OUR peaks between 20 and 36 hours of incubation and again between 40 and 70 hours of incubation (Figure 2A). The EQ-2 sample also contained two noticeable constituents but having different biodegradation characteristics than those in EQ-1. Analytical tests indicated that the ethanol content was 638 in the EQ-1 sample and 352 mg/L in the EQ-2 sample (see Table 1). It is likely that the constituents in EQ-2 included metabolites from the biodegradation reaction in EQ-1. The AB-1 sample showed only slowly biodegradable materials (Figure 2B). No ethanol was detected in the AB-1 or ST samples. This observation was expected because the readily biodegradable organics would have been degraded in the activated sludge process. The sludge storage tank sample showed low oxygen uptake, but with a noticeable peak of readily biodegradable materials prior to 10 hours of incubation. These constituents likely were formed by fermentation reactions in the storage tank because of the high VSS concentration.

### Second Respirometer Tests

The initial respirometer test allowed essentially all the readily biodegradable organic matter to be oxidized before conducting the ethanol biodegradation tests. This procedure insured that ethanol was the only readily biodegradable substrate in contact with the microorganisms in the second respirometer test series, thereby avoiding substrate interferences during the kinetic analysis. After the initial reactions had been completed after 72 hours if incubation, the test reactors were dosed with 200  $\mu$ L of ethanol per liter of culture volume (330 mg/L as COD).

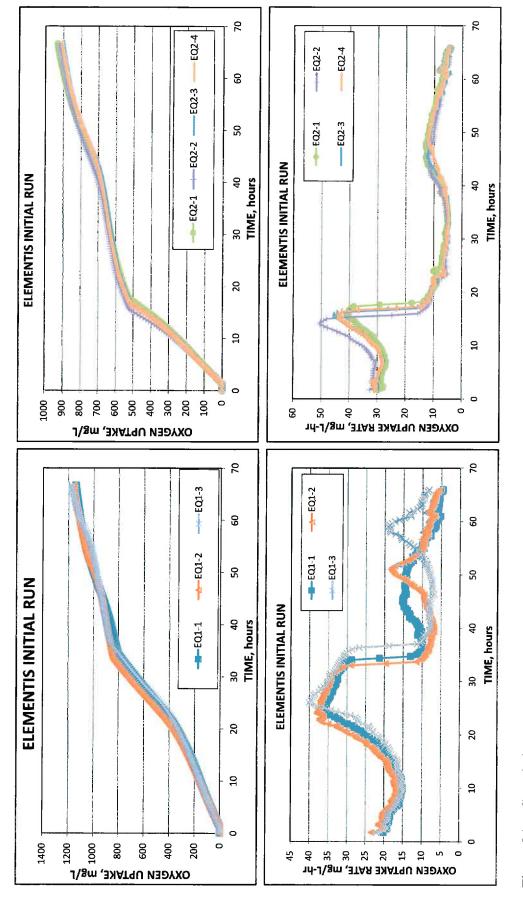
These tests showed that eight to twelve hours were required for biodegradation of the ethanol added to the EQ-1 and EQ-2 samples (Figure 3A). The added ethanol was degraded within two hours in almost all reactors containing the AB-1 and ST samples (Figure 3B).

Ethanol vs. Time in Second Respirometer Tests

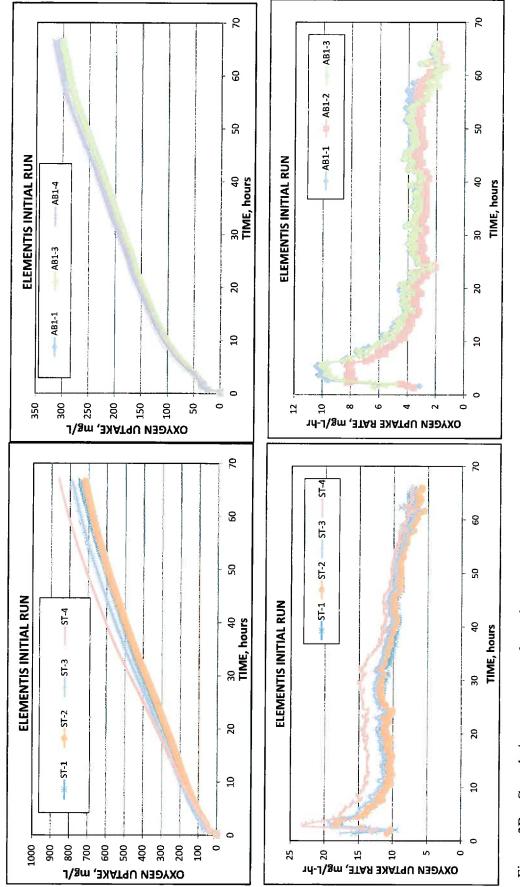
Ethanol concentrations during the respirometer tests, expressed as mg/L as COD, are shown in Table 3. Residual final soluble COD concentrations represent non-biodegradable organics other than ethanol.

|         |                             |                | Residu | ual Ethano | ol, mg/L as | COD |    |               |
|---------|-----------------------------|----------------|--------|------------|-------------|-----|----|---------------|
| Reactor | Hours of<br>incubation<br>> | 2              | 4      | 6          | 8           | 10  | 13 | Final<br>sCOD |
| EQ-1    |                             | 255            | 215    | 211        | 59          | ND  | ND | 95            |
| EQ-2    |                             | 257            | 270    | 142        | 84          | 21  | ND | 100           |
| AB-1    |                             | 7 <del>9</del> | ND     | ND         | ND          | ND  | ND | 24            |
| ST      |                             | ND             | ND     | ND         | ND          | ND  | ND | 102           |

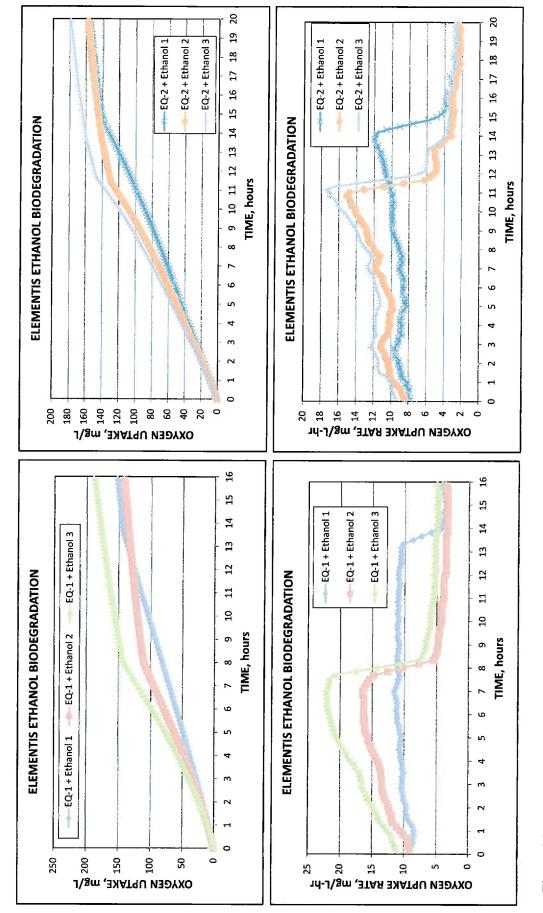
Table 3. Residual ethanol concentrations versus time during second respirometer test series.

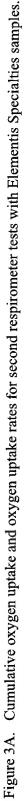




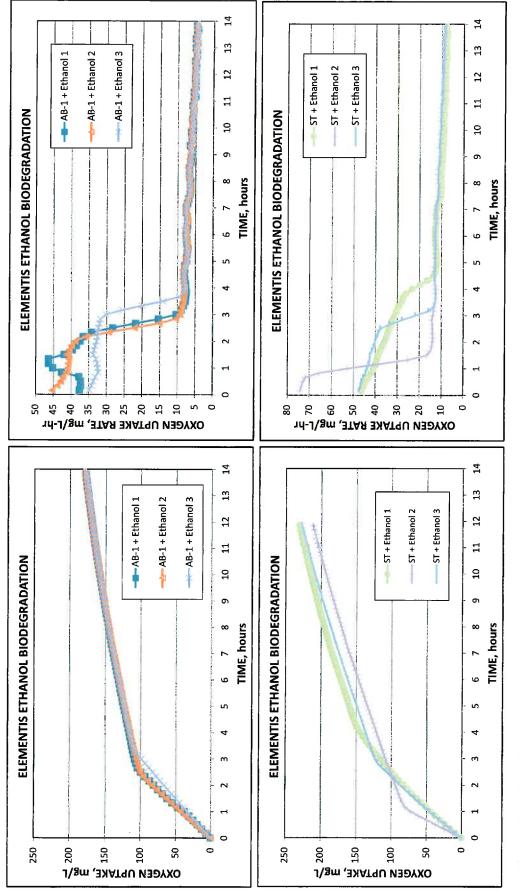


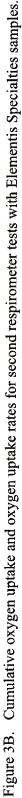






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### Kinetic Modeling of Oxygen Uptake Data

In all cases, two of the respirometer data sets were analyzed by the kinetic model. Figure 4 shows data for the AB-1 samples. In this case, the kinetic model matched the OUR data well (dashed green line vs. square symbols), and measured ethanol residuals agreed well with the calculated values (red dashed line and diamond symbols).

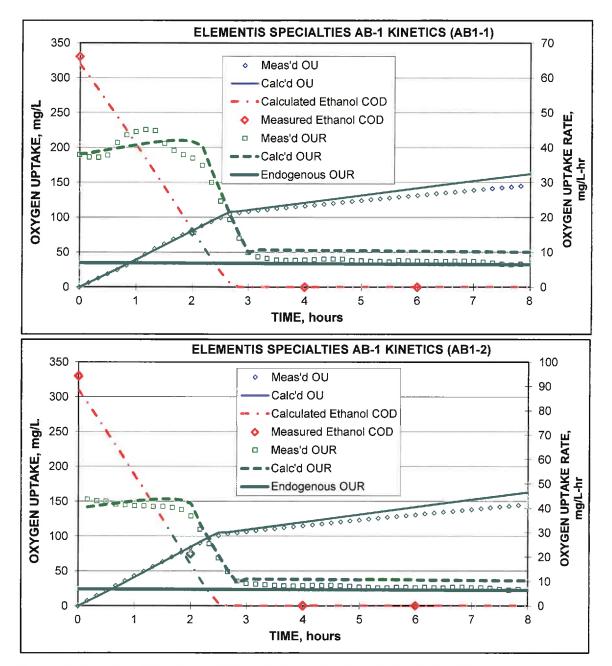


Figure 4. Results of kinetic modeling of ethanol biodegradation in the AB-1 sample.

Figure 5 shows the results for the ST sample. Ethanol biodegradation was very rapid because of the high concentration of biomass in the sample. In both cases the modeled OUR agreed well with the measured OUR, and measured ethanol concentrations tracked the calculated values.

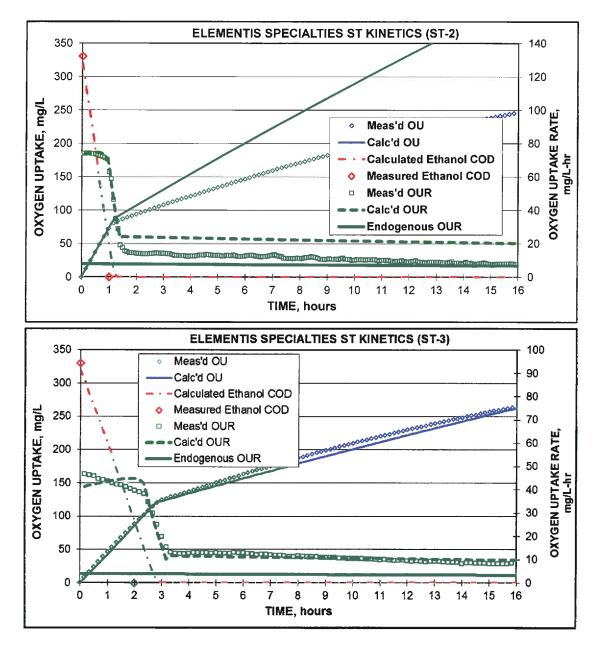


Figure 5. Results of kinetic modeling of ethanol biodegradation in the ST sample.

While the AB-1 and ST samples showed high ethanol-consuming activity, the EQ tanks showed lower rates because of the low amount of active biomass in the test samples (Figures 6 and 7). In both cases, it took it over 12 hours for the ethanol to be degraded completely. In general, the measured OUR and modeled OUR matched well, and measured and calculated ethanol concentrations were in reasonably good agreement. Kinetic modeling indicated the presence of 100 to 200 mg/L of active ethanol-degrading biomass; much of this biomass may have been produced during the initial respirometer test run.

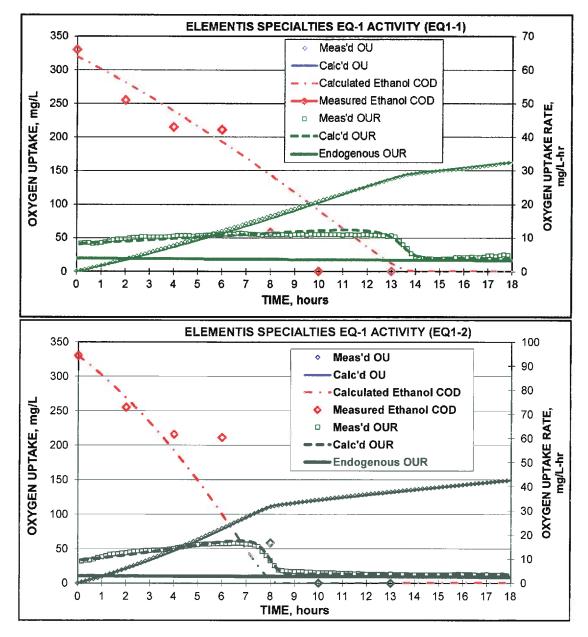


Figure 6. Results of kinetic modeling of ethanol biodegradation in the EQ-1 samples.

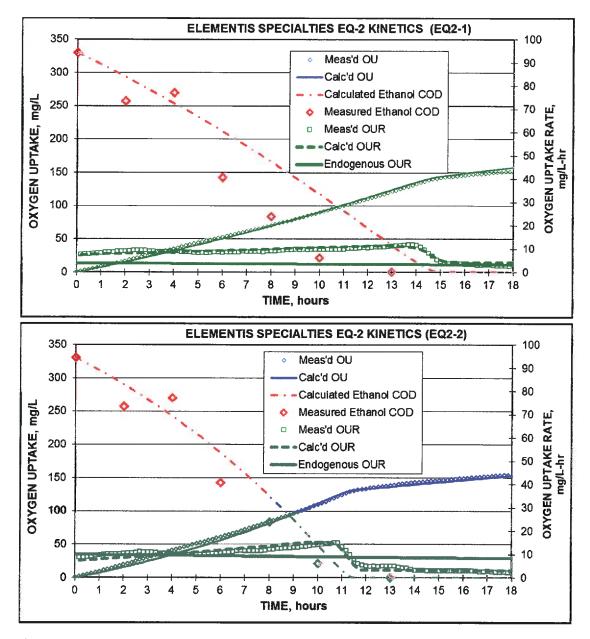


Figure 7. Results of kinetic modeling of ethanol biodegradation in the EQ-2 samples.

### **Summary of Kinetic Parameters**

A summary of kinetic parameters is given in Table 4. Because of the low initial biomass in EQ-1 and EQ-2 samples, the biomass data are expressed in terms of active biomass only. Similarly kinetic parameters for the ST and AB1 active  $X_a$  entries are based on active biomass. Actual measured data were used to model the data for AB1<sub>total</sub> entry. The net effect of this action was to decrease the  $q_{max}$  and  $\mu_{max}$  values. Overall, the tests showed good consistency in ethanol biodegradation kinetics among samples as shown in Figures 8 and 9 by calculated specific ethanol utilization rate ( $R_s/X_a$  using Eq. 1) and specific growth rates,  $\mu$  (=  $q^*Y_g$ ).

| Parameter                                                                                                                                                              | Symbol           | units                   | AB-1<br>Acetate | EQ-1  | EQ-2  | ST    | AB1<br>active Xa | AB1<br>total |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------|-----------------|-------|-------|-------|------------------|--------------|
| Total volatile solids                                                                                                                                                  | VSS              | mg/L                    | 1010            | 138   | 138   | 2965  | 815              | 815          |
| Active biomass                                                                                                                                                         | Xa               | mg/L                    | 292.9           | 138   | 138   | 1067  | 595              | 815          |
| Percent Ethanol degraders                                                                                                                                              | % <b>X</b> a     | %                       | 29%             |       |       | 36%   | 73%              |              |
| Half-Saturation Coefficient                                                                                                                                            | Ks               | mg/L                    | 60              | 9.0   | 5.0   | 11.5  | 10               | 10           |
| Yield Coefficient                                                                                                                                                      | Yo               | mg Xa/mg<br>COD removed | 0.55            | 0.495 | 0.495 | 0.535 | 0.520            | 0.555        |
| Max substrate utilization rate                                                                                                                                         | <b>q</b> max     | mg CODr/<br>mg Xa/hr    | 1.50            | 0.185 | 0.150 | 0.180 | 0.200            | 0.163        |
| Max growth rate                                                                                                                                                        | μ <sub>max</sub> | mg Xa/mg<br>Xa/hr       | 0.825           | 0.093 | 0.074 | 0.097 | 0.104            | 0.090        |
| First-order rate at low COD (S< <ks)< td=""><td>K1</td><td>L/mg VSS/hr</td><td>0.025</td><td>0.021</td><td>0.030</td><td>0.016</td><td>0.020</td><td>0.016</td></ks)<> | K1               | L/mg VSS/hr             | 0.025           | 0.021 | 0.030 | 0.016 | 0.020            | 0.016        |
| Zero-order rate at high COD (S>>Ks)                                                                                                                                    | Ko               | mg CODr/<br>mg Xa/hr    | 1.50            | 0.185 | 0.150 | 0.180 | 0.200            | 0.163        |
| Decay rate                                                                                                                                                             | Ь                | hr <sup>-1</sup>        | 0.250           | 0.25  | 0.25  | 0.25  | 0.25             | 0.25         |

Table 4. Summary of calculated kinetic parameters.

