



January 15, 2019

Mr. William Durham
Director, Division of Air Quality
West Virginia Department of Environmental Protection
601 57th Street
Charleston, West Virginia 25304

Via FedEx

**Subject: Rule 13 Air Permit Modification Application
Natrium Extraction and Fractionation Processing Plant
Blue Racer Midstream, LLC
Permit No. R13-2896E, Plant ID No. 051-00142
Proctor, Marshall County**

Dear Mr. Durham:

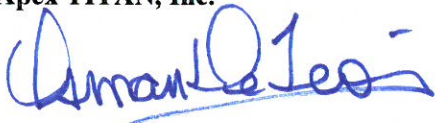
As requested by Mr. Joseph Kessler of West Virginia Department of Environmental Protection (WVDEP), Apex TITAN, Inc., a subsidiary of Apex Companies, LLC (Apex) is submitting on behalf of Blue Racer Midstream, LLC (BRM) this updated Rule 13 Air Permit application, originally submitted on August 3, 2018, incorporating all revisions to date. This application will update emission representations from existing equipment and equipment under construction, and authorize the construction of four (4) additional cryogenic plants (the Project) at the Natrium Extraction and Fractionation Processing Plant (the Plant), located in Proctor, Marshall County. The Plant is currently authorized by WV DEP Rule 13 Air Permit Number R13-2896E. The Project is a minor modification to the Rule 13 Air Permit, and will not trigger major source permitting for any criteria pollutants.

During review of the original application submittal, additional changes to the representations were submitted through revision pages on October 22, 2018 to include additional natural gasoline storage tanks. Furthermore, additional revisions are being submitted to authorize construction of a refrigerated propane storage tank and revisions requested by Mr. Kessler to ease the review process of the application, including addition of a thorough explanation of the applicability of federal requirements to all heaters and clarification on nested source applicability. As discussed with Mr. Kessler, resubmittal of this application will not affect the timing for permit issuance and will not require repayment of the application fee.

Enclosed please find one (1) hard copy and two (2) electronic copies of the Rule 13 air permit application.

BRM and Apex truly appreciate the WV DEP's review and approval of the enclosed application. If you have any questions or require additional information, please do not hesitate to contact Ms. Jill Thornberry of BRM at (740) 421-9255 ext. 119 or at jthornberry@blueracermidstream.com or myself at (469) 365-1121 or at odeleon@apexc.com.

Sincerely,
Apex TITAN, Inc.



Osman De Leon, P.E.
Project Manager

cc: Ms. Jill Thornberry, Blue Racer Midstream
Mr. Sean Wilson, Blue Racer Midstream
Mr. Steven Green, Blue Racer Midstream

RULE 13 AIR PERMIT MODIFICATION APPLICATION

Prepared for:



**Natrium Extraction and Fractionation Processing Plant
Permit No. R13-2896E, Plant ID No. 051-00142
Proctor, Marshall County, West Virginia**

January 2019

Apex TITAN Job No: 725010646036

Prepared by:

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INTRODUCTION

Blue Racer Midstream, LLC (BRM) is submitting this Rule 13 air permit modification application to the West Virginia Department of Environmental Protection (WV DEP) Air Permits Division (APD) to update emission representations based on as-built configuration of existing equipment and equipment under construction, and to authorize the construction of four (4) additional cryogenic plants (the Project) at the Natrium Extraction and Fractionation Processing Plant (Natrium Plant, or Plant) located in Proctor, Marshall County, West Virginia. The Plant emits carbon monoxide (CO), oxides of nitrogen (NO_x), particulate matter (PM), including PM with aerodynamic diameters of 10 and 2.5 microns or less (PM₁₀ and PM_{2.5}, respectively), sulfur dioxide (SO₂), volatile organic compounds (VOC), hazardous air pollutants (HAPs), and Greenhouse Gases (GHG).

Plant Permitting History

In an effort to facilitate the WV DEP's review of air permitting applicability to the Project and retrospectively to the Plant, the following paragraphs present a summary of the Plant's air permitting and ownership history.

Original Plant Construction under Dominion Natrium LLC Ownership

- August 2011: Original air permit application submittal
 - 400 Million standard cubic feet per day (MMscfd) Natural Gas Processing Facility, including two 200 MMscfd cryogenic units and associated natural gas liquid (NGL) fractionation
 - February 1, 2012: Anticipated Start of Construction (SOC)
 - December 1, 2012: Anticipated Start of Operation (SOO)
 - Site-wide Potential to Emit (PTE), excluding fugitives:
 - CO: 37.97 T/yr
 - NO_x: 23.94 T/yr
 - PM/PM₁₀/PM_{2.5}: 4.76 T/yr
 - SO₂: 0.37 T/yr
 - VOC: 6.03 T/yr
 - CO_{2e}: 85,062 T/yr
 - Synthetic minor source, due to federally enforceable operating limitations on the annual fuel firing rate of the hot oil heater Emissions Unit Number (EU#) S001.
- December 19, 2011: Permit R13-2896 issued
- May 15, 2013: Actual Start of Operation (SOO, construction exceeded anticipated project timeline)
- Upon SOO, flare operational issues resulted in visible emissions in excess of those allowed under 40 Code of Federal Regulations (CFR) §60.18 (adopted by reference in WV regulation §45-16-4) and insufficient destruction efficiency.
- July 31, 2013: Consent Order issued by WV DEP

August 14, 2013: Change of Ownership to Blue Racer Natrium, LLC

- August 20, 2013: Rule 13 permit modification application submittal
 - Change of ownership from Dominion Natrium LLC to Blue Racer Natrium, LLC
 - Replacement of the flare tip (modification to EU# S004) to resolve operational issues
 - Installation of a vapor recovery unit (VRU) on natural gasoline tank EU# S005, to capture and route the tank emissions (primarily natural gas blanket emissions) to hot oil heater EU# S001 fuel system instead of the flare
 - Installation of a VRU on slop tank EU# S007, to capture and route the tank emissions (primarily natural gas blanket emissions) to Flare EU# S004
 - Installation of two (2) new natural gas-fired heaters, EU#s S012 and S013 to provide heat to the second cryogenic unit
 - Update to site-wide PTE, excluding fugitives:
 - CO: 24.09 T/yr
 - NO_x: 34.35 T/yr
 - PM/PM₁₀/PM_{2.5}: 5.93 T/yr
 - SO₂: 0.46 T/yr
 - VOC: 2.22 T/yr
 - CO_{2e}: 94,877 T/yr
 - Retention of synthetic minor source status due to federally enforceable operating limitations on the annual fuel firing rate of the hot oil heater EU# S001.
- December 26, 2013: Permit R13-2896B issued by WV DEP
- During this review, WV DEP agreed that the installation of the two (2) heaters were a separate, distinct project from the original construction of the Plant, as these heaters were not anticipated to be needed during the original design and permitting of the Plant.

August 1, 2014: Fractionation Plant Expansion

- August 1, 2014: Rule 13 permit modification application submittal
- Change of owner/operator name to Blue Racer Midstream, LLC (Blue Racer Natrium, LLC was absorbed into its parent company)
- Increase in NGL fractionation capacity of the Plant by:
 - Tying a new NGL pipeline into the Plant's receiving area, and increasing the potential truck, railcar, and barge unloading of NGL;
 - Installation of two (2) deethanizer towers and associated equipment;
 - Installation of an ethane amine treating unit and associated equipment;
 - Installation of a depropanizer tower and associated equipment;
 - Installation of a debutanizer tower and associated equipment;
 - Installation of four (4) natural gas-fired hot oil heaters, EU#s S016, S017, S018, and S019;
 - Installation of glycol reboiler EU# S020 and regen gas heater EU# S022;
 - Installation of 30,000 bbl gasoline storage tank EU# S023 equipped with a natural gas blanket to reduce VOC emissions;
 - Installation of four (4) pressurized isobutane bullet tanks;
 - Increased utilization of existing Plant hot oil heater EU# S001;

- Revised plant natural gas processing rate from 400 MMscfd to 460 MMscfd;
- Increased throughput of the existing Plant product storage tanks, which are pressurized to prevent emissions during normal operations;
- Update to site-wide PTE, excluding fugitives:
 - CO: 99.23 T/yr
 - NO_x: 72.55 T/yr
 - PM/PM₁₀/PM_{2.5}: 16.78 T/yr
 - SO₂: 1.63 T/yr
 - VOC: 10.20 T/yr
 - CO_{2e}: 288,861 T/yr
- Due to Supreme Court ruling, GHG emissions alone may not trigger Prevention of Significant Deterioration (PSD) permitting on sources with total criteria pollutant potentials to emit less than the PSD major source thresholds.
- November 6, 2014: Permit R13-2896C issued by WV DEP

April 15, 2015: Plant Flare Replacement

- April 15, 2015: Rule 13 permit modification application submittal
 - Replacement of existing plant flare EU# S004 with a ground flare EU# S004A.
 - Removal of emergency flare EU# S021.
 - Update to site-wide PTE, excluding fugitives:
 - CO: 97.62 T/yr
 - NO_x: 72.91 T/yr
 - PM/PM₁₀/PM_{2.5}: 16.77 T/yr
 - SO₂: 1.63 T/yr
 - VOC: 9.48 T/yr
 - CO_{2e}: 288,749 T/yr
- The flare replacement did not result in an increase in potential emissions of criteria pollutants above major source permitting thresholds.
- October 30, 2015: Permit R13-2896D issued by WV DEP.