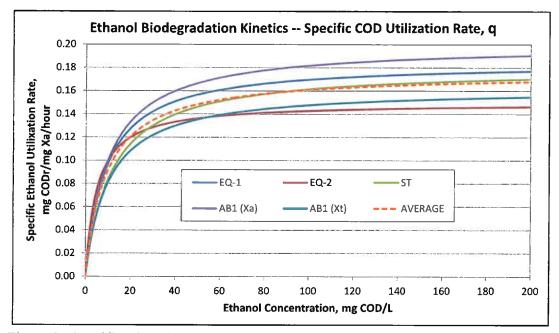


Figure 8. Specific ethanol COD utilization rates calculated from kinetic coefficients shown in Table 5.

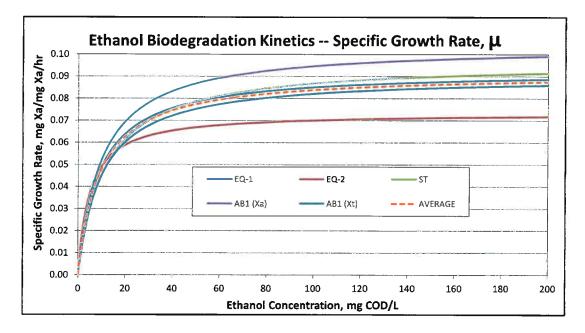


Figure 9. Specific growth rates calculated from kinetic coefficients shown in Table 5.

### **CONCLUSIONS**

Ethanol was degraded readily by the cultures in all four process tanks: EQ-1, EQ-2, AB-1 and ST. The consistency in results among all four tanks indicates that the kinetic parameters should be reliable for use in EPA's Water-9 model.

Como C. You December 10, 2013

James C. Young, General Manager, EnviTreat, LLCEmail: jcyenv@msn.comTel: 479-927-2672

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December 10, 2013

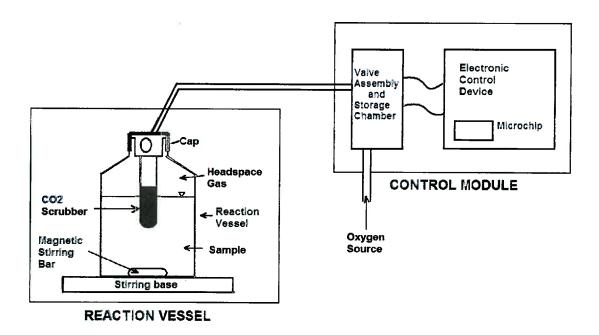
Robert M. Cowan, Process Specialist, EnviTreat, LLCEmail: <a href="mailto:bobcowan@comcast.net">bobcowan@comcast.net</a>Tel: 732-822-8111

### **Appendix A**

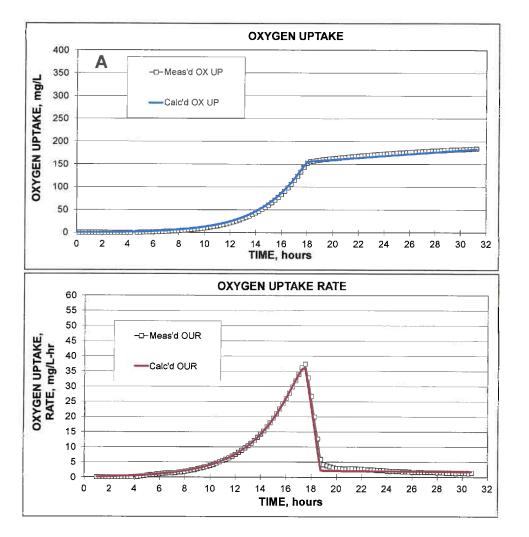
### **Respirometric Testing of Biodegradation Kinetics**

EnviTreat uses a specially designed respirometer reaction vessel configuration for conducting biodegradability tests as shown in the diagram below. The vessel can be any size but usually consists of a 0.7L bottle that contains 0.5 L of liquid test volume (or larger volumes if specified by the client). The principle of operation is the same as that which is used world-wide in headspace gas respirometers. Specifically,

- 1. As oxygen is consumed by the microorganisms in the liquid sample, an equal amount of pure oxygen is added to the headspace gas volume by the respirometer control module. Carbon dioxide is absorbed by a caustic scrubber usually 30% potassium hydroxide so that it does not build up in the vessel. In this manner, the oxygen and CO<sub>2</sub> content of the headspace gas remain constant throughout the test period. The dissolved oxygen content of the liquid sample is maintained by the rotating speed of the magnetic stirring bar and the oxygen content of the headspace gas.
- 2. While the phosphate buffer specified by ISO/OCED/EPA test protocols helps to maintain pH within an acceptable range, EnviTreat's reactor design avoids excessive stripping of carbon dioxide with consequent high pH values. This is an especially important feature if nitrification is to be evaluated.
- 3. EnviTreat's reactor design also prevents loss of volatile organics and prevents sample loss by evaporation.
- 4. Samples are removed from the vessel, as required by the test protocol, for analysis of residual COD and other parameters. For tests requiring measurement of carbon dioxide evolution, the  $CO_2$  scrubber liquid is changed at intervals and titrated to provide a measure of  $CO_2$  evolution from the biodegradation reaction.
- 5. When measuring oxygen uptake, the reactors are connected to an aerobic respirometer system to provide continuous data acquisition.



Respirometric oxygen uptake data subsequently are used to produce measures of biodegradation kinetic parameters. An example for an industrial solvent is given below. Symbols represent measured data; lines represent model results. The table gives resulting kinetic parameters. This method is based on the widely accepted Monod model that serves as the basis for most activated sludge process models (see references listed below).



| Model parameters                                  | Value | Units                    |
|---------------------------------------------------|-------|--------------------------|
| Biomass yield coefficient, Yo =                   | 0.625 | mg CODvss/mg COD removed |
| Maximum substrate removal rate, qm =              | 0.535 | mg CODr/mg CODvss/hr     |
| Half-saturation coefficient, Ks =                 | 14    | mg COD/L                 |
| Maximum specific growth rate, Um =                | 0.334 | /hr                      |
| First-order biodegradation rate at low $COD = K1$ | 0.037 | L/mg CODvss/hr           |
| Decay rate (active biomass basis) =               | 0.20  | /day                     |

### **References:**

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- 3. Young, J.C. and Cowan, R. M. (2004) *Respirometry for Environmental Science and Engineering*, SJ Enterprises, Springdale, AR USA.
- 4. DiMenna, R.A. and Sandeen, L. R. (2004) "Determination of Biological Kinetic Constants Using Respirometry for the Water9 Air Emissions Model" *Proc. WEFTEC 2004*, Water Environment Federation, Alexandria, VA USA
- 5. Sun, P.T. and Cano, M. (2000) "The Fate of Xenobiotic Compounds in Industrial Activated Sludge Systems" *Proc. WEFTEC 2000*, Water Environment Federation, Alexandria, VA USA.

### **Appendix B**

### PROTOCOL FOR TESTING ELEMENTIS-SPECIALTIES SAMPLES

1. There will be four samples as follows:

a. 1) EQ-1; 2) EQ-2; 3) AS-1; and 4) Sludge Tank

- b. Set aside a 20 mL sample for ethanol analysis; centrifuge immediately; decant and save centrate; add 1 drop conc.  $H_2SO_4$  and refrigerate until tests can be completed.
- c. Aerate the samples overnight before testing. Check volume to allow makeup for evaporation.
- 2. Tests to be conducted on each aerated sample:
  - a. ethanol by GC (to make sure it has been degraded before conducting respirometer tests.
  - b. sCOD, TSS, VSS, NH4-N, sTKN, tTKN, tPO<sub>4</sub>, sPO<sub>4</sub>, Minerals.
- 3. Prepare an ethanol feedstock solution containing 26 mL denatured alcohol to 474 mL distilled water. This solution will contain 50 uL ethanol/mL so the ethanol COD should be 82,000 mg/L. Check sCOD and ethanol by GC for accuracy.
- 4. Set up 26, 700 mL serum bottles for aerobic respirometer tests as follows (see Appendix C for mineral solution formulation):

| Set<br>No. | REACTOR ID                                | Replicates | Bottle<br>No. | mL of<br>E-S ML | mL<br>ethanol<br>feedstock | Min I,<br>mL | Min II,<br>m L | Nutrient,<br>mL | mL Resp.<br>PO4 Buffer | тсмр |
|------------|-------------------------------------------|------------|---------------|-----------------|----------------------------|--------------|----------------|-----------------|------------------------|------|
| 1          | Culture Blank: EQ-1                       | 2          | 1,2           | 500             | 0                          | 1.0          | 1.0            | 1,0             | 4.0                    | ves  |
| 2          | Culture Blank, EQ-2                       | 2          | 3, 4          | 500             | 0                          | 1.0          | 1.0            | 1.0             | 4.0                    | ves  |
| 3          | Culture Blank, AS-1                       | 2          | 5,6           | 500             | 0                          | 1.0          | 1.0            | 1.0             | 4.0                    | ves  |
| 4          | Culture Blank, Sludge tank                | 2          | 7,8           | 500             | 0                          | 1.0          | 1.0            | 1.0             | 4.0                    | yes  |
| 5          | EQ-1 + ethanol - 1                        | 3          | 9, 10, 11     | 500             | 2                          | 1.0          | 1.0            | 1.0             | 4.0                    | yes  |
| 6          | EQ-1 + ethanol - 2 (for ethaonI analysis) | 1          | 12            | 500             | 2                          | 1.0          | 1.0            | 1.0             | 4.0                    | yes  |
| 7          | EQ-2 + ethanol - 1                        | 3          | 13 14 15      | 500             | 2                          | 1.0          | 1,0            | 1.0             | 4.0                    | yes  |
| 8          | EQ-2 + ethanol - 2 (for ethanol analysis) | 1          | 16            | 500             | 2                          | 1.0          | 1.0            | 1.0             | 4.0                    | yes  |
| 9          | AS1 + ethanol-1                           | 3          | 17, 18, 19    | 500             | 2                          | 1.0          | 1.0            | 1.0             | 4.0                    | ves  |
| 10         | AS1 + ethanol-2 (for ethanol analysis)    | 1          | 20            | 500             | 2                          | 1.0          | 1.0            | 1.0             | 4.0                    | yes  |
| 11         | ST + ethanol - 1                          | 3          | 21, 22, 23    | 500             | 2                          | 1.0          | 1.0            | 1.0             | 4.0                    | ves  |
| 12         | ST + ethanol - 2 (for ethanol analysis)   | 1          | 24            | 500             | 2                          | 1.0          | 10             | 1.0             | 4.0                    | yes  |
| 13         | AS-1 Activity                             | 2          | 25, 26        | 500             | 0 75 acetate               | 1.0          | 1.0            | 1.0             | 4.0                    | ves  |

- 5. Run respirometers for 1 to 4 days until reactions are complete.
- 6. Check ethanol in ethanol-analysis bottles once per 2 hours for up to 24 hours for reactors 12, 16, 20 and 24.
- 7. Check sCOD in the last sample.
- 8. Add another dose of ethanol to each bottle and run for another 48 to 72 hours until reaction is complete. No need to check ethanol on this second run.

END

### Appendix C

### Nutrient/Mineral/Buffer stock solutions for aerobic testing

### Nutrient/Mineral/Buffer Stock Solutions

 Mineral Base I (Note: Most of these minerals already may be present in municipal wastewater) Add the following to 800 mL of reagent quality water. Dilute to 1.0 L. (Note: This mixture may form a light precipitate and should be agitated vigorously before transferring)

| $CoCl_2 \bullet 6H_2O$ | 0.25  | g | (0.062 mg Co/mL)  | Na <sub>2</sub> MoO <sub>4</sub> •2H <sub>2</sub> O | 0.005 | g | (0.0020 mg Mo/mL) |
|------------------------|-------|---|-------------------|-----------------------------------------------------|-------|---|-------------------|
| $FeCl_2 \bullet 4H_2O$ | 4.0   | g | (1.126 mg Fe/mL)  | NiCl <sub>2</sub> •6H <sub>2</sub> O                | 0.025 | g | (0.0062 mg Ni/mL) |
| $MnCl_2 \bullet 4H_2O$ | 0.05  | g | (0.0139 mg Mn/mL) | Na <sub>2</sub> SeO <sub>4</sub>                    | 0.025 | g | (0.0104 mg Se/mL) |
| $H_3BO_3$              | 0.025 | g | (0.0044 mg B/mL)  | $CuCl_2 \bullet 2H_2O$                              | 0.007 | g | (0.0026 mg Cu/mL) |
| ZnCl <sub>2</sub>      | 0.025 | g | (0.0119 mg Zn/mL) | _                                                   |       | U | 、 U )             |

2. Mineral Base II (Note: Most of these minerals already may be present in municipal wastewaters).

Dissolve the following in 800 mL distilled water. Dilute to 1 L.

| CaCl <sub>2</sub>                    | 15 g | (5.4 mg Ca/mL)  |
|--------------------------------------|------|-----------------|
| MgCl <sub>2</sub> •6H <sub>2</sub> O | 20 g | (2.36 mg Mg/mL) |

3. Nutrient Base (Note: Sufficient nitrogen and sulfate may be present in municipal wastewater)

Dissolve the following in 800 mL distilled water. Neutralize to pH 7 using 50% NaOH. Dilute to 1 L.

| NH4Cl                           | 53 g (13.9  mg N/mL) |
|---------------------------------|----------------------|
| KH <sub>2</sub> PO <sub>4</sub> | 50 g (11.4 mg P/mL)  |
| $Na_2SO_4$                      | 30 g (6.76 mg S/mL)  |

### 4. Buffer Base

Dissolve the following to 800 mL distilled water. Adjust pH to 7.0 - 7.2 using NaOH. Dilute to 1 L. (Note: The KH<sub>2</sub>PO<sub>4</sub> may not dissolve until adding NaOH.

KH<sub>2</sub>PO<sub>4</sub> 207 g (47 g P/L) (= 1.5 N as P)

Appendix D

# Spreadsheet and Equations used in EnviTreat's General Kinetic Model

Meas'd Biomass

Calcid OX UP Calcid OX UP **KINETIC MODELING** 

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200 600

GENERAL KINETIC MODEL FOR TOXICANT AND/OR SUBSTRATE TOXICITY Developed by James C. Young for EnviTreat, LLC @ 2004

Model Equations

| 500 000 °                                                                                                                             | 400                                           | 300                                  |                                          | 00<br>0 0 12<br>TME, hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 40                                                            | OXYGEN UPTAKE RATE,<br>mg/L-hr<br>mg/L-hr<br>- Catulated OUR<br>-                                                                                                                                                                                                   | culation value) 0.01                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|--------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Si = S <sub>i1</sub> - dS <sub>i</sub>                                                                                                | $dX_i = (1-f) b_a (X_{ac} + X_{a-nc}) dt$     | $dX_i = (dX_a + dX_i + dX_{a-nc})dt$ | SMP = SMP <sub>L1</sub> + $(Y_{smp})$ dS | <ol> <li>Cells in yellow highlight can be changed</li> <li>Copy oxygen uptake data, in mg/L, from test runs to Column I after changing the Time Interval to the same as that for the test data.</li> <li>Enter measured soluble COD into respective times in Column J if this data is available.</li> <li>Change Michael and biological growth parameters to optimize the fit of calculated oxygen uptake and OUR to measured values</li> <li>Change Michael and the ordinal file is for hisen at 25°C.</li> </ol> | INSTRUCTIONS/COMMENTS                                         | NISTRUCTIONS/COMMENTS<br>Start with values from independing vests, or use 0.5 as starting point<br>elect by curve fitting, start with 0.5 if belits restimates are not available<br>(Note: K <sup>+</sup> = 1.0 frno toxicant toxicity easists)<br>select by curve fitting. Jaset with 25 mg/L if better estimates are not available<br>(Note: K <sup>+</sup> = 1.0 frno toxicant toxicity easists)<br>Select by curve fitting. Use KI = 1.0000 frno substrate toxicity is expected.<br>Start with Veate from Independent yeals, or use "C/100<br>Use measured or selected values<br>a clust by curve fitting<br>select by curve fitting<br>select by curve fitting<br>select by curve fitting<br>select by curve fitting<br>select by curve fitting<br>select by curve fitting<br>(Vote: Use 0.00 unless other values are known)<br>(Note: Use 0.00 unless contrevalues are known)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (NORE, USE IN THE THET ALL ON YOUR UPERFORME THE AND THE SAME AS CALCULATION VALUE) |
| [q <sub>m</sub> k <sup>*</sup> S X <sub>6</sub> /(S + K <sub>5</sub> K <sub>5</sub> <sup>*</sup> +S <sup>2</sup> /K <sub>1</sub> )]dt | * (2-f)*X <sub>a</sub> )dt                    |                                      | S₀ - St - B(Xat - Xao)dt - SMP           | <ol> <li>Cells in yellow highlight can be changed</li> <li>Copy oxygen uptake data, in mg/L, from test runs to Column I after changing the Time I.</li> <li>Enter measured soluble COD into respective times in Column J if this data is available,</li> <li>Change kinetic and biological growth parameters to optimize the fit of calculated oxyge</li> <li>The armeter shown in the ordenial flat is for channel at 2°C.</li> </ol>                                                                             | Graph scales can be changed on the Graphs page<br>Value Units | Value<br>0.44<br>1.0<br>1.0<br>1.0<br>1.0<br>1.0<br>2.0<br>0.0<br>1.4<br>5.0<br>0.0<br>1.4<br>5.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                     |
| dS = [q <sub>m</sub> k <sup>*</sup> S X <sub>ø</sub> /(S                                                                              | $dX_{ac} = Y_g * dS - (b_a * (2-f) * X_a) dt$ | $dX_{a-nc} = (-b X_{a-nc}) dt$       | Oxygen Uptake =                          | Notes: 1. Celfs in yellov<br>2. Copy oxygen<br>3. Enter measure<br>4. The example                                                                                                                                                                                                                                                                                                                                                                                                                                  | 6. Graph scales<br>Model parameters                           | Vield coefficient, 'y' =<br>Vield coefficient, 'y' =<br>httristic max substate ternoval rale, qm =<br>k' inhibition factor =<br>httrinstic half-saturation coefficient, ka =<br>K', inhibition factor k, =<br>Haldans inhibition factor, k, =<br>Decay rale, b, =<br>httlal active competent biomass, X <sub>a ano</sub> =<br>httlal active competent biomass, X <sub>a ano</sub> =<br>httlal active competent biomass, X <sub>a ano</sub> =<br>httlal active rom-ocompetent biomass, X <sub>a ano</sub> =<br>httlal active rom-ocompetent biomass, X <sub>a ano</sub> =<br>httlal active rom-ocompetent biomass, X <sub>a ano</sub> =<br>bittlal active rom-ocompetent biomass, X <sub>a ano</sub> =<br>bittlal active rom-ocompetent biomass, X <sub>a ano</sub> =<br>httlal active rom-ocompetent biomass, X <sub>a ano</sub> =<br>bittla hactive rom-ocompetent biomass, X <sub>a ano</sub> =<br>the line active rom-ocompetent biomass, X <sub>a ano</sub> =<br>bittla hactive rom-ocompetent biomass, X <sub>a ano</sub> =<br>httla hactive rom-ocompetent biomass, X <sub>a ano</sub> =<br>bittla hactive rom-ocompetent biomass, X <sub>a ano</sub> =<br>the line active rom-ocompetent biomass, X <sub>a ano</sub> =<br>mittle hactive rom-ocompetent biomass |                                                                                     |

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| [                                                                                                                                                                                                                                                                                                                          |                                                                                  |        |          |        |           |        | -     | _     |       | _     |       | _                                           | ,     |                            | -     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------|----------|--------|-----------|--------|-------|-------|-------|-------|-------|---------------------------------------------|-------|----------------------------|-------|
| <sup>∞</sup>    Γ                                                                                                                                                                                                                                                                                                          |                                                                                  |        | Τ        |        |           | Ţ      | T     |       |       |       |       | 120 144 168 197 216 240 264 288 312 336 360 |       |                            |       |
| - 8                                                                                                                                                                                                                                                                                                                        |                                                                                  |        |          |        | <u>л</u>  |        | d     | (     | ן נ   |       | -     | 312.5                                       |       |                            |       |
| CELCT COLOR                                                                                                                                                                                                                                                                                                                | 1                                                                                | 0      |          |        | _         |        |       |       |       |       |       | 986 286                                     |       |                            |       |
| <b>2</b> 7 - <b>2</b> 7                                                                                                                                                                                                                                                                                                    |                                                                                  | 1      |          |        |           |        |       |       |       |       | -     | 240.2                                       |       | mg/L                       |       |
| Dours                                                                                                                                                                                                                                                                                                                      |                                                                                  |        |          |        |           |        |       |       |       |       |       | 92 216                                      |       | <b>OXYGEN UPTAKE, mg/l</b> |       |
| 100 100 100 100 100 100 100 100 100 100                                                                                                                                                                                                                                                                                    |                                                                                  | 9      |          |        |           |        |       |       |       |       |       | 168.1                                       |       | N UPT                      |       |
| 2 - 2 - 1 - 1                                                                                                                                                                                                                                                                                                              | ж н<br>Н                                                                         |        | 1.1.1    | 1      |           |        |       |       |       |       |       | 20 144                                      |       | XQEI                       |       |
|                                                                                                                                                                                                                                                                                                                            | sured OL<br>liated OL                                                            |        |          | 0. Fr. |           |        |       |       |       |       | ļ     | 96                                          |       | Ö                          |       |
| - w                                                                                                                                                                                                                                                                                                                        | <ul> <li>Measured OUR</li> <li>Calculated OUR</li> </ul>                         |        |          | Ì      | 112       | 5      | H     |       |       |       |       | 48 72                                       |       |                            |       |
|                                                                                                                                                                                                                                                                                                                            |                                                                                  |        |          |        |           |        | t     | 32    | 1     |       |       | 24                                          |       |                            |       |
|                                                                                                                                                                                                                                                                                                                            | 32                                                                               | <br>83 | 54       | 20     | 5         | <br>₽  | 12    | 00    |       | 4     | 0     | 0                                           |       |                            | 14.3  |
| O Ilation                                                                                                                                                                                                                                                                                                                  | , <b>ETE</b> ,                                                                   | 9 3    |          |        | /6ı<br>40 | u<br>N | 35    | ж     | xc    | )     |       |                                             |       |                            |       |
| ame as calc<br>Measid                                                                                                                                                                                                                                                                                                      | JR.<br>/L-hr                                                                     |        | 6.0      | 6.0    | 7.0       | 7.0    | 8.0   | 8.5   | 8.0   | 0.6   | 9.5   | 10.0                                        | 11.5  | 12.0                       | 12.0  |
| 80                                                                                                                                                                                                                                                                                                                         | our our,<br>mg/L-hr mg/L-hr                                                      |        | 6.1      | 6.5    | 7.0       | 7.4    | 7.9   | 8.4   | 8.9   | 9.5   | 10.1  | 10.7                                        | 11.4  | 12.2                       | 12.9  |
| nust be the<br>Catc'd                                                                                                                                                                                                                                                                                                      | (Calcd-Meas'd OUR<br>Oxy Up)*2 mg/L-h<br>ERR*2                                   | 0.00   | 8,59     | 7.09   | 4.77      | 12.11  | 6.45  | 11.18 | 8.30  | 4.54  | 4.32  | 7.32                                        | 3.96  | 8,48                       | 6.01  |
| ments r                                                                                                                                                                                                                                                                                                                    | lc'd-Mea<br>Up)*2<br>*2                                                          | 0      | 80       | 1      | 4         | 12     | ¢     | 1     | *0    | 4     | 4     | 2                                           | 6     | 80                         | 9     |
| npetent<br>justified<br>wn)<br>measure                                                                                                                                                                                                                                                                                     | (Calc'd-Me<br>Time, hr Oxy Up)*2<br>ERR*2                                        | 0.00   | 0.50     | 8      | 50        | 2.00   | 2.50  | 3.00  | 3.50  | 4.00  | 1.50  | 5.00                                        | 5.50  | 6.00                       | 6.50  |
| austory to unre rating<br>allect by curve fitting<br>=1 dial VSS active competent-active non-competent<br>COD of VSS, subitily 122 miless otherwise justified<br>Use 0.80 unless other values are known)<br>(Note: Use 0.0 unless actual values are known)<br>(Note: data time interval for oxygen uptake measure<br>Check |                                                                                  | 200    | 002      | 100    | 200       | 2002   |       | 700   | 200   |       |       | 200                                         | 700   | 700                        | 200   |
| austory to the minung<br>select by curve fitting<br>=Total VSS settive competent-active non<br>COD of VSS, usually 142 unless otherw<br>Bo 0.80 unless other values are involu-<br>(Note: Use 0.0 unless actual values are in<br>(Note: data time interval for oxygen upd<br>(Note: data time interval for oxygen upd      | d Sum<br>coD<br>mg/L                                                             | 700 7  | ~        | ~      | ~         | ~      | ~     | ~     | ~     | 630 7 | ~     | ř.                                          | Ä     | Ř                          | F     |
| ig<br>compete<br>by 1.42 u<br>ler value<br>ss actua<br>erval for                                                                                                                                                                                                                                                           | Measd<br>COD,<br>L mg/L                                                          | . 0    |          | 9      | 6         | 2      | 1     | 0     | 5     | 0     | 13    | 8                                           | 44    | 49                         | 56    |
| areacuty burner fitting<br>≡Total VSS active co.<br>COD of VSS, usually<br>Use 0.80 unless othe<br>(Note: Use 0.0 unless<br>(Note: data firme intel                                                                                                                                                                        | Meas'd<br>Oxy Up.<br>mg COD/L                                                    |        |          |        |           |        | -     |       |       |       |       |                                             |       |                            |       |
| ect by cl<br>ect by cl<br>D of VSS<br>D of VSS<br>e 0,80 u<br>bfe: Use                                                                                                                                                                                                                                                     | Calc'd<br>Oxy Up.<br>mg COD/L                                                    | 0.0    | 3.1      | 6.3    | 9.8       | 13.5   | 17.5  | 21.7  | 26,1  | 30.9  | 35.9  | 41.3                                        | 47.0  | 53.1                       | 59.5  |
|                                                                                                                                                                                                                                                                                                                            | Calc'd Meas'd Meas<br>SMP Oxy Up. Oxy Up. COD<br>mg COD/L mg COD/L mg COD/L mg/L | 0.00   | 0.00     | 0.00   | 0.00      | 0.00   | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00                                        | 0.00  | 0.00                       | 0.00  |
|                                                                                                                                                                                                                                                                                                                            |                                                                                  |        |          |        |           |        |       |       |       | 5     |       |                                             |       |                            |       |
|                                                                                                                                                                                                                                                                                                                            | Meas'd<br>VSS, mg/                                                               | 4      |          |        |           |        |       |       |       | 1     |       |                                             |       |                            |       |
|                                                                                                                                                                                                                                                                                                                            | ซ                                                                                | 0.0    | 0.0      | 0.0    | 0.0       | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0                                         | 0.0   | 0.0                        | 0'0   |
| ≝ 8                                                                                                                                                                                                                                                                                                                        | X <sub>9-10</sub><br>S/L mg VS                                                   | 45.0   | 47.9     | 51.0   | 54.4      | 619    | 61.7  | 65.7  | 9.9   | 74.4  | 9.2   | 84.4                                        | 89.8  | 95.6                       | 101.7 |
| 0.00<br>0.00<br>0.00<br>0.80<br>0.80<br>0.80<br>0.50<br>0.50                                                                                                                                                                                                                                                               | X<br>Mg VSs                                                                      |        |          |        |           |        |       |       |       |       |       |                                             |       |                            | •     |
| g coD/                                                                                                                                                                                                                                                                                                                     | ,<br>vss/L                                                                       | 0.0    | 0.0      | 0      | ö         | 0.2    | 0.3   | 0.3   | 0.4   | 0.5   | 9.6   | 0.6                                         | 0.7   | 0.8                        | 0.9   |
| 0.00<br>0.00<br>0.80<br>0.80<br>0.50                                                                                                                                                                                                                                                                                       |                                                                                  | 45.0   | 48.0     | 51.1   | 54.5      | 58.1   | 61.9  | 66.0  | 70.3  | 74.9  | 79.8  | 85.0                                        | 90.5  | 96.4                       | 102.7 |
|                                                                                                                                                                                                                                                                                                                            | Х,<br>mg VSS/L                                                                   |        | <b>6</b> | 8      |           | 8      | 4     | 0     | 9     | 3     | 0     | 8                                           | 9     | 4                          | 3     |
| е е                                                                                                                                                                                                                                                                                                                        | ŊQ                                                                               |        | 7.       | 7.8    | 8.3       | 8.8    | 9.4   | 0     | 10.   | 1     | 12.   | 12.8                                        | 13.6  | 14,4                       | 15.3  |
| t bioma£<br>s =<br>actor, Y,                                                                                                                                                                                                                                                                                               | dS<br>bool                                                                       | 0      | 7        | 6      | -         | 6      | ŝ     | 2     | 6     | 7     | ~     | 6                                           | 33    | Ð                          | 9     |
| hitial active-non-competent biomass, X <sub>enteo</sub> =<br>hitial inactive volatite solids =<br>ma CoDing VSs, B =<br>Biomas activity factor, f =<br>Soluble microbial product factor, Y <sub>mp</sub> =<br>Time interval, hours =                                                                                       | IS,                                                                              | 700.0  | 692.7    | 684.9  | 676.7     | 667.9  | 658,5 | 648.5 | 637.9 | 626.7 | 614.7 | 601.9                                       | 588.3 | 573.9                      | 558.6 |
| e-non-o<br>live volat<br>ng VSS,<br>ctivity fa<br>crobial p<br>ral, hour                                                                                                                                                                                                                                                   | Calc'd S,<br>mg COD/L                                                            | 0      | .0       | ç      |           | Ģ      | 0     | ç     | 0     | ç     | 0     | ¢                                           | 0     | 0                          | D     |
| Initial active-non-comp<br>Initial inactive volatile c<br>mg COD/mg VSS, B =<br>Biomass activity factor<br>Soluble microbial prod<br>Time interval, hours =                                                                                                                                                                | Tlme, hr                                                                         | 0.00   | 0.50     | 1.00   | 1.50      | 200    | 2.50  | 3.00  | 3.50  | 4.0   | 4.5   | 5.00                                        | 5.50  | 6.00                       | 6.50  |
| ie ie ĕiă Sil                                                                                                                                                                                                                                                                                                              | Ē                                                                                |        |          |        |           |        |       |       |       |       |       |                                             |       |                            |       |

|                                  | +        | -     | -    | •    | -     | +    | -     | Tel  | +    | -    | 0    |      |      | Ŀ     |  |
|----------------------------------|----------|-------|------|------|-------|------|-------|------|------|------|------|------|------|-------|--|
| 32                               | 82       | 24    | 20   | -    | ₽     | 4    | 00    | )    | 4    | 0    | •    |      |      | 14.3  |  |
|                                  |          | лц    | 1-7  | /6ı  | u     |      |       |      |      |      |      |      |      |       |  |
| <b>ETA</b> 3                     | 7 3<br>7 | ۲K    | 1    | 90   | I N   | 35   | ж     | xc   | )    |      |      |      |      |       |  |
| mg/L-hr                          |          | 6.0   | 6.0  | 7.0  | 7.0   | 8.0  | 8.5   | 0.8  | 06   | 9.5  | 10.0 | 11.5 | 12.0 | 12.0  |  |
| mg/L-hr mg/L-hr                  |          | 6.1   | 6.5  | 7.0  | 7.4   | 7.9  | 8.4   | 9    | 9.5  | 10.1 | 10.7 | 11.4 | 12.2 | 12.9  |  |
| 2 (D)                            | 0.00     | 8,59  | 7.09 | 4.77 | 12.11 | 6.45 | 11.18 | 8.30 | 4.54 | 4.32 | 7.32 | 3.96 | 8,48 | 6.01  |  |
| Time, hr Oxy Up)*2<br>ERR*2      | 0.00     | 0.50  | 1.00 | 1.50 | 2.00  | 2.50 | 3.00  | 3.50 | 4.00 | 4.50 | 5.00 | 5.50 | 6.00 | 6.50  |  |
| mg/L TI                          | 002      | 200   | 700  | 200  | 200   | 700  | 200   | 200  | 200  | 200  | 200  | 700  | 700  | 200   |  |
| mg/L                             | 200      |       |      |      |       |      |       |      | 630  |      |      |      |      |       |  |
| mg cob/L n                       | 0        | ei    | و    | 6    | 12    | 17   | 20    | 25   | 29   | 33   | 38   | 44   | 49   | 56    |  |
| mg coD/L r                       | 0.0      | 3.1   | 6.3  | 9.8  | 13.5  | 17.5 | 21.7  | 26.1 | 30.9 | 35.9 | 41.3 | 47.0 | 53.1 | 59.5  |  |
|                                  | 0.00     | 0,00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 00'00 |  |
| VSS, mg/L mg COD/L               | 43       |       |      |      |       |      |       |      | 75   |      |      |      |      |       |  |
| ng VSS/L                         | 0.0      | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0'0   |  |
| Auto Agente<br>mg VSS/L mg VSS/L | 45.0     | 47.9  | 51.0 | 54.4 | 619   | 61.7 | 65.7  | 6.69 | 74.4 | 79.2 | 84.4 | 89.8 | 95.6 | 101.7 |  |
| SSA                              | 0.0      | 0.0   | 0.1  | 0.1  | 0.2   | 0.3  | 0.3   | 0.4  | 0.5  | 0.5  | 0.6  | 0.7  | 0.8  | 0.9   |  |
|                                  | 45.0     | 48.0  | 51.1 | 54.5 | 58.1  | 61.9 | 66.0  | 70.3 | 74.9 | 79.8 | 85.0 | 90.5 | 96.4 | 102.7 |  |
| ту VSS/L                         |          | 7.3   | 7.8  | 8.3  | 8.8   | 9.4  | 10.0  | 10.6 | 11.3 | 12.0 | 12.8 | 13.6 | 14,4 | 15.3  |  |
| mg COD/L                         | 0.0      |       |      |      |       |      |       |      |      |      |      |      |      |       |  |
|                                  | 700      | 692.7 | 684  | 676  | 667   | 658  | 648   | 637  | 626  | 614  | 60   | 588  | 573  | 558   |  |



### DETERMINATION OF BIOLOGICAL KINETIC CONSTANTS USING RESPIROMETRY FOR THE WATER9 AIR EMISSIONS MODEL

Richard A. DiMenna, PE Lawrence R. Sandeen Rohm and Haas Co. 3100 State Road Croydon, PA 19021

### ABSTRACT

The U.S. E.P.A. Water9 air emissions model can be used to estimate air emissions, biological removal and adsorption of organic compounds in wastewater treatment and collection systems. Although the model contains an extensive database of physical property data and biological treatment kinetic constants for organic compounds, the Water9 documentation recommends that site-specific biotreatment kinetic data be used whenever available.