July 7, 2015: Installation of Cryogenic Train No. 3

- July 7, 2015: Rule 13 permit modification application submittal
 - Installation of one (1) 230 MMscfd natural gas cryogenic processing train;
 - Installation of two (2) 230 MMscfd glycol dehydration units EUs# S031 and S032 and associated 3.0 million British thermal units per hour (MMBtu/hr) glycol reboilers EUs# S028 and S029;
 - Installation of one (1) 9.7 MMBtu/hr regen gas heater EU# S024;
 - Installation of one (1) 26.3 MMBtu/hr cryo HMO heater EU# S026;
 - Update to emission controls for previously installed glycol dehydration unit EU# S006;
 - Installation of three (3) vapor combustor units, EU#s V001, V002 and V003 to control emissions from all dehydration units during times when emissions are not routed to S001 fuel system; and
 - Addition of piping and fugitive components EU# FUG AREA 3.
 - Update to site-wide PTE, excluding fugitives:

- CO: 132.35 T/yr
 - NO_x: 100.75 T/yr
 - PM/PM₁₀/PM_{2.5}: 18.48 T/yr
 - SO₂: 1.80 T/yr
 - VOC: 37.15 T/yr
 - CO_{2e}: 319,069 T/yr
- The addition of new equipment resulted in an increase in the site-wide potential emissions of NO_x and CO criteria pollutants above Title V major source permitting thresholds. As a result, BRM will submit a Title V application within 12 months after start of operation of cryogenic Plant No. 3.
 - January 15, 2016: Permit R13-2896E issued by WV DEP.

Project Description

With this filing, BRM is requesting that the WV DEP authorize the following updates to the Plant operations, based on as-built conditions:

- Clarify hot oil heater EU# S001 NO_x emission factor, based on updated vendor commitments and reduce fuel monitoring sampling frequency;
- Eliminate permit terms for regen gas heater EU# S022 since it was not constructed;
- Eliminate permit terms for glycol dehydration unit EU# S031 since it was not constructed;
- Clarify glycol dehydration unit EU# S006 natural gas throughput, glycol sump emissions, and emission controls;
- Eliminate permit terms for glycol reboiler EU#s S020 and S028, since they were not constructed (the glycol reboiler associated with dehydration unit EU# S006 uses hot oil as a heat source for the regeneration process);
- Eliminate permit terms for vapor combustor EU#s V001 and V002 since they were not constructed;
- Clarify the EU# designation for the slop storage tank from S007 to TK-906, and emission point ID from P007 to TK-906;
- Clarify the EU# designation for the natural gasoline storage tanks from S005 to TK-802, and S023 to TK-2802;
- Clarify control configuration on slop storage tank EU# TK-906 (previously known as S007);
- Incorporate uncontrolled produced water and slop water loading emissions EU# S015;
- Clarify emission representations for ethane amine treater EU# S011;
- Eliminate permit terms for ethane amine treater EU# S014 since it was not constructed;
- Clarify control configuration on barge loading emissions EU# S033;
- Clarify emission factors on fire pump engine EU#s S002 and S003 to reflect current regulatory requirements;
- Clarify ground flare EU# S004A waste gas streams and emission representations;
- Clarify fugitive component counts for EU#s FUG AREA 1 and FUG AREA 2 based on leak detection and repair (LDAR) component counts and monitoring program control efficiencies;

- Clarify fugitive component counts for EU# FUG AREA 3 based on component counts from a facility of similar design and monitoring program control efficiencies;
- Clarify pigging operation EU# S035 emission representations;
- Incorporate pigging flare EU# S034 for control of propane pig trap;
- Incorporate emissions from gasoline dispensing tank EU# TK-L-1 and associated loading operations EU# L-1;
- Incorporate pressurized truck loading operations for propane, butane, isobutane, and natural gasoline; and
- Claim permit exemptions for de-minimis sources.
- Although the vapor combustor is authorized as the primary emission control mechanism for glycol dehydration unit EU# S032, BRM would like to have the flexibility to route the dehydration unit emissions to the hot oil heater EU# S001 as fuel. For permitting purposes, BRM is representing continuous combustion of the dehydration unit emissions by the vapor combustor as the most conservative scenario.

In addition, BRM requests authorization of the following equipment associated with the installation of four (4) additional Cryogenic Plants:

- Installation of three (3) 230 MMscfd natural gas cryogenic processing plants;
- Installation of one (1) 345 MMscfd natural gas cryogenic processing plant;
- Installation of three (3) 9.7 MMBtu/hr regen gas heater EU#s S036, S044 and S048;
- Installation of one (1) 19.28 MMBtu/hr regen gas heater EU# S040;
- Installation of three (3) 26.3 MMBtu/hr cryo HMO heater EU#s S037, S045 and S049;
- Installation of one (1) 54.67 MMBtu/hr cryo HMO heater EU# S041;
- Installation of two (2) 61.6 MMBtu/hr hot oil heater EU#s S052 and S053;
- Installation of one (1) ethane amine treater EU# S054 and associated vapor recovery unit to control emissions from regenerator vent;
- Installation of deethanizer towers;
- Installation of one (1) slop storage tank EU# TK-2906 and one (1) produced water storage tank EU# TK-2907, and associated loading operations;
- Installation of one (1) 10.09 MMBtu/hr stabilizer heater EU# S056;
- Installation of four (4) natural gasoline storage tanks EU#s TK-3802, TK-4802, TK-5802, and TK-6802;
- Installation of one (1) refrigerated propane storage tank EU# TK-7802;
- Installation of back-up electric generator engine(s) (EU# S057) with a capacity not to exceed 16,000 horsepower (hp);
- Installation of four (4) spherical storage tanks;
- Installation of four (4) pressurized bullet tanks;
- Installation of additional pig traps for inlet and residue gas lines;
- Expansion of stabilizer system to increase liquid handling capacity, subsequently increasing fugitive component counts on EU# FUG AREA 2;
- Addition of piping and fugitive components EU#s FUG AREA 4, FUG AREA 5, FUG AREA 6 and FUG AREA 7;

- Authorization of additional barge loading operations for larger capacity barges; and
- Authorization of pressurized NGL/condensate unloading operations EU# S055.
- The following table demonstrates the site-wide PTE and existing source PTE after revisions to representations have been performed:

Regulated Air Pollutant	Site-wide Total PTE (T/yr)	Site-wide Total PTE (Excluding Fugitives) (T/yr)
Oxides of Nitrogen (NO _x):	210.46	210.46
Carbon Monoxide (CO):	233.75	233.75
Volatile Organic Compounds (VOC):	388.98	212.69
Particulate Matter (PM):	72.16	28.30
PM with an aerodynamic diameter of less than or equal to 10 microns (PM ₁₀)	39.99	28.30
PM with an aerodynamic diameter of less than or equal to 2.5 microns (PM _{2.5})	29.47	28.30
Sulfur Dioxide (SO ₂):	2.66	2.66
Greenhouse Gases (CO ₂ e):	466,864	463,720

- The Plant is an existing PSD minor source of regulated air contaminants. This modification project is not a PSD major source by itself. As a result, PSD permitting has not been triggered by the project for any regulated air contaminant.
- Currently, construction of cryogenic plant No. 3 is in progress and operations have not commenced. The revisions to the existing equipment emission representations result in an increase in VOC emissions above Title V major source permitting thresholds, and the addition of new equipment results in an increase in the site-wide potential emissions of NO_x and CO. As a result, BRM will submit a Title V permit application after submittal of this application.
- Although GHG emissions are above the PSD major source threshold of 100,000 tons per year (T/yr) CO₂e, GHG emissions cannot trigger PSD permitting unless at least one criteria pollutant triggers PSD permitting.



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

**APPLICATION FOR NSR PERMIT
AND
TITLE V PERMIT REVISION
(OPTIONAL)**

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

- CONSTRUCTION MODIFICATION RELOCATION
 CLASS I ADMINISTRATIVE UPDATE TEMPORARY
 CLASS II ADMINISTRATIVE UPDATE AFTER-THE-FACT

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

- ADMINISTRATIVE AMENDMENT MINOR 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 Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant (as registered with the WV Secretary of State's Office): Blue Racer Midstream, LLC		2. Federal Employer ID No. (FEIN): 46-1520107	
3. Name of facility (if different from above): Natrium Extraction and Fractionation Processing Plant (NPP)		4. The applicant is the: <input type="checkbox"/> OWNER <input type="checkbox"/> OPERATOR <input checked="" type="checkbox"/> BOTH	
5A. Applicant's mailing address: 5949 Sherry Lane, Suite 1300 Dallas, TX 75225		5B. Facility's present physical address: Natrium Extraction and Fractionation Processing Plant 14786 Energy Road Proctor, WV 26055	
6. West Virginia Business Registration. Is the applicant a resident of the State of West Virginia? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO – 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 . – 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 .			
7. If applicant is a subsidiary corporation, please provide the name of parent corporation:			
8. Does the applicant own, lease, have an option to buy or otherwise have control of the <i>proposed site</i> ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO – If YES , please explain: Applicant is the owner of the site. – If NO , you are not eligible for a permit for this source.			
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.): Natural Gas Extraction and Fractionation Facility		10. North American Industry Classification System (NAICS) code for the facility: 211130 Natural Gas Extraction	
11A. DAQ Plant ID No. (for existing facilities only): 051 – 00142		11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only): R13-2896E	

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

12A.

- 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**.

Facility is located off of State Road 2 at 14786 Energy Road, Proctor, WV 26055.

12.B. New site address (if applicable):

14786 Energy Road
Proctor, WV 26055

12C. Nearest city or town:

Proctor

12D. County:

Marshall

12.E. UTM Northing (KM): 4400.8

12F. UTM Easting (KM): 512.1

12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:

Revision of emission representations on existing equipment based on as-built configuration.

14A. Provide the date of anticipated installation or change: 11/1/2018

If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /

14B. Date of anticipated Start-Up if a permit is granted:

4/1/2019

14C. Provide a **Schedule** of the planned **Installation of/Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:

Hours Per Day 24 Days Per Week 7 Weeks Per Year 52

16. Is demolition or physical renovation at an existing facility involved? YES NO

17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (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 applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance (*if known*). Provide this information as **Attachment D**.

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to **Plot Plan Guidance**).

- Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F**.

23. Provide a **Process Description** as **Attachment G**.

- Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

All of the required forms and additional information can be found under the Permitting 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 MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I**.