The Water9 model uses a zero-order substrate removal constant ( $K_{max}$ ) and a first-order substrate removal constant ( $K_1$ ). While these appear similar to, and have the similar units as, the Monod maximum substrate removal constant  $q_{max}$  and the quotient of the Monod  $q_{max}$  divided by the half-saturation factor ( $K_s$ ), the procedures given for determining the Water9 kinetic factors by batch testing (40CFR Part 63 Appendix C) indicate that there are important differences. The Water9 factors are based on the entire biomass population as measured by the mixed liquor suspended solids, while the intrinsic Monod kinetics are based on the active biological population only. In addition, an effective  $K_1$  is determined at the substrate concentration of interest, rather than being a more generally applicable intrinsic constant.

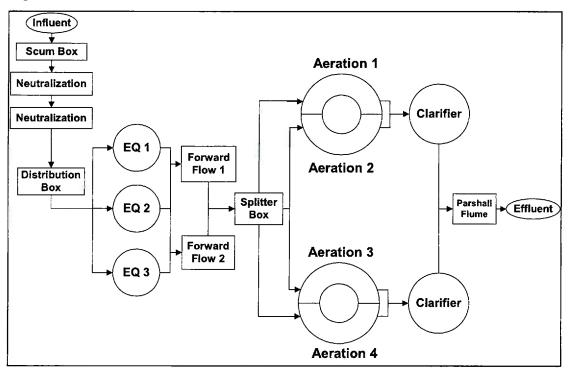
Water9 modeling of styrene emissions from an industrial biological wastewater treatment system using the default physical property and kinetic data gave estimated effluent concentrations and air emissions considerably greater than indicated by effluent analytical data, and as indicated by the lack of any styrene odor at the treatment plant. Batch respirometry testing using biomass from the industrial plant and pure styrene as the substrate was used to generate a styrene removal profile based on Monod kinetics. The substrate removal profile was used in place of substrate analytical data in a modification of one of the recommended procedures for determining the Water9 kinetic constants. Using the site-specific biorate constants resulted in estimates of the styrene effluent concentrations in much better agreement with measured concentrations in the plant effluent. The styrene air emissions estimated by the model decreased by several orders of magnitude.

### **KEYWORDS**

Respirometry, Water9, air emissions, kinetic constants

### **INTRODUCTION**

The Rohm and Haas plant located in Bristol, PA produces a variety of polymer products, including emulsion polymer coatings, solution polymers and digital imaging products. Wastewater from the production units is treated in a 1.5 million gallon per day wastewater treatment plant (WWTP) by equalization, neutralization and biological treatment. The WWTP was designed and built to minimize odors, with all tanks up to the secondary clarifiers covered. A flow diagram of the plant is shown in Figure 1.



### Figure 1. Bristol WWTP

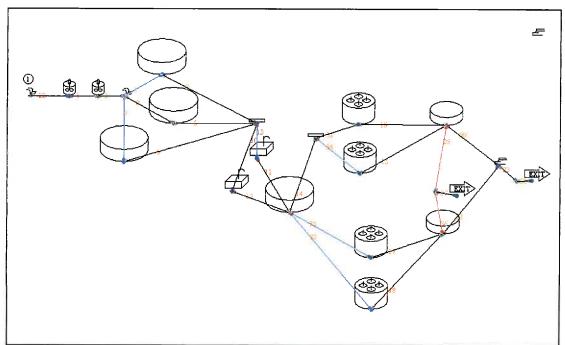
### WATER9 MODEL

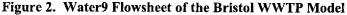
The Water9 model was developed to estimate air emissions from wastewater treatment collection and treatment systems. The fraction of each organic compound in wastestreams that is emitted to air, removed biologically, adsorbed or that remains in the system exit streams is calculated by mass balance and mass transfer calculations for each treatment unit based on the model unit parameters and the properties of each chemical. The Water9 model is available for download from the US EPA web site at <a href="http://www.epa.gov/ttn/chief/software/water/index.html">http://www.epa.gov/ttn/chief/software/water/index.html</a> .

The model contains modules for approximately 50 wastewater treatment and conveyance units and an extensive database of physical property data and biotreatment kinetic constants for organic compounds. Although default biotreatment kinetic constants and the ability to generate constants from molecular structure are provided, the Water9 documentation recommends using site-specific biodegradation constants whenever they are available. The reference for procedures for determining the kinetic constants is 40 CFR Part 63 Appendix C, Determination of Fraction Degraded (Fbio) in a Biological Treatment Unit.

### PRELIMINARY WATER9 MODELING RESULTS

Personnel at the plant wished to improve the method of estimating emissions from the wastewater treatment tanks for reporting required by the site air permit and for Toxic Release Inventory reporting. A Water9 model of the WWTP was developed and influent data for 21 organic compounds detected in the plant influent waste streams was entered into the model. The Water9 flowsheet for the plant is shown in Figure 2 and Table 1 contains the list of compounds in the plant wastewater.





With the exception of styrene, Water9 results using default physical properties and kinetic constants were in reasonable agreement with plant measured effluent concentrations and previous estimations of air emissions. Estimated emissions of styrene were an order of magnitude larger than the combined emissions of the other 20 chemicals, and the predicted effluent concentration, 1200  $\mu$ g/L, was much greater than the measured concentrations of <1-5  $\mu$ g/L.

The Water9 physical property data for styrene was reviewed and compared to literature and company data sources. While alternate values were found for Henry's Law

| Joulius III Dristor vv vv I | I WALLIS MOULI       |
|-----------------------------|----------------------|
| 1 butanol                   | ethyl acrylate       |
| methyl ethyl ketone         | 2-ethylhexylacrylate |
| ethylbenzene                | formaldehyde         |
| tert-butanol                | methacrylic acid     |
| acetaldehyde                | methanol             |
| acrylic acid                | methyl acrylate      |
| acrylonitrile               | methyl methacrylate  |
| benzene                     | styrene              |
| butyl acrylate              | toluene              |
| butyl methacrylate          | xylene               |
| chloroform                  |                      |

Table 1. Organic Compounds in Bristol WWTP Water9 Model

Constants, octanol-water partition coefficients and other parameters, use of the alternate values had little or no effect on predicted emissions. It was concluded that the biological removal coefficients were underestimating the amount of biological removal occurring in the system.

### **RESPIROMETRY TESTING USING STYRENE**

In order to determine site-specific biodegradation rates for styrene, closed-bottle respirometry using a Challenge Environmental Systems Respirometer was performed using styrene as the substrate and with biomass from the plant biological treatment system. The oxygen uptake for a respirometry run fed 100 mL/L of styrene is shown in Figure 3.

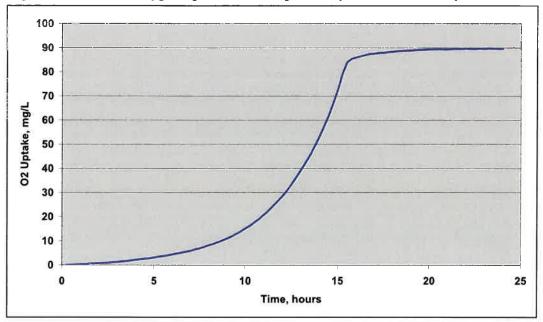


Figure 3. Measured Oxygen Uptake from Respirometry with 100 mL/L Styrene Feed

The data was curve fit to the Monod model

$$\mu = \frac{\mu_{\max}S}{K_s + S}$$

where  $\mu = \text{cell growth rate, hr}^{-1}$ 

 $\mu_{max}$  = maximum cell growth rate, hr<sup>-1</sup>

S = substrate concentration, mg/L

 $K_s = half saturation constant, mg/L.$ 

The Monod model can also be expressed in terms of the substrate removal rate, q

$$q = \frac{q_{\max}S}{K_s + S}$$

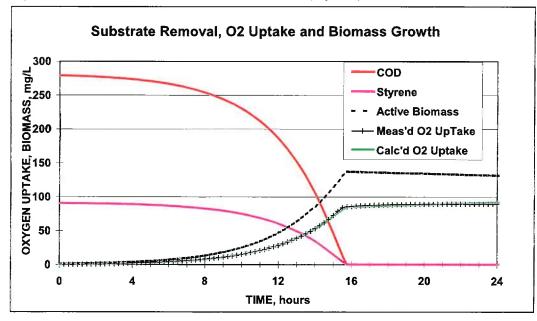
where  $q = substrate removal rate, hr^{-1}$ 

 $q_{max} = maximum$  substrate removal rate.

While "K" is sometimes used for the Monod substrate removal rate, "q" is used here to differentiate the values from the Water9 constants. The Monod q and  $\mu$  are related by the growth yield coefficient, Y<sub>g</sub>, which is  $\mu/q$ . At low substrate concentrations, the above equation would approach a first-order reaction, with q= q<sub>max</sub>S/K<sub>s</sub> and first-order constant q<sub>1</sub> = q<sub>max</sub>/K<sub>s</sub>.

The results of the fitting of the respirometry data to the Monod model are shown in Figure 4, in which the measured oxygen uptake and the modeled oxygen uptakes, cell growth and substrate reduction (as Chemical Oxygen Demand and as styrene) are plotted against time.

Figure 4. Monod Kinetics Growth and Substrate (Styrene) Removal



The Water9 model uses biorate constants  $K_{max}$  and  $K_1$ , with  $K_1 = K_{max}/K_s$ . While the constants had similar names and units to the Monod constants, the Water9 constants are based on the aggregate mixed liquor volatile suspended solids (MLVSS) as a surrogate for the total biomass concentration, rather than the portion of the biomass actively growing with a particular substrate. The active portion of the biomass treating a mixed substrate typically ranges from 5-25%, with the portion active for a particular chemical substrate being only a fraction of the total active biomass. In addition, in the procedure for determining the Water9 constants using a batch test,  $K_1$  is determined at a specific substrate concentration, rather than as a more general system constant. Table 2 below shows a comparison of the Monod and Water 9 kinetic constants.

| Model  | Constants           | Definition       | Units            |
|--------|---------------------|------------------|------------------|
|        | $\mu_{max}$         | maximum cell     | hr <sup>-1</sup> |
|        |                     | growth rate      | (mg cells/mg     |
|        |                     |                  | cells-hr)        |
|        | $\mathbf{q}_{\max}$ | maximum          | hr <sup>-1</sup> |
| Monod  |                     | substrate        | (mg              |
|        |                     | removal rate     | substrate/mg     |
|        |                     |                  | cells-hr)        |
|        | Ks                  | half-saturation  | mg substrate/L   |
|        |                     | constant         |                  |
|        | K <sub>max</sub>    | maximum          | mg substrate/g   |
|        |                     | substrate        | biomass-hr       |
|        |                     | removal rate;    |                  |
| Water9 |                     | zero-order rate  |                  |
|        |                     | constant         |                  |
|        | K1                  | first-order rate | L/g biomass-     |
|        |                     | constant         | hr               |

Table 2. Monod and Water9 Kinetic Constants

### **RECOMMENDED PROCEDURES FOR DETERMINATION OF WATER9 BIOLOGICAL REMOVAL KINETIC CONSTANTS**

The Water9 documentation refers the user to 40 CFR Part 63 Appendix C for procedures for determination of site-specific biological kinetic constants for use in the Water9 model. A number of continuous-flow and steady-state reactor procedures are given in the appendix, including one for a sealed reactor test, which can be performed in serum bottles, as in the equipment in the Challenge Environmental Systems and other commercially available respirometers. The procedure for calculation of the kinetic coefficients for the Water9 model from batch testing data is detailed in Section III.D.2 and Form XII of Appendix C, and can be summarized as follows:

- 1. Add a measured amount of biomass from the treatment plant to the closed reactors
- 2. Add compound to be evaluated and provide mixing and aeration in a closed system

- 3. Measure the compound concentration at least six times during the course of the run, including at least one measurement after the concentration has been reduced to below the limit of quantification
- 4. For the each time interval between consecutive pair of analyzed samples, calculate the removal rate in mg/L-hr, the log-mean substrate concentration (LM S) over the interval, and the ratio of the removal rate to the log-mean substrate concentration.
- 5. Plot the reciprocal of the ratio calculated in step 4 versus log-mean S.
- 6. Determine  $K_{max} = 1/$  (slope near the y-intercept \* MLVSS \* headspace factor), where MLVSS is the mixed liquor volatile suspended solids in g/L and the headspace factor is an adjustment based on the Henry's Law Constant of the compound and the amount of headspace in the apparatus relative to the liquid volume. The headspace factor is unitless, with a value slightly less than one for most compounds and respirometers.
- 7. Determine effective  $K_1$  = (ratio of removal rate/log-mean S)/(MLVSS \* headspace factor), with the removal rate being the rate during the time interval in which the substrate concentration was closest to the expected concentration in the full-scale aeration tank.

### DETERMINATION OF WATER9 CONSTANTS FROM RESPIROMETRY DATA AND MODELING

The respirometry data and Monod modeling were used to develop COD and styrene profiles giving the decrease in COD and styrene with time, as shown in Figure 4. The styrene profile was then used as a substitute for the sampling and analytical determination of styrene concentration in the Form XII procedure. Data from the respirometry run and calculated Form XII parameters are shown in Table 3.

|         |          |         |          | Datio of Data/         | Desinvosal |
|---------|----------|---------|----------|------------------------|------------|
|         |          | Rate,   | Log-mean | Ratio of Rate/         | Reciprocal |
| S, mg/L | Time, hr | mg/L-hr | S, mg/L  | LM S, hr <sup>-1</sup> | Rate, hr   |
| 90.60   | 0.0      |         |          |                        |            |
| 89.95   | 2.0      | 0.325   | 90.27    | 0.0036                 | 277.7      |
| 88.74   | 4.0      | 0.604   | 89.34    | 0.0068                 | 147.9      |
| 79.05   | 9.0      | 1.939   | 83.80    | 0.0231                 | 43.23      |
| 68.52   | 11.0     | 5.267   | 73.66    | 0.0715                 | 13.99      |
| 60.27   | 12.0     | 8.246   | 64.30    | 0.1282                 | 7.798      |
| 49.11   | 13.0     | 11.159  | 54.50    | 0.2048                 | 4.884      |
| 42.16   | 13.50    | 13.895  | 45.55    | 0.3051                 | 3.278      |
| 34.15   | 14.00    | 16.022  | 38.02    | 0.4214                 | 2.373      |
| 25.00   | 14.50    | 18.301  | 29.34    | 0.6238                 | 1.603      |
| 14.78   | 15.00    | 20.440  | 19.45    | 1.051                  | 0.9514     |
| 9.43    | 15.25    | 21.402  | 11.91    | 1.798                  | 0.5563     |
| 4.23    | 15.50    | 20.788  | 6.49     | 3.203                  | 0.3122     |
| 0.03    | 15.75    | 16.808  | 0.860    | 19.48                  | 0.0513     |
| 0.00    | 16.00    | 0.1299  |          |                        |            |

### Table 3. Form XII Data and Calculations

The plot of the reciprocal rate versus the log-mean S is shown in Figures 5 and 6, with Figure 6 showing only the part of the plot near the y-intercept and the linear regression equation, which shows the slope near the intercept.

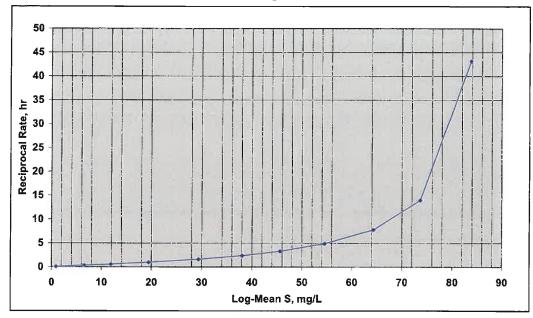


Figure 5. Plot of Reciprocal rate versus Log-Mean S

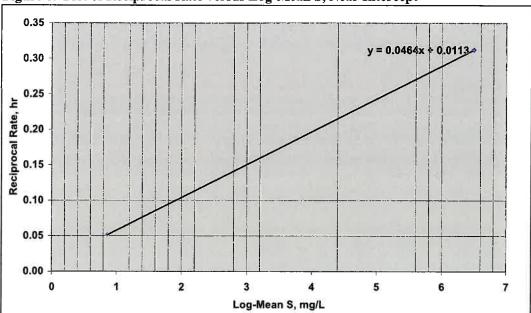


Figure 6. Plot of Reciprocal Rate versus Log-Mean S, Near Intercept

For the data shown in Table 3, the slope in the interval between 15.5 and 15.75 hours was used, which was 0.0464, as shown in Figure 6. This was used to calculate  $K_{max}$  from the

slope, the MLVSS as calculated from the kinetic model at 15.5 hours and the headspace factor of 0.968:

$$K_{max} = \frac{1}{\text{slope * MLVSS * headspace factor}}$$

$$K_{max} = \frac{1}{\frac{0.0464}{(hr)mg styrene/L} * \frac{3.02g MLVSS}{L} * 0.968} = 7.37 mg styrene/g MLVSS - hr$$

The effective  $K_1$  was determined based on the ratio of removal rate to log-mean S for this interval, for which the expected substrate concentration was closest to the expect full scale concentration:

$$K_1 = \frac{\text{ratio of rate/log - mean S}}{\text{MLVSS * headspace factor}}$$

$$K_1 = \frac{19.48/hr}{3.02g \text{ MLVSS/L}*0.968} = 6.66 \text{ L/g MLVSS-hr}$$

Table 4 below compares the Water9 constants as determined for the system to the default values and shows the estimated emissions and effluent concentrations for styrene in the Bristol WWTP.

|                          | Water9 Default Ks | Ks from Respirometry |
|--------------------------|-------------------|----------------------|
| K <sub>max</sub> , hr-1  | 31.1              | 7.37                 |
| K <sub>1</sub> , L/gm-hr | 0.11              | 6.66                 |
| Emissions, g/s           | 0.2               | 0.007                |
| Effluent, mg/L           | 1.2               | 0.006                |

Table 4. Kinetic constants, Emissions and Effluent Concentrations

The calculation of the slope of the plot of reciprocal rate versus log-mean S and point at which the effective  $K_1$  are selected are highly sensitive to the interval chosen and the closeness of the interval to the y-axis. Use of the respirometry data allows the slope to be determined for a smaller interval than would be typical using discrete-sample substrate monitoring and the interval can be chosen close to the y-axis, which may be difficult to achieve with discrete sample monitoring. In addition, MLVSS may increase over the course of a respirometer run. The Monod model can be used to estimate the MLVSS at the time that corresponds to the rates used to calculate  $K_{max}$  and  $K_1$  in the Form XII procedure. These factors may make the coefficients obtained by respirometry more representative of actual biodegradation than coefficients determined from discrete sampling.

### **REGULATORY CONSIDERATIONS**

The purpose of 40 CFR Part 63 Appendix C is to define procedures for calculation of sitespecific fraction of organic compounds degraded ( $F_{bio}$ ) in a biological treatment plant for regulatory determinations under certain Part 63 NESHAP standards. The specific procedures in the Part 63 regulations must be followed for determination of  $F_{bio}$  for this purpose.

### CONCLUSIONS

There are important differences between the intrinsic Monod biological kinetic constants and the constants used by the Warter9 model. Data obtained from fitting respirometry data to a Monod model can be used to generate a substrate removal profile, which can then be used to determine kinetic constants for the Water9 model in a modification of batch closed-reactor procedure for generating site-specific kinetic constants for the Water9 model.

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### ESTIMATING WASTEWATER TREATMENT EMISSIONS USING EPA's WATER9 MODELING SOFTWARE

Shiraz Sheikh/CH2M HILL Tom Sandy/CH2M HILL Masood Irani/CH2M HILL Kristen Jenkins/CH2M HILL

CH2M HILL, Inc. 7600 West Tidwell Rd, Suite 600 Houston, TX 77040

### ABSTRACT

As part of a biological wastewater pretreatment investigation, CH2M HILL was retained to provide volatile organic compound (VOC) predictions for federal and state air permitting. These predictions were performed using the U.S. Environmental Protection Agency's (EPA's) WATER9 model. WATER9 is a Microsoft® Windows-based program consisting of analytical expressions for estimating air emissions from individual wastewater units. WATER9 is able to evaluate a wastewater treatment facility's unit processes that may contain multiple streams, collection systems, and complex treatment configurations. The emission predictions are based on a combination of biological kinetics calculations and vapor equilibrium calculation that consider the properties of the compound and its concentration in the stream.

The Dow Chemical Company conveys wastewater from their production facility to a secondary wastewater treatment facility owned and operated by an independent corporation. The industrial wastewater is pretreated before its transfer to the treatment facility. CH2M HILL was retained to estimate the existing air emissions from the treatment facility and develop pretreatment options for the wastewater. The need was to predict VOC, hazardous air pollutant (HAP), and state air toxic emission rates from the existing treatment facility and different biological pretreatment options.

Conventional activated sludge, sequential batch reactors (SBRs), and surface aerators were evaluated. The conventional activated sludge option requires the construction of two aeration tanks and two clarifiers. Blowers would provide air for microbial processes and tank mixing through coarse bubble diffusers. The SBRs option requires the conversion of two existing tanks. Blowers would provide air for microbial processes and tank mixing through coarse bubble diffusers. The surface aerators option requires the conversion of a basin and construction of two clarifiers. Floating surface aerators would provide air for microbial processes and mixing.

The WATER9 model was used to predict emissions from these biological pretreatment options. Since the WATER9 model is applicable to a continuous process, CH2M HILL had to develop an approach to model the SBRs. This report contains the key findings from using the WATER9 model on these systems and the method used to predict emissions from the batch reactors.

### **KEYWORDS**

WATER9, VOC, HAP, Wastewater Treatment, Emissions Modeling, Conventional Activated Sludge, SBR, Surface Aerators

### INTRODUCTION

An independent corporation operates a treatment facility that receives and treats wastewater from three facilities. The primary contributor is a chemical plant in Texas owned by The Dow Chemical Company, which provides approximately 95 percent of the wastewater load.

The treatment facility was constructed in the 1970s after the applicable date for obtaining an air permit as a grandfathered facility. The facility has operated under Standard Exemption 61 (currently 30 Texas Administrative Code [TAC] 106.532, Permit by Rule for Water and Wastewater Treatment). This permit-by-rule (PBR) does not require specific agency registration and is subject only to the general 106 Subchapter A requirement of less than 25 tons per year (tpy) of volatile organic compounds (VOCs). In the late 1990s, the independent corporation began to re-evaluate its emissions from the treatment facility based on its experience. During this re-evaluation, the Texas Commission on Environmental Quality (TCEQ) audited the facility. Based on these events, the facility determined that its potential to emit exceeded 25 tpy, and the facility and the TCEQ entered into negotiations on a consent decree. Though this decree has not been signed by the TCEQ, it is expected to contain requirements for the facility to obtain an air permit within 365 days.

As the largest contributor to the treatment facility, the chemical plant has contractual language allowing The Dow Chemical Company first right of refusal on any capital improvements at the site. The chemical plant responded to several information requests from the treatment facility starting in 1999. The chemical plant put together a potential-to-emit (PTE) list for the treatment facility that included compounds and quantities potentially discharged to the treatment facility. This PTE list was used by the treatment facility in their initial WATER9 modeling and subsequent permit application. This application was reviewed by the TCEQ and the treatment facility received a Notice of Deficiency (NOD) in September 2003. In order to respond to this NOD and the impending consent decree, the treatment facility requested that the chemical plant more fully participate in the agency response. Specifically, the treatment facility wanted The Dow Chemical Company's best assessment of the potential discharges, with various operations' shutdowns taken into account. The Dow Chemical Company retained CH2M HILL to assist with the information gathering, emissions modeling, and technology evaluation strategies (Hilton et al. 2004).

Pretreatment options were examined for each of the sites based on convenience and availability of infrastructure. Each site offers unique advantages and disadvantages, so the evaluation included both sites for the location of the pretreatment technology.

### **BASELINE WASTE LOAD DEVELOPMENT**

The baseline waste load development focused on consolidating the available data from various sources, including the chemical plant site analytical data, treatment facility analytical data, and the PTE list.

The compiled data include:

- The chemical plant's weekly sampling data for each pump house
- The concentrated waste sump and the effluent to the treatment facility (1998-2002)
- Treatment facility's daily biochemical oxygen demand (BOD), total organic carbon (TOC), flow, and annual priority pollutant scans for the past 5 years
- List of PTE pollutants compiled by The Dow Chemical Company in 1999 and updated in 2003

The process wastewater and "clean" discharge sump have been equipped with flow meters. However, except for very limited flow rate data obtained for the chemical plant's discharge sump effluent, no other flow data were available. The daily influent flow rate of the treatment facility was obtained and used as the wastewater base flow rate from the chemical plant.

The chemical plant's weekly analytical data representing the discharge to the treatment facility for the 5 years from 1998 through 2002 were compiled in a database, and the outlier data points were eliminated. The resulting weekly analytical data were paired with the corresponding influent flow rates measured at the treatment facility. Mass loadings were calculated for each chemical based on the concentrations in the discharge to the treatment facility.

The effect of production areas being shut down on the chemical loadings was calculated and reflected in the database. Average, maximum, standard deviation, and 95 percent upper confidence limit (UCL) were calculated for each chemical. Since the loading data do not conform to a normal distribution, the 95 percent nonparametric upper tolerance limit (UTL) for each chemical load was selected by ranking the loading of each chemical and using statistical guidelines.

The baseline waste loading database was used for the technology evaluation and emission estimation using the WATER9 model. The waste loading included approximately 241 chemicals with a total combined loading of 56,000 pounds per day (lbs/day) and a theoretical total organic carbon (TOC) of 32,000 lbs/day. Most of the chemicals were VOCs and hazardous air pollutants (HAPs).

### WASTEWATER TECHNOLOGY EVALUATION

The focus of the technology evaluation was to find a solution that minimized the emissions produced from the wastewater treatment operation. The following four treatment cases were examined:

- Conventional Activated Sludge with Coarse Bubble Diffusers
- Sequencing Batch Reactors (SBRs)
- Advent<sup>™</sup> System
- Conventional Activated Sludge with Floating Surface Aerators

### **Conventional Activated Sludge – Diffused Air**

This case requires the construction of two 4.45 million gallon aeration tanks and two 127-foot clarifiers at the treatment facility. Three 14,000 standard cubic feet per minute (scfm)

blowers (2 in operation and 1 backup) provide air for microbial processes and tank mixing through coarse bubble diffusers. Cooling the influent will be required because microbial synthesis is expected to raise the influent temperature (approximately 35 degrees Celsius [°C]) by 4 to 5°C. The aeration tank sizing is based on a flow of 10 million gallons per day (mgd) and an organic loading of 80,000 lbs BOD/day. An oxygen transfer efficiency of 19 percent was assumed at a water depth of 20 feet in the new aeration tanks.

### Sequencing Batch Reactors (SBRs)

This case requires the conversion of two existing tanks (3.5 million gallons each) at the chemical plant to sequencing batch reactors. The new equipment includes the installation of two new blowers, two new jet aeration systems, and two new decant mechanisms. Cooling the influent will be required because microbial synthesis is expected to raise the influent temperature (approximately 35°C) by 4 to 5°C. The SBR tank cycling is based on a flow of 10 mgd. An oxygen transfer efficiency of 24 percent was assumed at an average water depth of 35 feet in the tanks. A blower requirement of 25,000 scfm was calculated based on the organic load of 80,000 lbs. BOD/day and a total fill/react time of 4 hours.

### Advent<sup>TM</sup> System

This case utilizes a proprietary integral aeration/clarification tank design. Air for microbial processes and tank mixing is provided by three 21,000 scfm blowers (2 in operation supplying air to both Advent<sup>TM</sup> units and 1 backup). Cooling the influent will be required because microbial synthesis is expected to raise the influent temperature (approximately 35°C) by 4 to 5°C. Based on a flow of 10 mgd and an organic loading of 80,000 lbs. BOD/day, the Advent<sup>TM</sup> vendor performed the sizing. Blower sizing is 33 percent higher (flow capacity requirement) than calculated for conventional activated sludge. According to the manufacturer, additional air is required for air-lift pumps to return sludge to the aerated portion of the tank.

### **Conventional Activated Sludge – Surface Aerators**

This case requires the conversion of the 13.73 million gallon spill basin to an aeration basin and the construction of two 127-foot clarifiers in the area of the existing equalization basin at the treatment facility. Floating surface aerators will provide 86,660 lbs of oxygen ( $O_2$ ) per day (12 – 100 horsepower [HP] aerators at 3.0 lbs/ HP-hr  $O_2$  transfer rate). Cooling the influent will be required because microbial synthesis is expected to raise the influent temperature (approximately 35°C) by 4 to 5°C. The system was sized for a maximum influent flow of 10 mgd.

### **WATER9 Modeling Software**

The U.S. Environmental Protection Agency's (EPA's) WATER9 model was chosen to estimate emissions from wastewater sources. WATER9 is a Microsoft® Windows-based computer program that consists of analytical expressions for estimating air emissions of individual waste constituents in wastewater collection, storage, treatment, and disposal facilities; a database listing many of the organic compounds; and procedures for obtaining reports of constituent fates, including air emissions and treatment effectiveness.

WATER9 is a significant upgrade of features previously obtained in the computer program WATER8. WATER9 contains a set of individual model units that can be used together in a project to provide an overall model for an entire facility. WATER9 is able to evaluate a full facility that contains multiple wastewater inlet streams, multiple collection systems, and complex treatment configurations. WATER9 provides separate emission estimates for each individual compound that is identified as a constituent of the wastes. The emission estimates are based upon the properties of the compound and its concentration in the wastes. To obtain these emission estimates, the user must identify the compounds of interest and provide their concentrations in the wastes. The identification of compounds can be made by selecting them from the database that accompanies the program or by entering new information describing the properties of a compound not contained in the database.

WATER9 has the ability to use site-specific compound property information, and the ability to estimate missing compound property values. Estimates of the total air emissions from the wastes are obtained by summing the estimates for the individual compounds.

Emissions were estimated from the wastewater treatment system for the combined chemical plant and treatment facility sites. WATER9 was being used by the treatment facility; therefore, WATER9 was selected for consistency.

During the project the model was converted from Version 1.0 to Version 2.0. The model was used to evaluate the various treatment technologies against regulatory requirements for destruction efficiencies and to evaluate overall emissions of VOCs and HAPs.

Version 1.0 of WATER9 is available for download from EPA's website (http://www.epa.gov/ttn/chief/software/water/index.html). However, the EPA is currently updating the model, and a Beta Version 2.0 is available from the developer. Changes in Version 2.0 include an improved chemical property estimation, ability to handle more compounds, and the ability to import files with less manual manipulation by the user.

To verify results from the new version, the first case was imported into the new model and run with the compound properties generated by Version 2.0. The difference between the emissions estimate from Versions 1.0 and 2.0 results was less than 1 percent. Therefore, Version 2.0 was used for all final emissions estimates for the cases chosen for evaluation.

Another consideration in the WATER9 modeling was the size of the compound list and number of compounds being modeled. Version 1.0 could handle only 60 compounds in the compound list; Version 2.0 can handle 100. The number of compounds being modeled was initially over 240, which required four modeling files. Each file was run and the results combined into a single emissions spreadsheet. Because this quadrupled the amount of time to perform a modeling run and significantly hindered rapid response time to evaluate different cases, the compound list was reduced to allow a single modeling run to be performed for each case. The top 85 highest risk compounds were chosen, which represented 97 percent of the chemical loading. This list was used for further case comparison runs to expedite the WATER9 modeling without sacrificing accuracy.

### MODELING CONSIDERATIONS

Typically to model a batch reactor, plug-flow is selected (based on guidance from developer of the WATER9 software). However, the reactors would be filled for 3 of the 4 hours of

react time, which is closer to a continuous reactor. Therefore the plug-flow option was not used. The emissions from the biological reactor were multiplied by a factor of 16/24 to obtain the emissions from the SBRs under aeration. A separate unit (a clarifier) was modeled after the aeration unit to estimate emissions during settling and decant. Likewise, emissions from the clarifier were multiplied by a factor of 8/24 to estimate emissions from the settling and decant phase (Hilton et al. 2004).

For biological treatment, either the activated sludge or diffused air biotreatment unit can be used to estimate emissions. The primary difference between the two is in the surface volatilization calculation. Certain assumptions are made with the diffused air unit, and the only parameter modified by the user is the percent of surface agitation. The activated sludge option allows the user to estimate surface agitation by inputting the mixing HP and area of surface agitation per mixer. The analysis shows that the assumptions in the model for diffused air are conservative, increasing emissions for the particular case by as much as 50 percent (Hilton et al. 2004).

### **MODELING RESULTS**

In summary, the emissions for all cases as shown in Table 1 were equitable, with each case being under 200 tpy and over 140 tpy. VOC emission reductions by all cases should be considered acceptable within the limitations of the WATER9 modeling software.

| Treatment Case                                   | Chemical<br>Plant<br>Emissions<br>(tpy) | Treatment<br>Facility<br>Emissions<br>(tpy) | Total<br>Emissions<br>(tpy) |
|--------------------------------------------------|-----------------------------------------|---------------------------------------------|-----------------------------|
| Conventional Activated Sludge - Diffused Air     | NA                                      | 189                                         | 189                         |
| Sequencing Batch Reactors (SBRs)                 | 101                                     | 42                                          | 143                         |
| Advent <sup>™</sup> System                       | NA                                      | 180                                         | 180                         |
| Conventional Activated Sludge - Surface Aerators | NA                                      | 175                                         | 175                         |

### Table 1 - Modeling Results

### REFERENCES

Hilton, E., C. Melton, T. Sandy, S. Sheikh, M. Irani, et al. 2004. "Wastewater Assessment Technical Report Prepared for The Dow Chemical Company" CH2M HILL Technical Report.

The U.S. Environmental Protection Agency's (EPA's) WATER9. (http://www.epa.gov/ttn/chief/software/water/index.html) (accessed 2004).