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 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:

<input checked="" type="checkbox"/> Bulk Liquid Transfer Operations	<input checked="" type="checkbox"/> Haul Road Emissions	<input type="checkbox"/> Quarry
<input checked="" type="checkbox"/> Chemical Processes	<input type="checkbox"/> Hot Mix Asphalt Plant	<input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities
<input type="checkbox"/> Concrete Batch Plant	<input type="checkbox"/> Incinerator	<input checked="" type="checkbox"/> Storage Tanks
<input type="checkbox"/> Grey Iron and Steel Foundry	<input checked="" type="checkbox"/> Indirect Heat Exchanger	

General Emission Unit, specify: **Fire Pump Engines (2), Generator Engine(s), Ground Flare, Pigging Flare, and Vapor Combustor.**

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L**.

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

<input type="checkbox"/> Absorption Systems	<input type="checkbox"/> Baghouse	<input checked="" type="checkbox"/> Flare
<input type="checkbox"/> Adsorption Systems	<input type="checkbox"/> Condenser	<input type="checkbox"/> Mechanical Collector
<input type="checkbox"/> Afterburner	<input type="checkbox"/> Electrostatic Precipitator	<input type="checkbox"/> Wet Collecting System

Other Collectors, specify: **Electric Vapor Recovery Units (4) and Vapor Combustor.**

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M**.

30. Provide all **Supporting Emissions Calculations** as **Attachment N**, or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** 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 **Attachment O**.

➤ 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.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and **Example Legal Advertisement** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

YES NO

➤ If **YES**, identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's "**Precautionary Notice – Claims of Confidentiality**" guidance found in the **General Instructions** as **Attachment Q**.

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

<input type="checkbox"/> Authority of Corporation or Other Business Entity	<input type="checkbox"/> Authority of Partnership
<input type="checkbox"/> Authority of Governmental Agency	<input type="checkbox"/> Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R**.

All of the required forms and additional information can be found under the 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.

SIGNATURE  DATE: 1/14/19
(Please use blue ink) (Please use blue ink)

35B. Printed name of signee: Steven Green		35C. Title: Sr. Vice President Engineering and Operations
35D. E-mail: sgreen@caimanenergy.com	36E. Phone: 214-580-3700	36F. FAX: 214-580-3750
36A. Printed name of contact person (if different from above): Jill Thornberry		36B. Title: Environmental Manager
36C. E-mail: jthornberry@blueracermidstream.com	36D. Phone: 740-421-9255 ext. 119	36E. FAX:

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Attachment A: Business Certificate | <input checked="" type="checkbox"/> Attachment K: Fugitive Emissions Data Summary Sheet |
| <input checked="" type="checkbox"/> Attachment B: Map(s) | <input checked="" type="checkbox"/> Attachment L: Emissions Unit Data Sheet(s) |
| <input checked="" type="checkbox"/> Attachment C: Installation and Start Up Schedule | <input checked="" type="checkbox"/> Attachment M: Air Pollution Control Device Sheet(s) |
| <input checked="" type="checkbox"/> Attachment D: Regulatory Discussion | <input checked="" type="checkbox"/> Attachment N: Supporting Emissions Calculations |
| <input checked="" type="checkbox"/> Attachment E: Plot Plan | <input checked="" type="checkbox"/> Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans |
| <input checked="" type="checkbox"/> Attachment F: Detailed Process Flow Diagram(s) | <input checked="" type="checkbox"/> Attachment P: Public Notice |
| <input checked="" type="checkbox"/> Attachment G: Process Description | <input type="checkbox"/> Attachment Q: Business Confidential Claims |
| <input checked="" type="checkbox"/> Attachment H: Material Safety Data Sheets (MSDS) | <input type="checkbox"/> Attachment R: Authority Forms |
| <input checked="" type="checkbox"/> Attachment I: Emission Units Table | <input type="checkbox"/> Attachment S: Title V Permit Revision Information |
| <input checked="" type="checkbox"/> Attachment J: Emission Points Data Summary Sheet | <input checked="" type="checkbox"/> Application Fee |

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 Group and:
- For Title V Administrative Amendments:
 - NSR permit writer should notify Title V permit writer of draft permit,
- For Title V Minor Modifications:
 - Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,
 - NSR permit writer should notify Title V permit writer of draft permit.
- For Title V Significant Modifications processed in parallel with NSR Permit revision:
 - NSR permit writer should notify a Title V permit writer of draft permit,
 - 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 found under the Permitting Section of DAQ's website, or requested by phone.

ATTACHMENT A: BUSINESS CERTIFICATE

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

State of West Virginia



Certificate

Emily

I, Natalie E. Tennant, Secretary of State of the State of West Virginia, hereby certify that

BLUE RACER MIDSTREAM, LLC

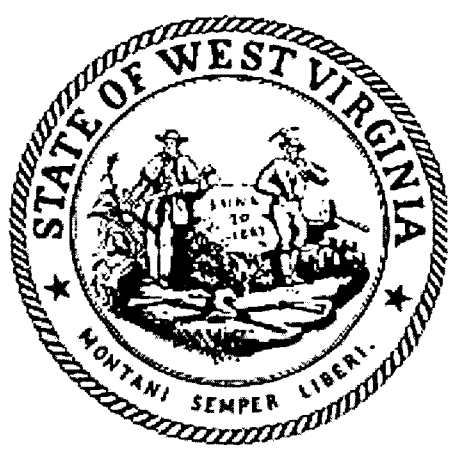
Control Number: 99Y8J

a limited liability company, organized under the laws of the State of Delaware has filed its "Application for Certificate of Authority" in my office according to the provisions of West Virginia Code §31B-10-1002. I hereby declare the organization to be registered as a foreign limited liability company from its effective date of December 20, 2012, until a certificate of cancellation is filed with our office.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORITY OF A FOREIGN LIMITED LIABILITY COMPANY

to the limited liability company authorizing it to transact business in West Virginia



Given under my hand and the Great Seal of the State of West Virginia on this day of December 20, 2012

Natalie E. Tennant

Secretary of State

S

FILED

DEC 20 2012

Natalie E. Tennant
Secretary of State
1900 Kanawha Blvd E.
Bldg 1, Suite 157-K
Charleston, WV 25305



Penney Barker, Manager
IN THE OFFICE OF Corporations Division
SECRETARY OF STATE Tel: (304)558-8000
Fax: (304)558-8381
www.wvsos.com
Hrs: 8:30 a.m. - 5:00 p.m. ET

FILE ONE ORIGINAL
(Two if you want a filed
stamped copy returned to you)
FEE: \$150

WV APPLICATION FOR
CERTIFICATE OF AUTHORITY OF
LIMITED LIABILITY COMPANY

Control # 9948J

****A CERTIFICATE OF EXISTENCE dated during the current tax year, from your home state****
of original organization is required to accompany this filing.

1. The name of the company as registered in its home state is: Blue Racer Midstream, LLC
and the state or country of organization is: State of Delaware

2. The name to be used in West Virginia will be:
[The name must contain one of the required terms such as "limited liability company" or abbreviations such as "LLC" or "PLLC". See instructions for complete list of acceptable terms and requirements for use of trade name.]
 Home State name as listed above, if available in WV
 DBA name _____
(ONLY if home state name is unavailable in WV)

3. The company will be a: [See instructions for limitations on professions which may form P.L.L.C. in WV. All members must have WV professional license. In most cases, a Letter of Authorization/Approval from the appropriate State Licensing Board is required to process the application.]
 regular L.L.C.
 Professional L.L.C. for the profession of _____

4. The address of the designated office of the company in WV, if any, will be:
No. & Street: _____
City/State/Zip: _____

5. The street address of the principal office is:
No. & Street: 120 Tredegar Street
City/State/Zip: Richmond, VA 23219
and the mailing address (if different) is:
Street/Box: _____
City/State/Zip: _____

6. Agent of Process:
Properly designated person to whom notice of process may be sent, if any:
Name: C T Corporation System
Address: 5400 D Big Tyler Road,
City/State/Zip: Charleston, West Virginia 25313

7. E-mail address where business correspondence can be received: _____

8. Website address of the business, if any: _____

9. The company is: an at-will company, for an indefinite period
 a term company, for the term of _____ years, which will expire on _____.

10. The company is: member-managed. [List the names and addresses of all members.]
 manager-managed. [List the names and addresses of all managers.]

List the name(s) of the members/managers of the company (attach additional pages if necessary).

<u>Name</u>	<u>Street Address</u>	<u>City, State, Zip</u>
Dominion Natrium Holdings, Inc.	120 Tredegar Street	
	Richmond, VA 23219	

11. All or specified members of a limited liability company are liable in their capacity as members for all or specified debts, obligations or liabilities of the company. No--All debts, obligations and liabilities are those of the company
 Yes--Those persons who are liable in their capacity as members for all debts, obligations or liability of the company have consented in writing to the adoption of the provision or to be bound by the provision

12. The purpose for which this limited liability company is formed are as follows:
 (Describe the type(s) of business activity which will be conducted, for example, "real estate," "construction of residential and commercial buildings," "commercial printing," "professional practice of architecture.")
 The purpose of the company is to engage in any lawful activity, including without limitation, the development of gas processing and fractionation and NGL transportation and any and all related activities.

13. Is the business a Scrap Metal Dealer?
 Yes [If "Yes," you must complete the Scrap Metal Dealer Registration Form (Form SMD-1) and proceed to question 14.].
 No [Proceed to question 14.]

14. The number of pages attached and included in this application is: 6

1. The requested effective date is: the date & time of filing
 the following date _____ and time _____

15. Contact and Signature Information:

a.	_____	_____
	Contact Name	Phone Number
b.	<u>Gary L. Syzolt</u>	<u>President, Dominion Natrium Holdings, Inc., as sole Member</u>
	Print or type name of signer	Title / Capacity of Signer
c.	<u><i>Gary L. Syzolt</i></u>	<u>12/18/12</u>
	Signature	Date

Delaware

PAGE 1

The First State

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY "BLUE RACER MIDSTREAM, LLC" IS DULY FORMED UNDER THE LAWS OF THE STATE OF DELAWARE AND IS IN GOOD STANDING AND HAS A LEGAL EXISTENCE SO FAR AS THE RECORDS OF THIS OFFICE SHOW, AS OF THE NINETEENTH DAY OF DECEMBER, A.D. 2012.