Elementis Specialtics - Charleston Facility Historical Emission Calculations

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

> Revised By: JAG Date: 2/27/2014

Checked by: PEW Date: 2/27/2014

# Process + Combustion Emissions

| 2013 | ТРҮ       | 10.57 | 12.59 | 0.96            | 0.08 | 26.71 |
|------|-----------|-------|-------|-----------------|------|-------|
| 2012 | ТРҮ       | 9.41  | 11.20 | 0.85            | 0.07 | 26.51 |
| 2011 | ТРҮ       | 9.38  | 11.17 | 0.85            | 0.07 | 25.92 |
| 2010 | ТРҮ       | 60.6  | 10.82 | 0.82            | 0.06 | 26.31 |
| 2009 | ΤPΥ       | 6.88  | 8.20  | 0.62            | 0.05 | 25.37 |
| 2008 | ТРҮ       | 12.21 | 14.53 | 1.10            | 0.09 | 27.04 |
| 2007 | ТРҮ       | 7.80  | 9.29  | 0.71            | 0.06 | 29.31 |
| 2006 | ТРҮ       | 8.25  | 9.83  | 0.75            | 0.06 | 32.43 |
| 2005 | ТРҮ       | 7.36  | 8.77  | 0.67            | 0.05 | 33.69 |
| 2004 | трү       | 6.64  | 7.91  | 0.60            | 0.05 | 44.05 |
| 2003 | ТРҮ       | 6.67  | 7.94  | 0.60            | 0.04 | 44.44 |
|      | Pollutant | co    | NOX   | PM <sup>1</sup> | S02  | VOC   |

1- Combustion only

### Wastewater emissions

|                | 2003 | 2004 | 2005 | 2006 | 2007  | 2008 | 2009 | 2010  | 2011  | 2012  | 2013  |
|----------------|------|------|------|------|-------|------|------|-------|-------|-------|-------|
| Prorate factor | NA   | NA   | NA   | NA   | NA    | NA   | 19%  | 40%   | 40%   | 40%   | 40%   |
| VOC            | 0.12 | 0.12 | 0.12 | 0.12 | 0.12  | 0.12 | 5.95 | 17.30 | 17.03 | 17.42 | 17.51 |
|                |      |      |      |      |       |      |      |       |       |       |       |
|                | 1000 | 1000 | 2000 | 2000 | 10000 | 0000 | 0000 | 0.00  |       | 10.00 |       |

|           | 2003  | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Total VOC | 44.57 | 44.17 | 33.81 | 32.55 | 29.44 | 27.17 | 31.31 | 43.62 | 42.95 | 43.93 | 44.22 |
|           |       |       |       |       |       |       |       |       |       |       |       |

| Elementis Specialties - Charleston Facility | listorical Emission Calculations |
|---------------------------------------------|----------------------------------|
| Eleme                                       | Histor                           |

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

| Checked by: PEW | Date: 2/27/2014 |
|-----------------|-----------------|
|                 | (*              |
|                 |                 |
| Revised By: JAG | Date: 2/27/2014 |

| Pollutant | 2003  | 2004  | 2005  | 2006  | 2007  | 2008  | 2009   | 2010   | 2011  | 2012  | 2013  |
|-----------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|-------|
|           | ТРҮ   | ТРҮ   | TPY   | ТРҮ   | TPY   | ТРҮ   | ТРҮ    | TPY    | TPY   | TPY   | ТРҮ   |
| co        | 6.83  | 6.83  | 6.83  | 6.83  | 6.83  | 6.83  | 6.83   | 6.83   | 6.83  | 6.83  | 6.83  |
| NOX       | 29.11 | 29.11 | 29.11 | 29.11 | 29.11 | 29.11 | 29.11  | 29.11  | 29.11 | 29.11 | 29.11 |
| PM        | 31.2  | 31.2  | 31.2  | 31.2  | 31.2  | 31.2  | 31.2   | 30.975 | 30.66 | 30.66 | 30.66 |
| SOx       | 0.16  | 0.16  | 0.16  | 0.16  | 0.16  | 0.16  | 0.16   | 0.16   | 0.16  | 0.16  | 0.16  |
| VOC       | 96.36 | 96.36 | 96.36 | 96.36 | 96.36 | 96.36 | 113.61 | 93.45  | 57.18 | 57.18 | 57.18 |
|           |       |       |       |       |       |       |        |        |       |       |       |

| Historical E                       | Litemenus opectatues - Charleston Facility<br>Historical Emission Calculations "HIS | acility<br>"HISTORI | UIIIY<br>"HISTORICAL EMISSIONS ESTIMATE" | IONS EST | IMATE"   |       |       |       |        |       |      |                 |         |      | POTEST | POTESTA & ASSOCIATES, INC.<br>Project No: 0101-12-0404 | JATES, IN<br>0101-12-04            |
|------------------------------------|-------------------------------------------------------------------------------------|---------------------|------------------------------------------|----------|----------|-------|-------|-------|--------|-------|------|-----------------|---------|------|--------|--------------------------------------------------------|------------------------------------|
| Revised By: JAG<br>Date: 2/27/2014 | r. JAG<br>/2014                                                                     |                     |                                          |          |          |       |       |       |        |       |      |                 |         |      |        | Chec                                                   | Checked by: PEW<br>Date: 2/27/2014 |
| PTE cmissie                        | PTE emissions of the Process with Dry Bentone                                       | Jry Bentone         |                                          |          |          |       |       |       |        |       |      |                 |         |      |        |                                                        |                                    |
| Emission<br>Point ID               | Description                                                                         | Ż                   | XON                                      |          | VOC      | Md    | PM10  |       | - COS  |       |      | Mathul Chlorida | blanida |      |        |                                                        |                                    |
|                                    |                                                                                     | lb/hr               | ТРҮ                                      | lb/hr    | TPY      | lb/hr | Y     | lb/hr | Y      | lb/hr | γų   | lb/hr           | -       | 1    | TPV    | lh/hr                                                  | r TPV                              |
| ∞                                  | 3x3 RD                                                                              | 0                   |                                          | 0.98     |          |       | 0.54  | 0     | ō      | 0     | 0    | 0               | 0       | 0    |        |                                                        |                                    |
| 7-17B                              | Oxidizer                                                                            | 0.38                |                                          | =        | 50       |       | 6     | 0.01  | 0.03   | 0.08  | 0.34 | 0.08            | 0.3352  | -    | 4.6    |                                                        | 0                                  |
| 10                                 | 51 Mill                                                                             | 0.1                 | 0.4                                      |          | 0.1 0.4  | )     | 69.0  | 0     | 0      | 0.02  | 0.08 | 0               | 0       | 0    | 0      |                                                        | 0                                  |
| 20                                 | Pug Mill                                                                            | 0                   |                                          | 0        |          |       |       | 0     | 0      | 0     | 0    | 0               | Ö       | 0    |        |                                                        | 0                                  |
| 7B                                 | St. Line                                                                            | 0                   |                                          | 0        | 0 0      | )     |       | 0     | 0      | 0     | 0    | 0               | 0       | 0    |        |                                                        |                                    |
| 9A                                 | Silos                                                                               | 0                   |                                          | 0        | 0        |       |       | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      |                                                        |                                    |
| 9B                                 | Day Bin                                                                             | 0                   |                                          | 0        |          | 2.5   |       | 0     | 0      | 0     | 0    | 0               | 0       | 0    |        |                                                        |                                    |
| 13                                 | North DC                                                                            | 0                   |                                          | 0        | 0        | Ĭ     |       | 0     | 0      | 0     | 0    | 0               | 0       | 0    |        |                                                        |                                    |
| 600                                | FBD Pack                                                                            | 0                   |                                          | 0        | 0 0      | 0.16  | 0.67  | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      |                                                        | 0                                  |
| 2A                                 | Batch Tanks                                                                         | 0                   |                                          | 0 0.(    | .08 0.34 | 0.08  |       | 0     | 0      | 0     | 0    | 0.03            | 0.0907  | 0    | 0      | 0.05                                                   | 0.2188                             |
| 2                                  | Rx and Disp Tanks                                                                   | 0                   | 0 0                                      | 0        | 0 0      | 0.08  | 0.34  | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      |                                                        |                                    |
| 3                                  | Flash Dryer                                                                         | 1.4                 | 1 5.88                                   | 5.45     | 15 23.87 | 0.46  | 1.93  | 0.01  | 0.03   | 0.35  | 1.47 | 0               | 0       | Ģ    | 0      |                                                        | 0                                  |
| 5                                  | AC #2                                                                               | 0                   |                                          | 0        | 0 0      |       | 0.5   | 0     | 0      | 0     | 0    | 0               | 0       | ¢    |        |                                                        |                                    |
| 18                                 | Kewanee                                                                             | 3.33                |                                          | 0        | .07 0.29 | 0.12  |       | 0.01  | 0.06   | 0.83  | 3.49 | 0               | 0       | 0    | 0      |                                                        | 0                                  |
| 19                                 | Gas Heater                                                                          | 0.01                | 0.04                                     | t neg.   | neg.     | neg.  |       | neg.  | neg. n | neg.  | 0.01 | 0               | 0       | 0    | C      |                                                        |                                    |
| 20                                 | Reagant                                                                             | 0                   |                                          |          | 0 0      | neg.  | neg.  | 0     | 0      |       | 0    | 0               | 0       | 0    | 0      |                                                        |                                    |
| 200                                | WRD                                                                                 | 0                   |                                          |          |          |       |       | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      |                                                        |                                    |
| 800                                | ERD                                                                                 |                     |                                          | 0 1.16   | 4.1      |       | Ű     | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      |                                                        | 0                                  |
| 16                                 | AC#1                                                                                |                     |                                          | 0        | 0        |       |       | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      | )                                                      |                                    |
| 17B                                | GIMCO B                                                                             | 0                   |                                          |          |          |       |       |       | 0      | 0     | 0    | 0               | 0       | 0    | 0      |                                                        |                                    |
| 017                                | W lst                                                                               | 0.5                 |                                          |          |          |       |       | neg.  | 0.01   | 0.1   | 0.36 | 0               | 0       | 0    | 0      |                                                        | 0                                  |
| 018                                | puz w                                                                               | 0.5                 |                                          |          |          |       |       | neg.  | 0.01   | 0.1   | 0.36 | 0               | 0       | 0    | 0      | )                                                      | 0                                  |
| 610                                | E 1st                                                                               | 0.5                 |                                          |          |          |       | 0.22  | neg.  | 0.01   | 0.1   | 0.36 | 0               | 0       | 0    | 0      | )                                                      | 0                                  |
| 020                                | E 2nd                                                                               | 0.5                 | -                                        | 8 0.61   |          | 0.0   |       | neg.  | 0.01   | 0.1   | 0.36 | 0               | 0       | 0    | 0      |                                                        | 0                                  |
| 28                                 | Quat Tank                                                                           | 0                   |                                          |          |          |       | 0     | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      |                                                        | 0                                  |
| 29                                 | Quat Tank                                                                           |                     |                                          |          | 0        |       | 0     | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      |                                                        | 0                                  |
| 30                                 | Quat Tank                                                                           | 0                   |                                          |          |          |       |       | 0     | 0      | 0     | Ċ.   | 0               | 0       | 0    | 0      |                                                        | 0                                  |
| 32                                 | Quat Tank                                                                           | ¢                   |                                          |          |          |       |       | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      |                                                        | 0                                  |
| 33                                 | Quat Tank                                                                           | •                   |                                          |          |          | 0     | 0     | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      | 0                                                      |                                    |
| 34                                 | Quat Tank                                                                           | 0                   |                                          | _        |          |       |       | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      | 0                                                      |                                    |
| 36                                 | Central Vac                                                                         | 0                   | 0                                        |          | 0 0      | neg.  | neg.  | 0     | 0      | 0     | 0    | 0               | 0       | 0    | 0      |                                                        |                                    |
| 40                                 |                                                                                     | 1                   | 1                                        | 1        | 1        |       |       |       |        |       |      | 0               | 0       | 0    | 0      | 0                                                      |                                    |
|                                    |                                                                                     | 7.22                | 29.11                                    | 23.40    | 96.36    | 12.20 | 31.20 | 0.03  | 0.16   | 1.68  | 6.83 | 0.11            | 0.43    | 1.10 | 4.60   | 0.05                                                   | 0.22                               |
|                                    |                                                                                     |                     |                                          |          |          |       |       |       |        |       |      |                 |         |      |        |                                                        |                                    |

Elementis Specialties - Charleston Facility

POTESTA & ASSOCIATES, INC.