AND I DO HEREBY FURTHER CERTIFY THAT THE ANNUAL TAXES HAVE NOT BEEN ASSESSED TO DATE.

5245987 8300

121362169

You may verify this certificate online
at corp.delaware.gov/authver.shtml




Jeffrey W. Bullock, Secretary of State
AUTHENTICATION: 0082629

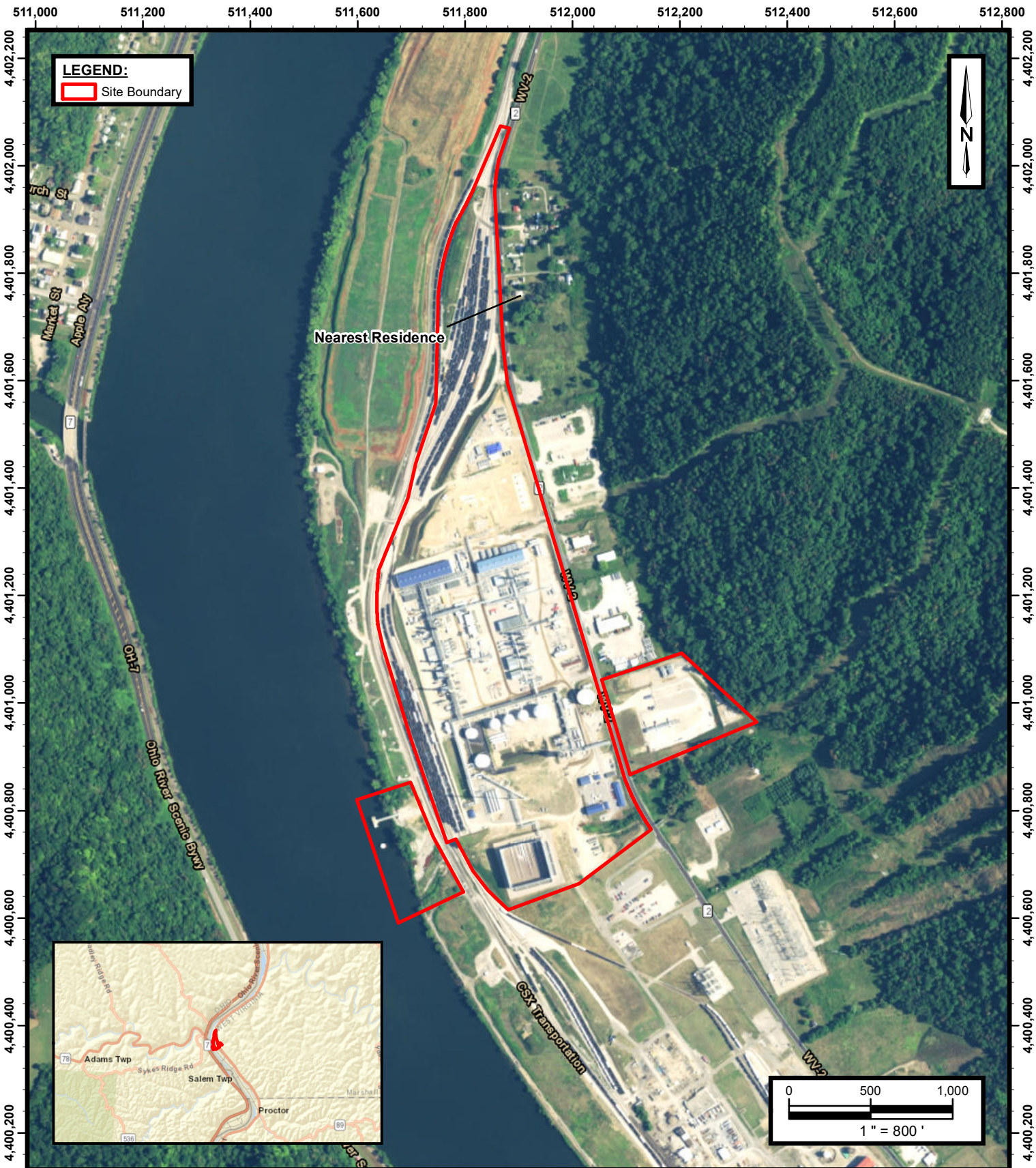
DATE: 12-19-12

ATTACHMENT B: MAPS

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC



Blue Racer Midstream, LLC
Natrium Extraction and Fractionation
Processing Plant
 January 2019
 Proctor, Marshall County, WV

Project No. 725010646036



Apex TITAN, Inc.
 12100 Ford Road, Suite 401
 Dallas, Texas 75234
 Phone: (469) 365-1100
www.apexcos.com
 A Subsidiary of Apex Companies, LLC

ATTACHMENT B-1

Area Map

Service Layer Credits:
 Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong),
 Esri Korea, Esri (Thailand), MapnyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid,
 IGN, IGP, swisstopo, and the GIS User Community
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ATTACHMENT C: INSTALLATION AND START-UP SCHEDULE

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

This permit application intends to revise and clarify emission representations on existing equipment, equipment under construction, and authorize new equipment to be constructed at the Plant. As a result, BRM understands that the updated emission limits will not become effective until the permit revision is issued. Construction of new equipment is intended to commence on November 1, 2018 or upon issuance of this permit, whichever comes later. Operation of new equipment is not expected to occur at least until April 1, 2019.

ATTACHMENT D: REGULATORY DISCUSSION

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

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ATTACHMENT D: REGULATORY DISCUSSION

This attachment discusses the federal and state regulations that apply to the Project and the existing Plant.

D.1. 45 CSR 2 and 2A: PM from Combustion of Fuel in Indirect Heat Exchangers

45 Code of State Rules (CSR) 2-3 limits opacity from fuel burning equipment to ten percent (10%) opacity, based on a six-minute block average, except during periods of startup, shutdown, or malfunction (SSM). At all times, including periods of SSM, BRM will, to the extent practicable, maintain and operate the Plant’s fuel burning unit(s) in a manner consistent with good air pollution control practices for minimizing emissions.

45 CSR 2-4 contains weight-based PM emissions standards for fuel burning units. According to 45 CSR 2-2, a fuel burning unit is defined as any furnace, boiler apparatus, device, mechanism, stack or structure used in the process of burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer. Fuel burning units with a heat input less than ten (10) MMBtu/hr are exempt from this rule. Process heaters, primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst, are not subject to this rule. Therefore, the regen gas heaters (EU#s S012, S024, S036, S044, and S048), glycol reboiler (EU# S029), and regen gas heater (EU# S040) are exempt from 45 CSR 2-4 since they meet the definition of process heaters. The Plant’s heaters are all type “b” units, as defined in the rule. For type “b” fuel burning units, the PM emission limit is the product of 0.09 and the total design heat input for such units in MMBtu/hr, not to exceed 600 pounds per hour (lb/hr) PM from all such units. The HMO heaters (EU#s S013, S026, S037, S041, S045, and S049), hot oil heaters (EU#s S001, S016, S017, S018, S019, S052, and S053), and stabilizer heater (EU# S056) at the Plant are subject to this rule. These units have allowable and potential PM emission rates as follows:

Emissions Unit ID	Maximum Heat Input (MMBtu/hr)	Allowable PM Emission Rate (lb/hr)	Potential PM Emission Rate (lb/hr)
S001	216.7	19.50	1.61
S013	26.3	2.37	0.19
S016	61.6	5.54	0.46
S017	61.6	5.54	0.46
S018	61.6	5.54	0.46
S019	61.6	5.54	0.46
S026	26.3	2.37	0.20
S037	26.3	2.37	0.20
S041	54.67	4.92	0.41
S045	26.3	2.37	0.20
S049	26.3	2.37	0.20
S052	61.6	5.54	0.46
S053	61.6	5.54	0.46
S056	10.09	0.91	0.08
Total		600	5.85

As shown in the above table, these units satisfy the requirements of this rule.

No other requirements of this rule apply to the Plant.

D.2. 45 CSR 4: Discharge of Air Pollutants that Cause Objectionable Odors

This rule prohibits the discharge of air contaminants that cause or contribute to an objectionable odor. This rule applies to the Plant, and BRM will continue to comply with this rule.

D.3. 45 CSR 6: Control of Air Pollution from Combustion of Refuse

This rule establishes emission standards for PM and requirements for activities involving incineration of refuse which are not subject to, or are exempted from, regulation under a federal counterpart for specific combustion sources. This rule also prohibits (with limited exception) open burning and sets forth the registration, permitting, reporting, testing, emergency, natural disaster and exemption provisions for activities involving the combustion of refuse and land clearing debris. This rule applies to the Plant. BRM will continue to comply with the open burning provisions of this rule.

This rule limits flare and vapor combustor's visible emissions to 20% opacity, except during periods aggregating to no more than eight (8) minutes in any sixty (60) minute period, during which opacity is limited to 40%. This rule also requires that flares and vapor combustors be permitted and tested upon agency request. BRM will continue to operate the ground flare EU# S004A and vapor combustor EU# V003 in accordance with this rule. The pigging flare EU# S034 only operates during propane pig trap operation, and is operated in accordance with this rule.