From R13-1847E

## Elementis Specialties - Charleston Facility Historical Emission Calculations

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

Revised By: JAG Date: 2/27/2014

Checked by: PEW Date: DRAFT

| Ī                    |                   |       |     |           |                  |          |          |         |        |        |        |        |        |                 |            |     |     |                 |        |                          |
|----------------------|-------------------|-------|-----|-----------|------------------|----------|----------|---------|--------|--------|--------|--------|--------|-----------------|------------|-----|-----|-----------------|--------|--------------------------|
| Emission<br>Point ID | Description       | z     | NOX |           | Λ                | voc      | 4        | PM10    |        | 802    |        | 00     | Methvl | Methyl Chloride | le HCI     |     |     | Benzyl Chloride | lorido | commente                 |
|                      |                   | lb/hr | ΥqT |           | lb/hr            | ΤPΥ      | lb/hr    | ΥqT     | lb/hr  | ТРҮ    | lb/hr  | TPY    | lb/hr  | ТРУ             | <u>l</u> à | ТРУ | =   | Ib/hr IT        | TPY    |                          |
| 80                   | 3x3 RD            | -     | t   | Ø         | <del>10</del> .0 | <b>8</b> | 1:0      | H 0.54  | 4      | 0      | 6      | 9      |        | đ               | 0          | 0   | 0   | 0               | 0      | out of service           |
| 7-17B                | Oxidizer          | 0.38  | 80  | 1.6       | 0.11             | 16 0.41  | 16 2.28  |         | 8 0.01 | 0.03   | 3 0.08 |        | 4 0.08 | 8 0.3352        | 52         | 1.1 | 4.6 | 0               |        |                          |
| 10                   | 51 Mill           | 0.1   |     | 0.4       | 0.1              |          | 0.4 0.17 | 17 0.69 |        |        | 0 0.02 | 0.08   |        | 0               | 0          | 0   | 0   | •               | 0      |                          |
| 9C                   | Pug Mill          | 0     | 6   | 0         |                  | 0        | 0 2.     | 2.5 9.9 |        |        |        |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 7B                   | St. Line          |       | 0   | 0         |                  | 0        | 0 0.11   |         |        |        | 0      |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 9A                   | Silos             | Ĵ     | 0   | •         |                  | 0        | 0 2      | .5 0.88 |        |        |        |        |        | 0               | 0          | 0   | 0   | 0               |        |                          |
| 9B                   | Day Bin           | 0     |     | •         |                  | 0        |          | 2.5 0.8 |        | 0      | 0      | 0      |        | 0               | 0          | 0   | 0   |                 | 0      |                          |
| 13                   | North DC          | 3     | 0   | 0         |                  | 0        | )        |         |        |        |        |        |        | 0               | 0          | 0   | 6   | C               | 0      |                          |
| 600                  | FBD Pack          |       | 0   | ¢         |                  | 0        | 0 0.16   |         |        |        |        |        |        |                 | 0          | 0   | 0   | 0               |        |                          |
| 2A                   | Batch Tanks       | 0     | 6   | 0         | 0.08             | 0.34     | 34 0.08  |         |        |        | 0      |        | 0.03   | 3 0.0907        | 07         | 0   | ē   | 0.05            | 0.2188 |                          |
| 2                    | Rx and Disp Tanks | )     | 0   | 0         |                  | 0        | 0 0.08   |         |        |        | 0      |        |        | 6               | 0          | 0   | 10  | 0               | 0      |                          |
| 9                    | Flash Dryer       | 1.4   |     | 5.88      | 3.57             | 57 15.62 |          |         | 3 0.01 | 0.03   | Î      | -      |        | 0               | 0          | 0   | 0   | 0               | 0      | was 5.45 lb/hr 23.87 tbv |
| 5                    | AC #2             | 0     | 6   | 0         |                  | 0        | 0 0.12   | 12 0.5  |        | 0      |        |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 18                   | Kewanee           | 3.33  |     | 13.99     | 0.07             | 0.29     |          |         | 0.0    | 0.06   | 0      |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 19                   | Gas Heater        | 0.01  |     | 0.04 ncg. | cg.              | neg.     | neg.     | neg.    | neg.   | ncg.   | neg.   | 0.01   |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 20                   | Reagant           | 0     |     | 0         |                  | 0        | 0 neg.   | neg.    |        |        |        |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 207                  | WRD               | 0     | _   | 0         | 1.16             | 6 4.16   | 16 0.14  | 4 0.59  |        |        | 0      |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 908                  | ERD               | 0     |     | 0         | 1.16             | 6 4.16   |          | )       |        |        |        |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 16                   | AC#I              | 0     |     | 0         |                  | 0        | 0 0.12   |         |        | 0      |        | 0 0    |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| B                    | GIMCO B           |       | _   | 0         |                  | 0        | 0 0.11   |         |        |        | 0      |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 017                  | W 1st             | 0.5   | 2   | 1.8       | 0.61             |          |          |         | 2 neg. | 10'0   | 1 0.1  | 1 0.36 |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 018                  | W 2nd             | 0.5   | 2   | 1.8       | 0.61             |          | .2 0.06  |         | 2 neg. | 0.01   |        | 1 0.36 |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 019                  | E 1st             | 0.5   | 5   | 8:1       | 0.61             |          | 2.2 0.0  |         | 2 neg. | 0.01   |        | 1 0.36 |        | 0               | 0          | 0   | 0   | 0               | 0      | 0                        |
| 020                  | E 2nd             | 0.5   |     | 1.8       | 0.61             |          | .2 0.06  | 0.2     | 2 neg. | 0.01   | 1 0.1  |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 28                   | Quat Tank         | 5     |     | 0         |                  | 0        |          | 0       |        | 0      | 6      |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 29                   | Quat Tank         | 0     | 6   | 0         |                  | 0        | 0        | 0       |        |        | 0      |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 30                   | Quat Tank         | 0     | (   | 0         |                  | 0        |          | 0       |        |        | 0      |        |        | 6               | 0          | 0   | 0   | 0               | 0      |                          |
| 32                   | Quat Tank         | 0     | (   | 0         |                  | 0        | 0        | 0       | 0      |        | 0      |        | ĺ      | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 33                   | Quat Tank         | )     | 0   | 0         |                  | 0        |          | 0       |        |        | 0      |        |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 34                   | Quat Tank         | 9     | 0   | 0         |                  | 0        | 0        | 0       |        | 0      | 0      | 0 0    |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
| 36                   | Central Vac       | 5     | 0   | 0         |                  | 0        | 0 neg.   | neg.    |        |        | 0      |        |        | 6               | 0          | 0   | 0   | 0               | 0      |                          |
| 40                   |                   | -     | ,   | 1         |                  | 1        | 0.07     | 0.3     | 3      | 1      |        | 1      |        | 0               | 0          | 0   | 0   | 0               | 0      |                          |
|                      |                   | 7.22  |     | 29.11     | 8.69             | 14       | 19 12.06 | 30.66   | 6 0.03 | 3 0 16 | 6 1 68 | g 6.93 | 0 11   | 1 0.4250        | 20         | -   | 46  | 0.05            | 0.0100 |                          |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Emissions from Combustion |                   |                  |          |         |         |         |            |            |          |        |         |        | Mithour   | Without DB and with |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|------------------|----------|---------|---------|---------|------------|------------|----------|--------|---------|--------|-----------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | UDISDATIO                 | 2003              | 2004             | 2005     | 2006    | 2007    | 2008 DB | and SBR    | 2009 DB (  | and WWTP | 2010   | 2011    | 2012   | 2013 WWTP | (IIIM DIIP OC)      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CO Emissions (Ibs)        | 13,335            | 13,290           | 14,729   | 16,507  | 15,601  | 24,412  | 48,905     | 13.768     | 48.905   | 18.176 | 18.758  | 18.822 | 21 145    | A NOON A            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SOx Emission (Ibs)        | 11                | 95               | 104      | 118     | 111     | 174     | 320        | 98         | 320      | 130    | 134     | 134    | 151       | 320                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (sql)                     | 15875             | 15821            | 17535    | 19,651  | 18,573  | 29,062  | 58,220     | 16,391     | 58,220   | 21.638 | 22.331  | 22.407 | 26.173    | 58 220              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           | 873               | 870              | 964      | 1,081   | 1,022   | 1,598   | 0          | 901        | 0        | 1.190  | 1.228   | 1 232  | 1.384     | C                   |
| 150         150         150         157         197         196         211         223         223         223         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226         226 <td>(sql)</td> <td>1,207</td> <td>1,202</td> <td>1,333</td> <td>1,493</td> <td>1,412</td> <td>2,209</td> <td>4,425</td> <td>1.246</td> <td>4.425</td> <td>1.644</td> <td>1.697</td> <td>1 703</td> <td>1 913</td> <td>4 425</td>                                                                                                                                                                                                                    | (sql)                     | 1,207             | 1,202            | 1,333    | 1,493   | 1,412   | 2,209   | 4,425      | 1.246      | 4.425    | 1.644  | 1.697   | 1 703  | 1 913     | 4 425               |
| 8015         87.20         64.06         57.73         57.605         5.2.467         19.2.720         49.833         112.720         51.782         5.2.005         51.782         5.2.005         51.782         5.2.005         5.0.005         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016         2.5.016 <td></td> <td>159</td> <td>158</td> <td>175</td> <td>197</td> <td>186</td> <td>291</td> <td>582</td> <td>164</td> <td>582</td> <td>216</td> <td>223</td> <td>224</td> <td>252</td> <td>582</td>                                                                                                              |                           | 159               | 158              | 175      | 197     | 186     | 291     | 582        | 164        | 582      | 216    | 223     | 224    | 252       | 582                 |
| 4.0014 $4.5149$ $3.2302$ $3.866$ $26.2435$ $26.2435$ $26.2435$ $26.205$ $26.776$ $25.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.005$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$ $26.016$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 000                       | 88,015            | 87.230           | 66.406   | 63.773  | 57.605  | 52.487  | 192 720    | 49 833     | 192 720  | 51 436 | 50.615  | 51 707 | 52 041    | CLC 03              |
| 0)         88.80<br>44.4         88.100<br>44.4         67.37<br>53.69         53.04<br>53.61         53.05<br>55.37         55.37<br>56.56         55.37<br>56.57         55.92<br>56.7         53.06<br>56.7         53.02<br>56.7         53.02<br>57.7         53.02<br>57.7         53.02<br>57.7         53.02<br>57. |                           | 44.0074           | 43.6149          | 33.2028  | 31,8866 | 28.8025 | 26.2435 | 26.0205    | 24.9165    | 96.36    | 25.718 | 25.3075 | 25.896 | 26.0205   | 34,186              |
| V)         4.44         4.05         33.60         32.43         29.31         77.04         96.36         25.37         96.36         75.31         29.37         96.36         75.31         29.37         96.36         75.31         29.37         96.36         75.31         29.37         96.36         75.31         26.37         96.36         75.31         75.32         26.37         96.37         96.36         73.3         43.3         53.33         32.01         28.37         96.36         73.3         17.30         17.30         17.30         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36         17.36 </td <td>nbustion (lbs)</td> <td>88,888</td> <td>88,100</td> <td>67.370</td> <td>64,854</td> <td>58.627</td> <td>54.085</td> <td>192 720 00</td> <td>50 734</td> <td>192 720</td> <td>52 626</td> <td>51 843</td> <td>53 024</td> <td>53 425</td> <td></td>                                                                                                               | nbustion (lbs)            | 88,888            | 88,100           | 67.370   | 64,854  | 58.627  | 54.085  | 192 720 00 | 50 734     | 192 720  | 52 626 | 51 843  | 53 024 | 53 425    |                     |
| 413         4374         33.33         32.01         28.37         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.14         0.13         0.13         0.13         0.13         0.13         0.14         0.14         0.14         0.14         0.15         0.14         0.14         0.14         0.14         0.14         0.14         0.14         0.14         0.14         0.14         <                                                                                                                                                                                                                                                                                                                                                                                                         | Thbustion (TPY)           | 44,44             | 44.05            | 33,69    | 32,43   | 29.31   | 27.04   | 96.36      | 25.37      | 96.36    | 26.31  | 25.97   | 26.61  | 26.71     |                     |
| 413         43.74         33.33         2.01         2.833         2.637         0.12         0.12         0.12         0.12         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13 <th0.13< th="">         0.13         0.13         &lt;</th0.13<>                                                                                                                                                                                                                                                                                                                                                                                        | al VOC and                |                   |                  |          |         |         |         |            |            |          |        |         |        |           |                     |
| 3.3         3.2.01         2.8.33         2.6.37         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.13         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.3         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5         17.5                                                                                                                                                                                                                                                                                                                                                                                                                | C Emissions               |                   |                  |          |         |         |         |            |            |          |        |         |        |           |                     |
| 0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.12         0.13         17.0         17.4         17.5           238         16.501         15.601         24,412         43.005         13.768         43.905         18.75         18.72         21.445         44           238         14.83         14.12         2.209         62,400         1.466         18.75         18.725         21.445         44           338         14.83         14.12         2.209         62,400         1.446         82,400         1.8,75         18.222         21.445         44           338         14.83         14.12         2.209         62,400         1.8,176         18.753         18.23         1.913         1.913         1.913         1.913         1.913         1.913         1.913         1.913         2.407         56.173         5         5         1.913         1.913         1.913         5         1.913         5         5         1.913         1.913         1.913         1.913         1.913         1.913         5         1.913         5         1.913         1.913         5         1.913         5         1.913         1.913                                                                                                                                                                                                                                                                                                                                                                                                                                    |                           | 44.13             | 43.74            | 33,33    | 32.01   | 28.93   | 26.37   |            | 30.9       |          | 43.0   | 42.3    | 43,3   | 43.5      |                     |
| 0.25%         0.25%         0.25%         0.25%         0.25%           739         (6.507         15.601         2.412         49.005         13.768         48.905         18.176         18.728         18.822         21.145         44           733         1.412         2.203         62.400         1.246         62.400         1.817         1.872         21.145         44           555         19.651         1.8473         2.203         62.400         1.344         1.873         1.813         1.813           555         19.651         1.8473         2.203         2.2407         2.6473         1.813           556         19.651         1.8473         2.203         58.203         16.391         2.820         1.344         1.597         1.743         1.513         1.743         1.513         1.745         1.513         1.745         1.513         1.745         1.513         1.745         1.513         1.745         1.513         1.745         1.513         1.745         1.513         1.745         1.513         1.745         1.513         1.745         1.513         1.745         1.513         1.745         1.513         1.745         1.513         1.745         1.513                                                                                                                                                                                                                                                                                                                                                                                                                        |                           | 0.12              | 0.12             | 0.12     | 0.12    | 0,12    | 0.12    | 0.12       | 5.9        | 23.0     | 17.3   | 17.0    | 17.4   | 17.5      | 23                  |
| 729         16,507         15,801         24,412         48,905         13,766         48,905         18,176         18,822         21,145         4           333         1,483         1,412         2,203         6,507         15,801         24,412         48,905         13,766         48,905         18,176         18,822         21,145         4           333         1,483         1,412         2,203         6,5,400         1,246         62,400         1,844         1,667         1,703         1,913         4           335         1,9651         18,873         28,220         16,391         58,200         13,440         1,567         1,703         1,913         4         151         2         4         151         2         4         151         2         4         151         2         4         151         2         4         151         2         4         151         2         4         151         2         4         151         2         4         151         5         151         2         4         151         2         4         151         151         2         4         151         5         4         151         6                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | emissions associate       | ed with WWTP      |                  |          |         |         |         | 0.5%       |            | 19.3%    |        |         |        |           | 40%                 |
| 13.355       13.290       14.728       15.601       24,412       48,905       18,176       18,758       18,822       21,145       44         77       95       1,202       1,333       1,233       1412       2,203       65,400       1,246       82,400       1,844       1,872       1,913       41         77       95       1,133       1,412       2,203       65,400       1,246       82,400       1,844       1,877       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       1,913       2,407       5,5173       5,617       5,617       5,613       5,612       5,6129       5,6129       5,6129       5,6129       5,6129       5,6129       5,6129       5,6129       5,6129       5,6129       5,6129       5,6129       5,6129       5,6129       5,6139       5,6139       5,6139       5,6139       5,6139       5,6169 <th>emissions associate</th> <th>ed with process a</th> <th>nd combustion en</th> <th>nissions</th> <th></th> <th></th> <th></th> <th>99.5%</th> <th></th> <th>80.7%</th> <th></th> <th></th> <th></th> <th></th> <th>60%</th>                                                                                                                                                                                                                                    | emissions associate       | ed with process a | nd combustion en | nissions |         |         |         | 99.5%      |            | 80.7%    |        |         |        |           | 60%                 |
| 13.335         13.290         14.729         16,507         15,601         24,412         48,905         13,76         18,76         18,75         18,75         18,822         21,45         48           7         95         1,202         1,333         1,493         1,412         2,209         63,400         1,246         62,400         1,847         1,703         1,913         4           1,207         1,202         1,333         1,413         2,209         63,400         1,246         62,400         1,341         1,697         1,703         1,913         4           1,5875         15,877         25,611         18,573         29,022         58,220         21,639         23,312         24,47         1,51         5         15         5         15         5         15         5         15         5         15         5         15         5         15         5         15         5         15         5         15         15         5         15         5         15         5         15         5         15         5         15         5         15         5         15         5         15         15         15         15         15                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |                   |                  |          |         |         |         |            |            |          |        |         |        |           |                     |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                           |                   |                  |          |         |         |         |            |            |          |        |         |        |           |                     |
| 1.207         1.207         1.203         1.413         2.209         6.2,400         1.246         6.2,400         1,647         1,607         1,703         1,913           1.5.87         15.821         11.63         1.412         2.209         62,400         16.44         16.67         1,703         1913           15.87         15.821         17.555         19.651         18.773         29.062         58,220         16.391         58,200         16.301         28,173         2407         26,473         151           15.87         15.821         17.555         19,551         18,773         29,062         58,220         16,391         58,230         2130         22,331         2407         26,473         54,433         151           89,155         88,347         67,617         58,873         54,332         192,967         62,629         248,720         85,436         87,400         86,438         11           6.67         0.66         7.80         12.21         24         68,230         248,720         87,870         86,438         11           6.60         0.66         0.66         12.61         12.61         0.65         0.65         0.67         0.65         0.6                                                                                                                                                                                                                                                                                                                                                                                                                         | ssions (lbs)              | 13,335            | 13,290           | 14,729   | 16,507  | 15,601  | 24,412  | 48,905     | 13,768     | 48,905   | 18,176 | 18,758  | 18,822 | 21,145    | 48904.8             |
| 77         95         104         111         114         320         98         320         130         134         151           15,875         15,821         17,355         19,651         18,573         29,062         58,220         16,391         58,220         133         23,407         25,173         5           89,135         88,347         65,617         58,873         29,967         65,629         238,720         87,222         85,939         22,407         25,173         5           89,135         88,347         65,679         58,873         54,332         192,967         65,629         238,720         87,222         85,939         22,407         25,470         28,439         11           667         6.60         17,75         54,332         192,967         62,629         238,720         87,232         86,439         11           050         0.60         1221         24         6.88         24         16         0.57           050         0.66         0.66         0.25         0.12         24         8.438         11         10.57           050         0.66         0.06         0.06         0.06         0.06         0.06                                                                                                                                                                                                                                                                                                                                                                                                                                                            | (sql) suois               | 1,207             | 1,202            | 1,333    | 1,493   | 1,412   | 2,209   | 62,400     | 1,246      | 62,400   | 1,644  | 1,697   | 1,703  | 1,913     | 61320               |
| 15.875         15.821         17.555         19.651         18.573         29.062         58.220         16.391         58.200         21.638         22.407         25.173         5           89,135         88.347         67,017         56,101         58,873         54,332         192,967         62,629         238,720         87,232         86,436         713         5           667         664         7.36         8.25         7.80         12.21         24         6.68         24         10.57         08,438         11           050         0.60         0.66         0.75         7.10         12.21         24         6.68         24         10.57         0.6438         11         10.57         0.66         0.16         0.56         0.16         0.56         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36                                                                                                                                                                                                                                                                                                                                                                                                                                | ission (Ibs)              | 1                 | 35               | 104      | 118     | 111     | 174     | 320        | <b>8</b> 6 | 320      | 130    | 134     | 134    | 151       | 320                 |
| 89,135         68,347         67,617         66,101         58,873         54,332         192,967         6.229         238,720         87,370         88,438         11           6.67         6.64         7.36         8.25         7.80         1221         24         6.88         23         9.41         10.57         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56         0.56 </td <td>ission (lbs)</td> <td>15,875</td> <td>15,821</td> <td>17,535</td> <td>19,651</td> <td>18,573</td> <td>29,062</td> <td>58,220</td> <td>16,391</td> <td>58,220</td> <td>21,638</td> <td>22,331</td> <td>22.407</td> <td>25.173</td> <td>58.220</td>                                                                                                                                                   | ission (lbs)              | 15,875            | 15,821           | 17,535   | 19,651  | 18,573  | 29,062  | 58,220     | 16,391     | 58,220   | 21,638 | 22,331  | 22.407 | 25.173    | 58.220              |
| 6.67         6.64         7.36         8.25         7.80         12.21         24         6.88         24         9.09         3.38         9.41         10.57           0.50         0.60         0.67         0.75         0.71         1.10         31         0.62         31         0.85         0.85         0.85         0.36           0.04         0.05         0.06         0.09         0.16         0.06         0.06         0.06         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36         0.36                                                                                                                                                                                                                                                                                                                                                                                                                                    | bs)                       | 89,135            | 88,347           | 67,617   | 65,101  | 58,873  | 54,332  | 192,967    | 62,629     | 238,720  | 87,232 | 85,896  | 87,870 | 88,438    | 114,372             |
| 0.60 0.60 0.67 0.75 0.71 1.10 31 0.62 31 0.85 0.85 0.95 0.56<br>0.04 0.05 0.08 0.06 0.09 0.16 0.05 0.16 0.06 0.07 0.06<br>7.94 7.91 8.77 9.83 9.29 14.53 2.911 10.22 11.17 11.20 12.59<br>4.47 4.71 9.55 9.40 777 9.54 9.40 9.41 10.22 11.17 11.20 12.59                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | rotal CO Emissions (tpy)  | 6.67              | 6.64             | 7.36     | 8.25    | 7.80    | 12.21   | 24         | 6.88       | 24       | 9.09   | 9.38    | 9.41   | 10.57     | PC.                 |
| 0.04 0.05 0.05 0.06 0.06 0.09 0.16 0.05 0.16 0.06 0.07 0.07 0.08<br>7.91 7.91 8.17 9.83 9.29 1.4.53 2.811 8.20 2.911 1.102 1.2.59<br>4.7.4 4.17 9.55 79.44 7.17 8.54 9.44 7.17 8.54 7.55 7.54 7.2.59                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ssions (tpy               | 0.60              | 0.60             | 0.67     | 0,75    | 0.71    | 1.10    | 31         | 0.62       | 31       | 0.82   | 0.85    | 0.85   | 0 qf      | 5                   |
| 7.9         8.77         9.83         9.29         14.53         29.11         8.20         29.11         10.82         11.17         11.20         12.59           Ad 77         Ad 77         37.47         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44         56.44 <td>ission (tov)</td> <td>0.04</td> <td>0.05</td> <td>0.05</td> <td>0.06</td> <td>0.06</td> <td>0.09</td> <td>0.16</td> <td>0.05</td> <td>0.16</td> <td>0.06</td> <td>002</td> <td>002</td> <td>0.00</td> <td></td>                                                                                                                                                                 | ission (tov)              | 0.04              | 0.05             | 0.05     | 0.06    | 0.06    | 0.09    | 0.16       | 0.05       | 0.16     | 0.06   | 002     | 002    | 0.00      |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ission (tov)              | 7.94              | 7.91             | 8.77     | 9.83    | 62.6    | 14.53   | 29.11      | 8 20       | 20.11    | 10.82  | 11 17   | 11.20  | 12 50     | 01.0<br>11.00       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | in land                   | AA 67             | A 47             | 10.00    |         |         |         |            |            |          | 20.0   |         | 07.11  | 14.00     | 1.52                |

| Elementis Specialties - Charleston Facility<br>Historical Emission Calculations | <ul> <li>Charleston Facility</li> <li>Iculations</li> </ul> |                      |                     | POTESTA & ASSOCIATES, INC.<br>Project No: 0101-12-0404 |
|---------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------|---------------------|--------------------------------------------------------|
| Revised By: JAG<br>Date: 2/27/2014                                              |                                                             |                      |                     | Checked by: PEW                                        |
|                                                                                 |                                                             |                      |                     |                                                        |
| Pollutant                                                                       | Process (dry + wet)                                         | Process (wet only)   | WWTP (SBR)          | WWTP (full treatment plant)                            |
|                                                                                 | Tons/month                                                  | Tons/month           | Tons/month          | Tons/month                                             |
| CO                                                                              | 0.569                                                       | 0.569                | 0                   |                                                        |
| NOX                                                                             | 2.426                                                       | 2.426                | 0                   | 0                                                      |
| PM                                                                              | 2.600                                                       | 2.555                | 0                   | 0                                                      |
| SOx                                                                             | 0.013                                                       | 0.013                | 0                   | 0                                                      |
| VOC                                                                             | 8.030                                                       | 2.849                | 0.01                | 1 1.92                                                 |
|                                                                                 |                                                             |                      |                     |                                                        |
|                                                                                 |                                                             |                      |                     |                                                        |
|                                                                                 |                                                             |                      |                     |                                                        |
| Pollutant                                                                       | 2003-March 2009                                             | April 2009-July 2010 | August 2010-Present |                                                        |
|                                                                                 | Tons/Month                                                  | Tons/Month           | Tons/Month          |                                                        |
| CO                                                                              | 0.569                                                       | 0.569                | 0.569               |                                                        |
| NOX                                                                             | 2.426                                                       | 2.426                | 2.426               |                                                        |
| PM                                                                              | 2.600                                                       | 2.600                | 2.555               |                                                        |
| SOx                                                                             | 0.013                                                       | 0.013                | 0.013               | 3                                                      |
| VOC                                                                             | 8.030                                                       | 9.947                | 4.765               |                                                        |
| VOC % Process                                                                   | %6.66                                                       | 80.7%                | 59.8%               |                                                        |
| VOC % Wastewater                                                                | #REF!                                                       | 19.3%                | 40.2%               |                                                        |

| Revised By: JAG |  | Checked by: PEW |
|-----------------|--|-----------------|
| Date: 2/27/2014 |  | Date: 2/27/2014 |