D.4. 45 CSR 7: To Prevent and Control Particulate Matter Air Pollution from Manufacturing Processes and Associated Operations

This rule establishes emission standards for PM and opacity from manufacturing processes. This rule does not apply to emissions regulated by 45 CSR 2, 3, or 5 or to sources that have a PTE less than one (1) lb/hr PM and an aggregate of less than one thousand (1,000) lb/yr for all such sources of PM located at the stationary source. Therefore, this rule does not apply to the Plant's fuel burning units, EU#s S001, S012, S013, S016, S017, S018, S019, S024, S026, S029, S036, S037, S040, S041, S044, S045, S048, S049, S052, S053, and S056 because they are regulated by 45 CSR 2. The remaining emissions sources at the Plant have negligible PM emission rates and/or are not manufacturing processes. Therefore, this rule does not apply.

D.5. 45 CSR 10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

This rule establishes weight-based emission standards for SO₂ from fuel burning units. Marshall County is listed as a Priority I region in Table 45-10A. The Plant's heaters are all type "b" units, as defined in the rule. For type "b" fuel burning units in a Priority I region, the SO₂ emission limit is the product of

3.1 and the total design heat inputs for such units in MMBtu/hr, with each stack not exceeding 25% of the total allowable emission rate for the site. All heaters at the Plant are fired on sweet natural gas, with an emission rate well below this limitation.

No other requirements of this rule apply to the Plant.

D.6. 45 CSR 13: Permits for Construction, Modification, Relocation and Operation of Stationary Sources, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, Permission to Commence Construction, and Procedures for Evaluation

This rule establishes the permitting requirements for minor sources. The Plant is currently permitted by Rule 13 Permit No. R13-2896E, in accordance with this rule. The Plant is a minor source relative to PSD permitting thresholds, and the Project-related emission increases are below the PSD major source thresholds, thus the Plant is subject to the minor source permitting requirements of this rule. Detailed emission rate calculations are included in Attachment N to this application.

D.7. 45 CSR 14: Permits for Construction and Major Modification of Major Stationary Sources for the Prevention of Significant Deterioration of Air Quality

The Plant is a minor source relative to PSD. The Project-related emission increases are below the PSD major source thresholds. Therefore, this rule is not applicable. According to 40 CFR §60.41b, a steam generating unit is defined as a device that combusts any fuel or byproduct/waste and produces steam or heats water or heats any heat transfer medium. This term does not include process heaters, which are defined as devices that are primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst. According to 40 CFR §52.21, a major stationary source includes fossil-fuel boilers (or combinations thereof) totaling more than 250 MMBtu/hr heat input. The Plant is not one of the named sources under 40 CFR §52.21. However, the Plant includes several heaters that meet the definition of steam generating units, that when combined, the total heat input exceeds 250 MMBtu/hr. These sources are considered “nested” sources within the Plant, which include hot oil heater EU#s S001, S016, S017, S018, S019, S052, and S053, cryo HMO heater EU#s S013, S026, S037, S041, S045, and S049, and stabilizer heater EU# S056. Process heaters (i.e. direct fire heaters) are not included as part of the nested sources since they do not employ a heat medium for heat transfer. Upon issuance of this permit, the total potential to emit associated with the Plant’s boilers (nested sources) will be considered an existing major source, and any subsequent projects will be evaluated against PSD significance thresholds. The following table summarizes the nested source status for all heaters at the Plant.

Emission Unit ID	Description	Maximum Heat Input (MMBtu/hr)	Boiler/Process Heater	Nested Source
S001	Hot Oil Heater	216.7	Boiler	Yes
S012	Regen Gas Heater	9.7	Process Heater	No
S013	Cryo HMO Heater	26.3	Boiler	Yes
S016	Hot Oil Heater	61.6	Boiler	Yes

Emission Unit ID	Description	Maximum Heat Input (MMBtu/hr)	Boiler/Process Heater	Nested Source
S017	Hot Oil Heater	61.6	Boiler	Yes
S018	Hot Oil Heater	61.6	Boiler	Yes
S019	Hot Oil Heater	61.6	Boiler	Yes
S024	Regen Gas Heater	9.7	Process Heater	No
S026	Cryo HMO Heater	26.3	Boiler	Yes
S029	Glycol Reboiler	3.0	Process Heater	No
S036	Regen Gas Heater	9.7	Process Heater	No
S037	Cryo HMO Heater	26.3	Boiler	Yes
S040	Regen Gas Heater	19.28	Process Heater	No
S041	Cryo HMO Heater	54.67	Boiler	Yes
S044	Regen Gas Heater	9.7	Process Heater	No
S045	Cryo HMO Heater	26.3	Boiler	Yes
S048	Regen Gas Heater	9.7	Process Heater	No
S049	Cryo HMO Heater	26.3	Boiler	Yes
S052	Hot Oil Heater	61.6	Boiler	Yes
S053	Hot Oil Heater	61.6	Boiler	Yes
S056	Stabilizer Heater	10.09	Boiler	Yes

D.8. 45 CSR 16: Standards of Performance for New Stationary Sources

This rule incorporates by reference the New Source Performance Standards (NSPS) codified in 40 CFR Part 60. The following sections address the NSPS applicable to the Plant, which include:

- NSPS Subpart A, General Provisions
- NSPS Subpart Db – Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units
- NSPS Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units
- NSPS Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984
- NSPS KKK – Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984 and on or Before August 23, 2011
- NSPS IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
- NSPS JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines
- NSPS OOOO – Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution for which Construction, Modification, or Reconstruction commenced after August 23, 2011, and on or before September 18, 2015
- NSPS OOOOa – Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction commenced after September 18, 2015

D.8.1. NSPS A

BRM must comply with the general provisions of Title 40, Code of Federal Regulations, Part 60 (40 CFR 60), Subpart A, which establish notification, recordkeeping, testing, monitoring, and reporting requirements for any and all sources subject to a particular NSPS.

D.8.2. NSPS Db

NSPS Db (40 CFR 60, Subpart Db - Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units) is applicable to steam generating units that commence construction, modification, or reconstruction after June 19, 1984, and that have a heat input capacity greater than 100 MMBtu/hr. According to 40 CFR §60.41b, a steam generating unit is defined as a device that combusts any fuel or byproduct/waste and produces steam or heats water or heats any heat transfer medium. This term does not include process heaters, which are defined as devices that are primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst. Hot oil heater EU# S001 is subject to the NO_x emission limitation of 0.1 lb/MMBtu because it fires natural gas, as defined in this rule. The heater complies with this requirement as demonstrated by the continuous emissions monitoring system.

The hot oil heater is exempt from the SO₂ limitations of this subpart because it fires natural gas, as defined in this rule, and has a PTE less than 0.32 lb/MMBtu SO₂.

BRM will demonstrate continuous compliance with NSPS Db by complying with the applicable monitoring, recordkeeping, and reporting requirements of this rule.

BRM complies with the fuel sulfur content requirements of this rule by implementing a fuel analysis plan that was submitted to WV DEP on August 31, 2015. Currently, fuel gas to the hot oil heater is sampled on a weekly basis for sulfur content. Data collected since the implementation of the plan demonstrates that the sulfur content of the natural gas fuel is consistently less than 4 parts per million (ppm) sulfur, with no spikes or any other indications that the sulfur content could increase suddenly. As a result, BRM petitions WV DEP to reduce the fuel sampling frequency to a quarterly frequency, per §60.49b(r)(2)(iv).

In addition, BRM currently complies with the requirement of §60.49b(d)(1) by recording the amount of fuel gas combusted by the hot oil heater on a daily basis. The hot oil heater is not expected to use fuels other than pipeline quality natural gas, and the fuel demand of the heater is not expected to change drastically from day to day. As a result, BRM proposes that, in the event that fuel measurement for any given day is not recorded (i.e. due to circumstances outside BRM's control), the daily fuel measurement shall be based on the average of the measurement recorded on the day immediately before the missing date and the measurement recorded on the day immediately afterwards. Since fuel consumption does not change drastically over short periods of time, this averaging method would provide an accurate representation of the fuel consumed by the heater.

D.8.3. NSPS Dc

NSPS Dc (40 CFR Part 60, Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units) outlines specific requirements for steam generating units built after June 9, 1989 with a heat duty between 10 MMBtu/hr and 100 MMBtu/hr. According to 40 CFR §60.41c, a steam generating unit is defined as a device that combusts any fuel or byproduct/waste and produces steam or heats water or heats any heat transfer medium. This term does not include process heaters, which are defined as devices that are primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst. Hot oil heaters, EU#s S016, S017, S018, S019, S052, and S053, HMO heaters EU#s S013, S026, S037, S041, S045, and S049, and stabilizer heater S056 at the Plant are subject to this rule. Because the heaters fire natural gas, they have no emissions standards, but they will continue to comply with the monitoring, recordkeeping, and reporting requirements of this subpart, as applicable.

Glycol reboiler EU# S029 and regen gas heaters EU#s S012, S024, S036, S044, and S048 are not subject to this rule since their fuel firing rates are below 10 MMBtu/hr and do not employ a heat transfer medium. Regen gas heater EU# S040 is not subject to this rule since it is a direct fire heater that does not use a heat medium for heat transfer.

D.8.4. NSPS Kb

NSPS Kb (40 CFR Part 60 Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984) outlines specific requirements for storage vessels containing volatile organic liquids. NSPS Kb is not applicable to pressurized storage vessels, or to storage vessels with a capacity less than 75 cubic meters (472 barrels).

The natural gasoline tanks, EU# S005, S023, TK-3802, TK-4802, TK-5802, and TK-6802, are subject to NSPS Kb. These tanks are equipped with a natural gas blanket to reduce VOC emissions. The tank emissions are vented to a closed vent system through a VRU for compression and then to the hot oil heater EU# S001 fuel supply. BRM will continue to comply with applicable monitoring, recordkeeping, and reporting requirements of NSPS Kb. Furthermore, the proposed refrigerated propane storage tank, EU# TK-7802, is subject to NSPS Kb. The refrigerated propane tank will be equipped with a VRU to recapture propane product that flashes-off from the storage tank, re-condense the product and route it back to the storage tank. Therefore, the propane storage tank will satisfy the requirements of this rule.

Slop oil storage tanks EU#s TK-906 and TK-2906, and produced water storage tank EU#s TK-907 and TK-2907 are not subject to the requirements of this rule since each tank's storage capacity is less than 1,589.874 m³ (10,000 bbl) and they store liquids prior to custody transfer. The gasoline dispensing tank EU# TK-L-1 has a storage capacity less than 75 m³ and is therefore not subject to the requirements of this rule.

D.8.5. NSPS KKK

NSPS KKK (40 CFR Part 60 Subpart KKK - Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants for which Construction, Reconstruction, or Modification commenced after January 20, 1984, and on or before August 23, 2011) applies to the fugitive components associated with cryo plant no. 1 (excluding demethanizer) and cryo plant no. 2 (EU# FUG AREA 1). BRM will continue to comply with the applicable requirements of NSPS KKK.

Fugitive components associated with the demethanizer on cryo plant no. 1 and fractionator no. 2 (EU# FUG AREA 2), and cryo train no. 3 (EU# FUG AREA 3) were constructed after the applicability dates of this rule, and thus are not subject to these requirements. The proposed cryo plant nos. 4, 5, 6 and 7 (EU#s FUG AREA 4, FUG AREA 5, FUG AREA 6 and FUG AREA 7) will be constructed after the applicability date of this rule, and thus are not subject to these requirements. Fractionator no. 1 has undergone a modification that triggers the monitoring requirements of NSPS OOOOa as of May 24, 2018, and thus, is no longer subject to this rule.

D.8.6. NSPS IIII

NSPS IIII (40 CFR Part 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines) outlines specific requirements for new or modified engines. According to 40 CFR §60.4200(a)(4), compression ignition internal combustion engines commencing construction after July 11, 2005 are subject to these standards. The existing emergency firewater pump engines, EU#s S002 and S003, are manufacturer-certified as compliant with NSPS IIII; therefore, they meet the requirements of NSPS IIII. BRM will continue to comply with the applicable monitoring, recordkeeping, and reporting requirements of NSPS IIII.

D.8.7. NSPS JJJJ

NSPS JJJJ (40 CFR Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines) affects owners and operators of stationary spark ignition internal combustion engines (SI ICE) that commence construction, reconstruction or modification after June 12, 2006. The proposed emergency generator engine(s) under EU# S057 at the Plant will be constructed after June 12, 2006. The emergency generator engine(s) are expected to provide electricity during periods of unavoidable loss of electric service and are expected to operate for no more than 100 hours per year for non-emergency situations. Therefore, the emergency generator engine(s) will comply with the requirements of NSPS JJJJ for emergency engines.

D.8.8. NSPS OOOO

NSPS OOOO (40 CFR Part 60 Subpart OOOO – Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution for which Construction, Modification or Reconstruction commenced after August 23, 2011, and on or before September 18, 2015) outlines requirements for well completions, pneumatic controllers, equipment leaks from natural gas processing plants, reciprocating

compressors, centrifugal compressors, sweetening units, and storage vessels which were constructed, modified or reconstructed after August 23, 2011 and on or before September 18, 2015.

Any pneumatic controllers installed at the Plant during the applicability dates of this rule will operate at a natural gas bleed rate of zero scfh.

The existing storage tanks (EU#s TK-906 and TK-907) at the Plant were constructed prior to the applicability dates of this rule, therefore, they are not subject to Subpart OOOO. The proposed storage tanks (EU#s TK-2906, TK-2907, TK-3802, TK-4802, TK-5802, TK-6802, and TK-7802) will be constructed after September 18, 2015 and thus are not subject to this rule.

BRM will comply with applicable requirements for reciprocating compressors subject to Subpart OOOO.

The existing FUG AREA 1 commenced construction prior to August 23, 2011, and, therefore, is not subject to this rule. The NGL fractionation unit 2 and demethanizer 1 (EU# FUG AREA 2) are subject to NSPS OOOO. The cryogenic plant associated with FUG AREA 3 commenced construction prior to September 18, 2015, and therefore, is subject to NSPS OOOO. The proposed cryogenic plants associated with EU#s FUG AREA 4, FUG AREA 5, FUG AREA 6, and FUG AREA 7 will commence construction after September 18, 2015 and are not subject to the requirements of this rule.

FUG AREA 2 and FUG AREA 3 are subject to the equipment leak standards for onshore natural gas processing plants. According to §60.5400 equipment leaks must comply with the requirements of §§60.482-1a(a), (b), and (d), 60.482-2a, and 60.482-4a through 60.482-11a, except as provided in §60.5401.

The ethane amine unit EU# S011 removes CO₂ and trace amounts of H₂S from the NGL stream. The requirements of NSPS OOOO do not apply to this amine unit since it does not process natural gas from natural gas wells. The proposed ethane amine unit EU# S054 will be constructed after September 18, 2015, and thus, is not subject to the requirements of this rule.

D.8.9. NSPS OOOOa

NSPS OOOOa (40 CFR Part 60 Subpart OOOOa – Standards of Performance for Crude Oil and Natural Gas Facilities for Which Construction, Modification or Reconstruction Commenced after September 18, 2015) outlines requirements for well completions, pneumatic controllers, equipment leaks from natural gas processing plants, reciprocating compressors, centrifugal compressors, sweetening units, and storage vessels which are constructed, modified or reconstructed after September 18, 2015.

Any pneumatic controllers installed at the Plant will operate at a natural gas bleed rate of zero scfh.

The existing storage tanks at the Plant (EU#s TK-906 and TK-907) were constructed prior to the applicability date of this rule, therefore, they are not subject to Subpart OOOOa. The proposed storage tank EU#s TK-2906 and TK-2907 potential emissions of VOC are less than 6 T/yr, and thus, are not subject to the requirements of this rule. The proposed natural gasoline tanks EU#s TK-3802, TK-4802,

TK-5802 and TK-6802, and the proposed refrigerated propane storage tank EU# TK-7802 are subject to the requirements of NSPS Kb and therefore are not subject to the requirements of this rule.

BRM will comply with applicable requirements for reciprocating compressors subject to Subpart OOOOa.

Equipment from FUG AREA 4, FUG AREA 5, FUG AREA 6 and FUG AREA 7 will be subject to the equipment leak monitoring requirements under this subpart. Additionally, fractionator no. 1 (frac 1) underwent an upgrade project that is considered a modification, in accordance with this rule. As a result, frac 1 became subject to the monitoring requirements of NSPS OOOOa as of May 24, 2018. BRM will comply with the fugitive monitoring requirements of this rule by complying with the requirements of §§60.482-1a(a), (b), and (d), 60.482-2a, and 60.482-4a through 60.482-11a, except as provided in §60.5401a.

The proposed ethane amine unit EU# S054 removes CO₂ and trace amounts of H₂S from the NGL stream. The requirements of NSPS OOOOa do not apply to this amine unit since it does not process natural gas from natural gas wells.

D.9. 45 CSR 17: To Prevent and Control PM Air Pollution from Materials Handling, Preparation, Storage, and Other Sources of Fugitive PM

BRM will continue to utilize dust control measures to prevent fugitive PM from being emitted beyond the property line. BRM will also continue to maintain the Plant roads in a manner consistent with this rule.

D.10. 45 CSR 19: Permits for Construction and Modifications in Nonattainment Areas

The Plant is located in the Franklin Tax District in Marshall County, West Virginia. In 2013, EPA designated this area as nonattainment for the 2010 primary SO₂ National Ambient Air Quality Standards (NAAQS). Therefore, the major source threshold for SO₂ is 100 T/yr. As shown in Attachment N – Emissions Calculations, the Plant’s potential to emit SO₂ is well below this threshold. Therefore, this rule does not apply.

D.11. 45 CSR 20: Good Engineering Practices as Applicable to Stack Heights

The Plant does not include any existing or proposed stacks that exceed the Good Engineering Practice height.

D.12. 45 CSR 22: Air Quality Management Fee Program

This rule contains fee structure information for permits to construct and operate. In accordance with 45CSR 22-3, BRM is submitting an application fee in accordance with Rule 13 air permit applications as follows:

- NSPS Source: \$ 1,000
- NESHAP Source: \$ 2,500

- Base Fee: \$ 1,000
 \$ 4,500

D.13. 45 CSR 30: Requirements for Operating Permits

As discussed in previous air permit applications, upon completion of construction of cryo plant no. 3, the Plant will be a major source of NO_x and CO with respect to Title V permitting thresholds. Currently, construction of cryogenic plant no. 3 is in progress and operations have not commenced. Upon review of existing equipment emission representations, BRM has determined that the existing equipment PTE for VOC exceeds the Title V permitting thresholds. BRM will submit a Title V permit application following submittal of this permit application.

D.14. 45 CSR 34: Emission Standards for Hazardous Air Pollutants

This rule incorporates by reference the National Emissions Standards for Hazardous Air Pollutants (NESHAP) codified in 40 CFR Part 61 and in 40 CFR Part 63 Maximum Achievable Control Technology (MACTs).

40 CFR Part 61 contains standards for various materials, including radon, beryllium, mercury, vinyl chloride, radionuclides, benzene, asbestos, and inorganic arsenic emissions from various types of sources. The Plant is not subject to any NESHAPs listed in 40 CFR Part 61.

40 CFR Part 63 contains MACT standards for various source categories and/or industries. The Plant is an area source of HAPs. The Project does not include the installation of any equipment subject to a MACT standard listed in 40 CFR Part 63. The following sections address the MACT standards that potentially apply to the existing Plant, including:

- MACT HH – National Emissions Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities
- MACT ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines
- MACT DDDDD – National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters
- MACT JJJJJ – National Emissions Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers at Area Sources

D.14.1. MACT HH

MACT HH (40 CFR Part 63 Subpart HH – National Emissions Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities) outlines specific requirements for major or area sources at oil and natural gas production facilities. As previously discussed, the Plant is located at an area source of HAPs. The glycol dehydration units EU#s S006 and S032 are triethylene glycol (TEG) dehydration units. Because each dehydration unit’s potential benzene emissions are less than 1 T/yr, the units are only

subject to recordkeeping requirements to demonstrate exemption from the control requirements of the rule.