Source : AP-42 1.4 Natural Gas Combustion

|                   | Factor    |
|-------------------|-----------|
|                   | (lb/MMcf) |
|                   |           |
| NOx               | 100       |
| VOC               | 5.5       |
| CO                | 84        |
| CO <sub>2</sub>   | 120,000   |
| PM <sup>(1)</sup> | 7.6       |
| SO2               | 0.6       |

Notes:

 $^{(i)}$  Emission factor reflects total particulate matter. Condensible PM = 5.7 lb/10^6 scf and

Filterable PM =  $1.9 \text{ lb}/10^6 \text{ scf.}$ 

### By: JAG Date: 2/27/2014

### Preliminary Water9 results

### - Yearly based on average temperature and average ethanol/methanol

|                                            | M        | MODEL 1 - EQ1 |         | MODEL 1A - EQ2, DAF1 |       |        |       |              |
|--------------------------------------------|----------|---------------|---------|----------------------|-------|--------|-------|--------------|
|                                            |          |               |         |                      |       |        | VOC   |              |
|                                            |          | VOC           |         |                      | VOC   |        | from  |              |
|                                            | Lift to  | from EQ1      | Model   | EQ1 to               |       | DAF1   | DAF1  | DAF1 outlet  |
| Description                                | EQ1 Tank | Tank          | Output  | EQ2 Tank             | Tank  | Tank   | Tank  | waste stream |
| Water Flow Rate, GPM                       | 350      |               |         | 350                  |       | 350    |       | 350          |
| Air Flow Rate, SCFM                        | 300      |               |         | 300                  |       | 300    |       |              |
| Average Temperature, F                     | 89.8     |               |         | 89.8                 |       | 89.8   |       |              |
| Ethanol, lb/hr                             | 175.90   | 3.269         |         | 116.26               | 1.546 | 54.77  | 0.166 | 54.61        |
| Methanol, lb/hr                            | 1.95     | 0.055         |         | 1.44                 | 0.041 | 1.07   | 0.004 | 1.06         |
| Ethanol, TPY                               |          | 14.316        |         |                      | 6.773 |        | 0.729 |              |
| Methanol, TPY                              |          | 0.240         |         |                      | 0.177 |        | 0.019 |              |
| Total VOC, lb/hr                           | 177.85   | 3.323         |         |                      | 1.587 |        | 0.171 |              |
| Total VOC, TPY                             | 778.96   | 14.556        |         |                      | 6.950 |        | 0.748 |              |
| WATER9 OUTPUT                              |          | č.            |         |                      |       |        |       |              |
| Ethanol, g/s                               |          | 0.412         |         |                      | 0.195 |        | 0.021 |              |
| Methanol, g/s                              |          | 0.007         |         |                      | 0.005 |        | 0.001 |              |
| Ethanol, ppm                               |          |               | 663.459 |                      |       | 312.58 |       | 311.63       |
| Methanol, ppm                              |          |               | 8.23947 |                      |       | 6.0777 |       | 6.05347      |
| Ethanol, Mg/yr                             |          | 12.987        |         |                      | 6.144 |        | 0.662 |              |
| Methanol, Mg/yr                            |          | 0.217         |         |                      | 0.161 |        | 0.017 |              |
| WATER9 INPUT                               |          |               |         |                      |       |        |       |              |
| waste stream                               |          |               |         |                      |       |        |       |              |
| Ethanol, ppm                               | 1000.3   |               |         | 663.459              |       |        |       |              |
| Methanol, ppm                              | 11.1     |               |         | 8.23947              |       |        | 3     |              |
| Ethanol K <sub>max,</sub> hr <sup>-1</sup> | 188.9693 |               |         | 203.5467             |       |        |       |              |
| Ethanol K <sub>1</sub> , L/gm-hr           | 102.9942 |               |         | 70.148               |       |        |       |              |
| Active Biomass, g/L                        | 0.138    |               |         | 0.138                |       |        |       |              |

Potesta & Associates, Inc. Project No. 0101-12-0404

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### By: JAG Date: 2/27/2014

### Preliminary Water9 results

= Yearly based on average temperature and average ethanol/methanol

|                                            |          | MODEL 2 - AB1, AB2, DAF2 |          |          |             |       |                   |
|--------------------------------------------|----------|--------------------------|----------|----------|-------------|-------|-------------------|
|                                            |          |                          |          |          |             | VOC   |                   |
|                                            |          | VOC                      |          | VOC      |             | from  |                   |
|                                            |          | from AB1                 | AB1 to   | from AB2 | AB2 to DAF2 | DAF2  | DAF2 outlet waste |
| Description                                | AB1 Tank | Tank                     | AB2 Tank | Tank     | Tank        | Tank  | stream            |
| Water Flow Rate, GPM                       | 350      |                          | 350      |          | 350         |       | 350               |
| Air Flow Rate, SCFM                        | 300      |                          | 300      |          | 300         |       |                   |
| Average Temperature, F                     | 89.8     |                          | 89.8     | _        | 89.8        |       |                   |
| Ethanol, lb/hr                             | 79.57    | 0.0059                   | 0.07     | 0.000    | 0.00        | 0.000 | 0.00              |
| Methanol, lb/hr                            | 0.60     |                          | 0.15     | 1        | 0.02        |       | 0.02              |
| Ethanol, TPY                               |          | 0.0257                   |          | 0.000    |             | 0.000 |                   |
| Methanol, TPY                              |          | 0.0683                   |          | 0.011    |             | 0.000 |                   |
| Total VOC, lb/hr                           |          | 0.0218                   |          | 0.003    |             | 0.000 |                   |
| Total VOC, Ton/yr                          |          | 0.0957                   |          | 0.011    |             | 0.000 |                   |
| WATER9 OUTPUT                              |          |                          |          |          |             |       |                   |
| Ethanol, g/s                               |          | 0.001                    |          | 0.000    |             | 0.000 |                   |
| Methanol, g/s                              |          | 0.002                    |          | 0.000    |             | 0.000 |                   |
| Ethanol, ppm                               |          |                          | 0.425    |          | 0.001       |       | 0.001             |
| Methanol, ppm                              |          |                          | 0.836    |          | 0.136       |       | 0.135             |
| Ethanol, Mg/yr                             |          | 0.023                    |          | 0.000    |             | 0.000 |                   |
| Methanol, Mg/yr                            |          | 0.062                    |          | 0.010    |             | 0.000 |                   |
| WATER9 INPUT                               |          |                          |          |          |             |       |                   |
| waste stream                               |          |                          |          |          |             |       |                   |
| Ethanol, ppm                               | 311.63   |                          |          |          |             |       |                   |
| Methanol, ppm                              | 6.05347  |                          |          |          |             |       |                   |
| Ethanol K <sub>max,</sub> hr <sup>-1</sup> | 281.812  |                          |          |          |             |       |                   |
| Ethanol K <sub>1</sub> , L/gm-hr           | 24.77061 |                          | c .      |          |             |       |                   |
| Active Biomass, g/L                        | 0.595    |                          |          |          |             |       |                   |

Potesta & Associates, Inc. Project No. 0101-12-0404

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### By: JAG Date: 2/27/2014

### Preliminary Water9 results

### Yearly based on average temperature and average ethanol/methanol

| MODEL 3 - Sludge Tank                      |              |                         | TOTAL |
|--------------------------------------------|--------------|-------------------------|-------|
| December                                   | Sludge Teels | VOC from Sludge<br>Tank |       |
| Description                                | Sludge Tank  | Tank                    |       |
| Water Flow Rate, GPM                       | 77           |                         |       |
| Air Flow Rate, SCFM                        | 300          |                         |       |
| Average Temperature, F                     | 89.8         |                         |       |
| Ethanol, lb/hr                             | 6.73         | 0.001                   | 4.98  |
| Methanol, lb/hr                            | 6.95         | 0.144                   | 0.26  |
| Ethanol, TPY                               |              | 0.006                   | 21.85 |
| Methanol, TPY                              |              | 0.631                   | 1.14  |
| Total VOC, lb/hr                           |              | 0.146                   | 5.25  |
| Total VOC, Ton/yr                          |              | 0.637                   | 22.99 |
| WATER9 OUTPUT                              |              |                         |       |
| Ethanol, g/s                               |              | 0.000                   |       |
| Methanol, g/s                              |              | 0.018                   |       |
| Ethanol, ppm                               |              |                         |       |
| Methanol, ppm                              |              |                         |       |
| Ethanol, Mg/yr                             |              | 0.005                   | 19.82 |
| Methanol, Mg/yr                            |              | 0.572                   | 1.04  |
| WATER9 INPUT                               |              |                         |       |
| waste stream                               |              |                         |       |
| Ethanol, ppm                               | 174.7        |                         |       |
| Methanol, ppm                              | 180.4        |                         |       |
| Ethanol K <sub>max,</sub> hr <sup>-1</sup> | 198.8079     |                         |       |
| Ethanol K <sub>1</sub> , L/gm-hr           | 14.81906     |                         |       |
| Active Biomass, g/L                        | 1.0674       | 3                       |       |

### Elementis Specialties - Charleston Facility Historical Emission Calculations

POTESTA & ASSOCIATES, INC. Project No: 0101-12-0404

Revised By: JAG Date: 2/27/2014

### Checked by: PEW Date: 2/27/2014

### Preliminary Water9 results

|                                            |             |           | MOL     | DEL 1 - EQ | tanks as SB  | R units   |           |           |
|--------------------------------------------|-------------|-----------|---------|------------|--------------|-----------|-----------|-----------|
| 1                                          |             | VOC from  |         |            |              | 1         |           |           |
|                                            |             | EQ1 Tank  |         |            |              |           |           |           |
|                                            |             | (as       |         |            |              |           |           | 1         |
|                                            |             | Activated |         |            | VOC from     |           | Emissions | Emissions |
|                                            | Lift to EQ1 | Sludge    |         |            | EQ1 Tank     | EQ2 to    | from SBR  | from 2    |
| Description                                | Tank        | Unit)     |         |            | as clairfier | DAF1 Tank | Unit      | SBR Units |
| Water Flow Rate, GPM                       | 350         |           |         | 350        |              | 350       |           |           |
| Air Flow Rate, SCFM                        | 300         |           |         | 300        |              | 300       |           |           |
| Average Temperature, F                     | 89.8        |           |         | 89.8       |              | 89.8      |           |           |
| Ethanol, lb/hr                             | 175.90      | 0.004     |         | 0.08       | 0.002        | 0.13      |           |           |
| Methanol, lb/hr                            | 1.95        | 0.013     |         | 1.44       | 0.009        | 0.32      |           |           |
| Isopropanol, lb/hr                         | 0.00        | 0.000     |         | 0.00       | 0.000        | 0.00      |           |           |
| tert-Butanol, lb/hr                        | 0.00        | 0.000     |         | 0.00       | 0.000        | 0.00      |           |           |
| Ethanol, TPY                               |             | 0.016     |         |            | 0.010        |           |           |           |
| Methanol, TPY                              |             | 0.059     |         |            | 0.038        |           |           |           |
| Total VOC, lb/hr                           | 177.85      | 0.017     |         |            | 0.011        |           | 0.014     | 0.028163  |
| Total VOC, Ton/yr                          | 778.96      | 0.075     |         |            | 0.048        |           | 0.062     | 0.123355  |
| WATER9 OUTPUT                              |             |           |         |            |              |           |           |           |
| Ethanol, g/s                               |             | 0.000     |         |            | 0.000        |           |           |           |
| Methanol, g/s                              |             | 0.002     |         |            | 0.001        |           |           |           |
| Isopropanol, g/s                           |             | 0         |         |            | 0            |           |           |           |
| tert-Butanol, g/s                          |             | 0         |         |            | 0            |           |           |           |
| Ethanol, ppm                               |             |           | 0.72916 |            |              | 0.71599   |           |           |
| Methanol, ppm                              |             |           | 1.90373 |            |              | 1.85437   |           |           |
| Isopropanol, ppm                           |             |           |         | 0          |              | 0         |           |           |
| tert-Butanol, ppm                          |             |           |         | 0          |              | 0         |           |           |
| Ethanol, Mg/yr                             |             | 0.015     |         |            | 0.009        |           |           |           |
| Methanol, Mg/yr                            |             | 0.053     |         |            | 0.034        |           |           |           |
| Isopropanol, Mg/yr                         |             | 0.000     |         |            | 0.000        |           |           |           |
| tert-Butanol, Mg/yr                        |             | 0.000     |         |            | 0.000        |           |           |           |
| WATER9 INPUT                               |             |           |         |            |              |           |           |           |
| waste stream                               |             |           |         |            |              |           |           |           |
| Ethanol, ppm                               | 1000.3      |           |         | 0.44595    |              |           |           |           |
| Methanol, ppm                              | 11.1        | -         |         | 8.23947    |              |           |           |           |
| Isopropanol, ppm                           | 0           |           |         |            |              |           |           |           |
| tert-Butanol, ppm                          | 0           |           |         |            |              |           | _         |           |
| Ethanol K <sub>max,</sub> hr <sup>-1</sup> | 281.812     |           |         |            |              |           |           |           |
| Ethanol K <sub>1</sub> , L/gm-hr           | 24.77061    |           |         |            |              |           |           |           |
| Active Biomass, g/L                        | 0.595       |           |         |            |              |           |           |           |

Converting WATER9 results to SBR factors Elementis 4 hour SBR cycle 6 cycles per day

Hours per Aeration (Y/N) Hours day Hours Step 1. Fill for 1 hour 12 Aeration time 1 Y 2 Step 2. Aerate for 1 hour 1 Y 1 N 1 N Step 3. Settle for 1 2 12 No air Step 4. Decant for 1 hour

**APPENDIX II** 

### **Emissions Report for: Annual**

### S1 Tank - Vertical Fixed Roof Tank

|                               | Losses(bs)   |                |                 |  |  |  |  |
|-------------------------------|--------------|----------------|-----------------|--|--|--|--|
| Components                    | Working Loss | Breathing Loss | Total Emissions |  |  |  |  |
| Ethyl Alcohol (Option 2 Only) | 12,114.98    | 0.00           | 12,114.98       |  |  |  |  |

### **Emissions Report for: Annual**

### S2 Tank - Vertical Fixed Roof Tank

|                               | Losses(bs)   |                |                 |  |  |  |
|-------------------------------|--------------|----------------|-----------------|--|--|--|
| Components                    | Working Loss | Breathing Loss | Total Emissions |  |  |  |
| Ethyl Alcohol (Option 2 Only) | 12,112.49    | 0.00           | 12,112.49       |  |  |  |

### Emissions Report for: Annual

S3 Tank - Vertical Fixed Roof Tank

|                               | Losses(lbs)  |                |                 |  |  |  |
|-------------------------------|--------------|----------------|-----------------|--|--|--|
| Components                    | Working Loss | Breathing Loss | Total Emissions |  |  |  |
| Ethyl Alcohol (Option 2 Only) | 8,388.04     | 0.00           | 8,385.04        |  |  |  |

### **Emissions Report for: Annual**

### B Tank - Vertical Fixed Roof Tank

|                               | Losses(lbs)  |                |                 |  |  |  |
|-------------------------------|--------------|----------------|-----------------|--|--|--|
| Components                    | Working Loss | Breathing Loss | Total Emissions |  |  |  |
| Ethyl Alcohol (Option 2 Only) | 8,890.16     | 0.00           | 8,890.16        |  |  |  |

### **Emissions Report for: Annual**

### C Tank - Vertical Fixed Roof Tank

|                               | Losses(lbs)  |                |                 |  |  |  |
|-------------------------------|--------------|----------------|-----------------|--|--|--|
| Components                    | Working Loss | Breathing Loss | Total Emissions |  |  |  |
| Ethyl Alcohol (Option 2 Only) | 8,890.16     | 0.00           | 8,890.16        |  |  |  |

### Emissions Report for: Annual

### D Tank - Vertical Fixed Roof Tank

|                               | Losses(lbs)  |                |                 |  |  |  |
|-------------------------------|--------------|----------------|-----------------|--|--|--|
| Components                    | Working Loss | Breathing Loss | Total Emissions |  |  |  |
| Ethyl Alcahol (Option 2 Only) | 8,389.40     | 0.00           | 8,389.40        |  |  |  |