D.14.2. MACT ZZZZ

MACT ZZZZ (40 CFR Part 63 Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines) outlines specific requirements for new or modified engines at major and area sources of HAPs. The emergency firewater pump engines, EU#s S002 and S003, are new compression ignition reciprocating internal combustion engines located at an area source of HAPs. Accordingly, these units will continue to meet the requirements of MACT ZZZZ by meeting NSPS IIII. The proposed emergency generator engines, EU# S057, are spark ignition reciprocating internal combustion engines located at an area source of HAPs, and will meet the requirements of MACT ZZZZ by meeting NSPS JJJJ.

D.14.3. MACT DDDDD

MACT DDDDD (40 CFR Part 63 Subpart DDDDD – National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters) outlines specific requirements for industrial, commercial, and institutional boilers and process heaters at major sources of HAPs. The Plant is not a major source of HAPs and is thus not subject to the requirements of this rule.

D.14.4. MACT JJJJJ

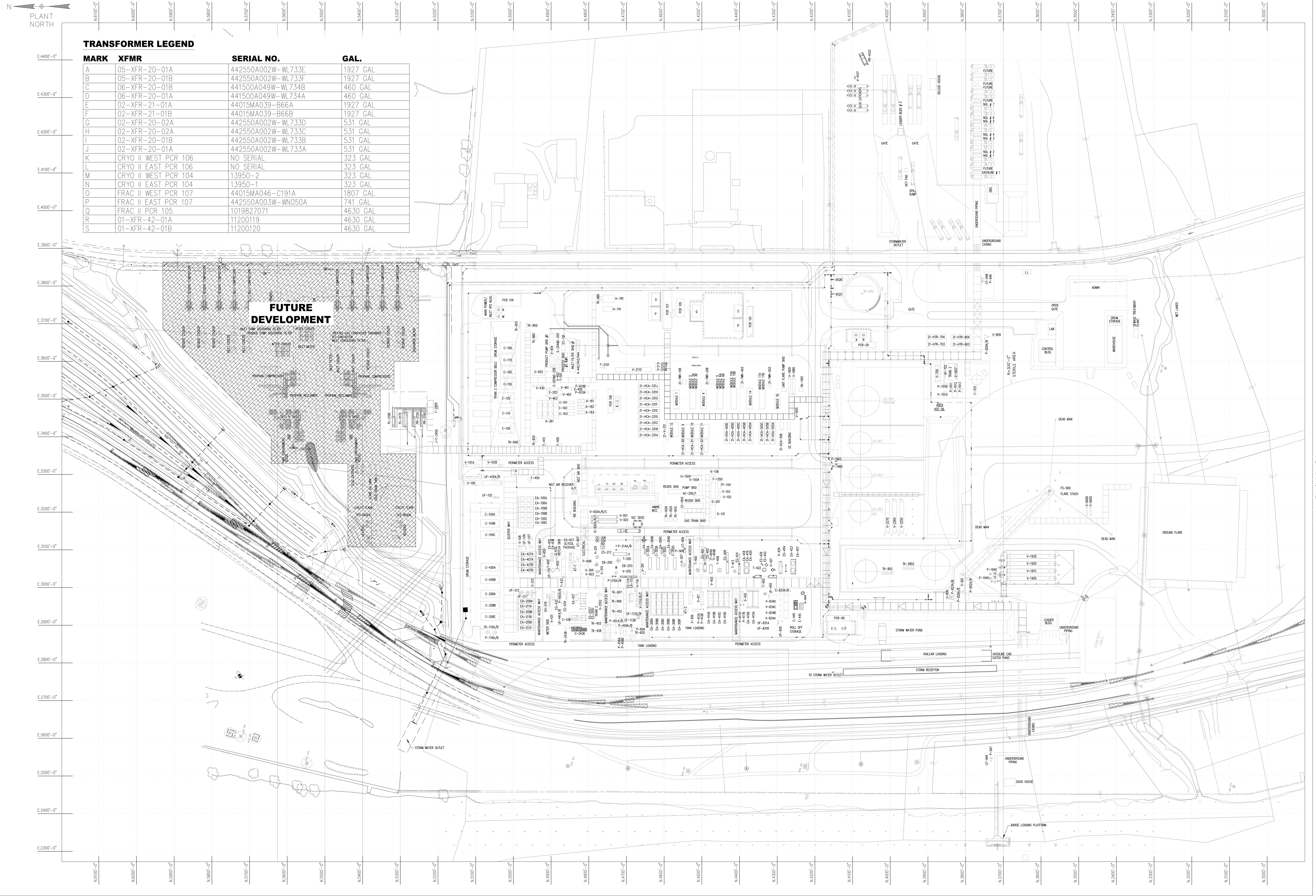
MACT JJJJJ (40 CFR Part 63 Subpart JJJJJ – National Emissions Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers at Area Sources) outlines requirements for boilers at area sources of HAPs. Per §63.11195(e), gas-fired boilers as defined by this subpart are not subject to the requirements of this rule. Therefore, the Plant's heaters are not subject to the requirements of this rule.

ATTACHMENT E: PLOT PLANS

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC



TRANSFORMER LEGEND

MARK	XFMR	SERIAL NO.	GAL.
A	05-XFR-20-01A	442550A002W-WL733E	1927 GAL
B	05-XFR-20-01B	442550A002W-WL733F	1927 GAL
C	06-XFR-20-01B	441500AD49W-WL734B	460 GAL
D	06-XFR-20-01A	441500AD49W-WL734A	460 GAL
F	02-XFR-21-01A	44015MA039-B66A	1927 GAL
F	02-XFR-21-01B	44015MA039-B66B	1927 GAL
G	02-XFR-20-02A	442550A002W-WL733D	531 GAL
H	02-XFR-20-02A	442550A002W-WL733C	531 GAL
J	02-XFR-20-01B	442550A002W-WL733B	531 GAL
J	02-XFR-20-01A	442550A002W-WL733A	531 GAL
K	CRYO II WEST PCR 106	NO SERIAL	323 GAL
L	CRYO II EAST PCR 106	NO SERIAL	323 GAL
M	CRYO II WEST PCR 104	13950-2	323 GAL
N	CRYO II EAST PCR 104	13950-1	323 GAL
O	FRAC II WEST PCR 107	44015MA046-C191A	1807 GAL
P	FRAC II EAST PCR 107	442550A003W-WN050A	741 GAL
Q	FRAC II PCR 105	1019827071	4630 GAL
R	01-XFR-42-01A	11200119	4630 GAL
S	01-XFR-42-01B	11200120	4630 GAL

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NOTES:

DWG. NO.	TITLE	NO.	DESCRIPTION

REFERENCE DRAWINGS

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REVISIONS

BY	DATE	CHK.	DATE	APPR.	DATE
CE	02/24/16	OK	02/24/16	OK	02/24/16



SITE PLAN
GENERAL LAYOUT SITE PLAN

DRAWN BY: C. EWING	CHECKED: G. KRUSE	APPROVED: G. KRUSE
CREATION DATE: 02/23/2016	CHECK DATE: 02/23/2016	APPR. DATE: 02/23/2016
DWG. No.: BRN-PP-2016		

SCALE: 1"=75'-0"

FILE LOCATION: **A**

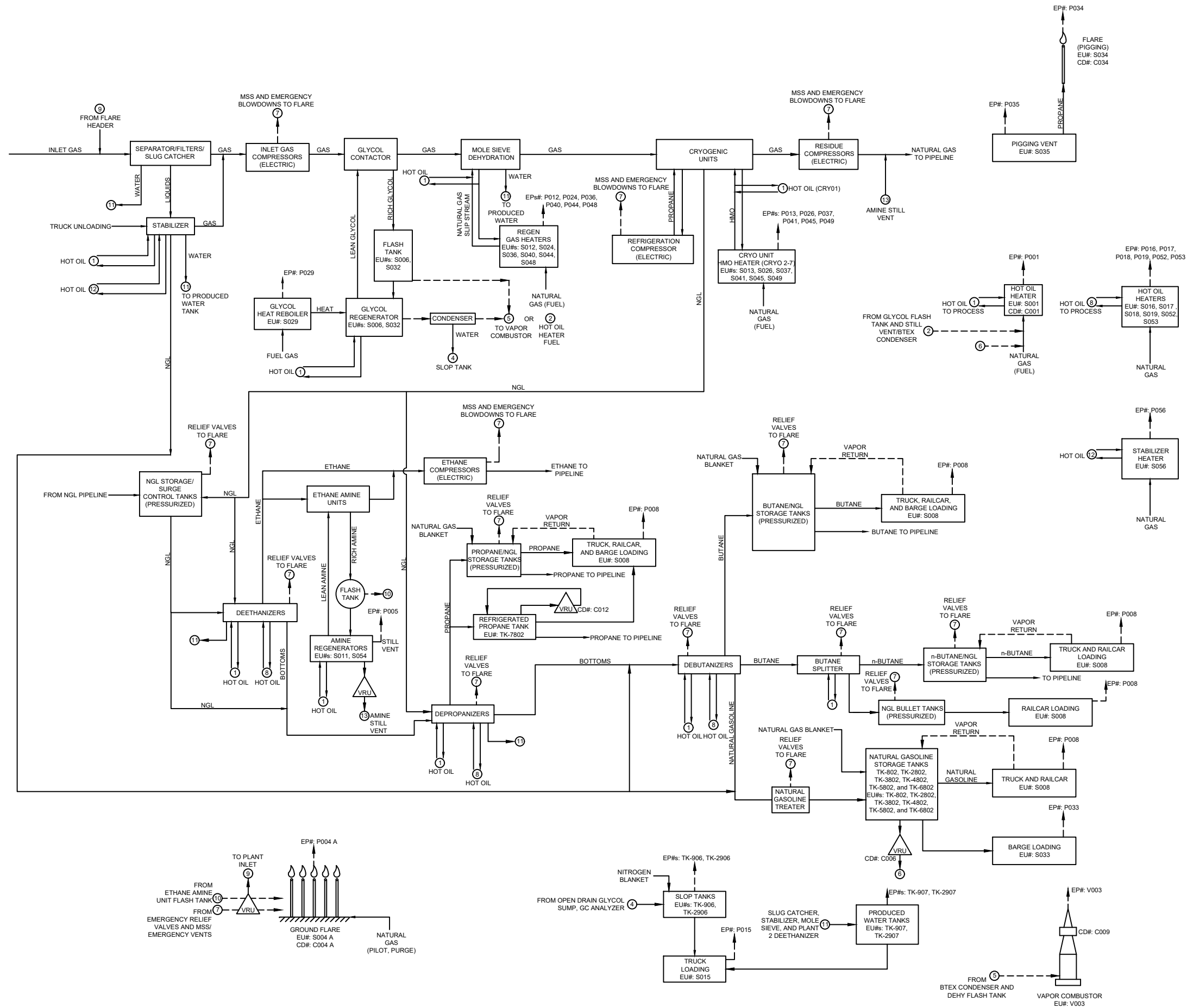
PLOT TIME/DATE: LAST SAVED: 02/26/16 By: Christina Lwng

ATTACHMENT F: DETAILED PROCESS FLOW DIAGRAM

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC



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 12100 Ford Road, Suite 401
 Dallas, Texas 75234
 Phone: (469) 365-1100
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 A Subsidiary of Apex Companies, LLC

Blue Racer Midstream, LLC
Natrium Extraction and Fractionation Processing Plant
January 2019
 Proctor, Marshall County, WV

Project No. 725010646036

ATTACHMENT F
PROCESS FLOW DIAGRAM

ATTACHMENT G: PROCESS DESCRIPTION

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

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ATTACHMENT G: PROCESS DESCRIPTION

The Natrium Extraction and Fractionation Processing Plant is an existing 690 MMscfd natural gas processing plant with NGL processing capability. The Plant will consist of seven (7) cryogenic plants (Cryo 1, Cryo 2, Cryo 3 (under construction), and proposed Cryo 4, Cryo 5, Cryo 6 and Cryo 7), each with a natural gas handling capacity of 230 MMscfd and Cryo 5 with a capacity of 345 MMscfd, and two (2) fractionation plants (Frac 1 and Frac 2). This Project will update emission representations for the two (2) existing cryogenic plants (Cryo 1 and Cryo 2) and the two (2) fractionation units (Frac 1 and Frac 2) based on as-built conditions, and authorize construction of four (4) additional cryogenic plants. Currently, the third cryogenic plant (Cryo 3) is under construction. Upon completion of the Project, the Plant's capacity will increase to a total of 1,725 MMscfd.

G.1. Inlet Gas/Liquids Separation and Liquids Handling

Gas from the pipeline passes through horizontal separators, or slug catchers, which separate entrained liquids from the inlet gas. In addition, liquids can be received via "pigging" operations. "Pigging" is an industry term to describe a pipeline maintenance activity, in which a solid slug, called a "pig" is inserted into the pipeline at a "pig launcher." As the pig travels through the pipeline with the natural gas, it pushes liquids that have collected in lower areas of the pipeline. The liquids and the pig that is pushing the liquids arrive at a "pig receiver" downstream of the "pig launcher." The liquids are routed into the slug catcher. During pigging operations, the pig trap is depressurized by routing the gas contents to the ground flare, with a minimal amount venting to atmosphere. As shown in Attachment N, pigging equipment operates in inlet gas, residue gas, propane, or condensate service. Pigging emissions in propane service are routed to a flare designated specifically for this operation.

The liquids are treated in the stabilizer (application of heat provided by the hot oil heater), where the lighter components are removed and combined with the separated inlet gas for processing. Heavier liquid components not driven off in the stabilization process are then routed to the fractionation plant for further processing or directly to natural gasoline storage if further processing is not required. Water separated from the NGL in the stabilizer is routed to the produced water tank, and hauled off site via trucks. Since the composition of the produced water is expected to be primarily water with minimal amounts of oil, the produced water tank vents to atmosphere.

NGL can be received at the Plant via pipeline and truck. Received NGL is stored in the pressurized NGL tanks prior to processing. The NGL unloading operations are performed under pressure, in order to prevent emissions to the atmosphere, with a minimal amount of VOCs released during disconnection of the loading line (EU# S055).

G.2. Natural Gas Processing

After liquids separation at the slug catcher, the inlet gas is compressed to increase pressure. The inlet compressors are electric-driven, such that they do not result in air emissions during normal operations (i.e., other than fugitive equipment piping leaks).

Each compressor is equipped with a blowdown vent through which a small amount of natural gas is emitted during shutdown (i.e., for decompression, which is required for safety purposes). These emissions are routed to the ground flare for combustion.

The ground flare will have one annual emission limit per pollutant, which will include normal operations and scheduled maintenance, startup, and shutdown (MSS) emissions (combustion of blowdown vent emissions).

After compression, the wet gas is transported to the triethylene glycol (TEG) dehydration system, which uses TEG to remove water from the gas. Cryo 1 and Cryo 2 share a single dehydration system with two contactors with a total capacity of 460 MMscfd, where the sweet gas comes into contact with glycol. The rich glycol (water saturated) solution is routed to a flash tank, where light-end VOCs flash-off from the solution. Flash gas generated by the flash tank are routed to the hot oil heater (EU# S001) as fuel, with a destruction efficiency of 98%. The rich glycol is then heated in the glycol regenerator to release water from the solution prior to being routed back into the dehydration process. Heat for the glycol regeneration process is provided by the hot oil heater (EU# S001). Emissions from the glycol regenerator still vent are also routed to the hot oil heater (EU# S001) as fuel, for 98% destruction efficiency. Cryo 3 will operate a 230 MMscfd dehydration unit, where emissions from the BTEX condenser and flash tank can be routed to a vapor combustor (EU# V003) for 98% destruction efficiency or to the hot oil heater (EU# S001) for combustion as fuel. Given the size of the heater, the waste gas contribution to the total fuel gas consumed by the heater is minimal. As a result, when waste gas is routed to the hot oil heater (EU# S001) as fuel, emissions from the dehydration units are considered negligible. BRM is permitting the Cryo 3 dehydration unit emissions assuming that all waste gas is routed to the vapor combustor on a continuous basis, to be conservative, but would like to keep the flexibility to route the waste gas to the hot oil heater (EU# S001) as fuel. The proposed cryo plants 4 through 7 will employ molecular sieve dehydration systems only.

From the TEG units, the gas is routed to the molecular sieve dehydration system, where the water content is reduced further. Heat from hot oil in Cryo 1 and natural gas-fired heaters in Cryo 2, Cryo 3, Cryo 4, Cryo 5, Cryo 6 and Cryo 7 are used to heat a small amount of natural gas that is slip-streamed from the dry gas line as needed to regenerate the beds. The wet gas is then routed back into the inlet process stream. The molecular sieve units do not have vents to atmosphere. Therefore, the only emissions from these units are associated with fugitive piping/equipment leaks and combustion-related emissions from the heaters.

After molecular sieve dehydration, the propane-cooled cryogenic units remove heavier components to produce NGL by cooling the stream and reducing the stream pressure. One cryogenic unit utilizes heat from the hot oil heater, and the remaining units have their own dedicated natural gas-fired heat medium oil (HMO) heaters. The natural gas leaving the cryogenic units is lean and dry (i.e., pipeline quality), and it is compressed via electric-driven residue gas compressors and shipped off site via pipeline.

The NGL can be transferred back to the NGL storage/surge tanks or directly into the deethanizers or depropanizers of the NGL fractionation plants. The only emissions from these cryogenic units are associated with fugitive piping/equipment leaks and the associated HMO heaters.

G.3. NGL Fractionation

NGL leaving the cryogenic units or received on site as raw material feed is fed to a series of trayed columns for separation into constituent product gases. At the bottom of each column is a reboiler that is heated by the hot oil systems. As the NGL stream enters a column in the middle, the reboiler vaporizes a portion of the feed to produce stripping vapors rising inside the column. This stripping vapor rises up through the column contacting down-flowing liquids, allowing for the fractionation of the liquids. Vapor leaving the top of the column enters a condenser where heat is removed by a cooling medium and the vapor condenses. Liquid is returned to the column as reflux to limit the loss of heavy components overhead. The product leaving the lower part of the column has the highest boiling point, whereas the hydrocarbon leaving the top of the column has the lowest boiling point.

The NGL fractionation plants include three deethanizers, two depropanizers, two debutanizers, and a butane splitter. This project will authorize two additional deethanizers.

Ethane product may be further treated in the ethane amine units before being compressed and shipped off site via pipeline.

In the ethane amine units (EU#s S011 and S054), amine contactors are used to remove CO₂ and trace amounts of H₂S from the ethane product stream. Small amounts of hydrocarbons may also be absorbed in this process as well. The saturated (rich) amine from the contactors enters a flash tank where gaseous vapors are flashed and routed to the ground flare. After the flash tank, the liquid stream (rich amine) is routed to an amine regenerator, where heat from the hot oil system vaporizes the remaining CO₂, H₂S and hydrocarbons from the rich amine stream. The lean amine is returned to the amine contactors for reuse. The waste gas from amine regenerator EU# S011 is vented to the atmosphere, and the waste gas from amine regenerator EU# S054 is captured by a vapor recovery unit (VRU) and routed to the Plant's discharge line. The amine unit vent streams are primarily (~97%) CO₂, with water and trace amounts (~0.5%) of hydrocarbons.

The remaining separated NGL streams (propane, butanes, and natural gasoline) are stored and shipped off-site via truck, railcar, pipeline, and/or barge. Propane product loads may be odorized during the loading process. All loading into railcars is pressurized with vapor return, in order to prevent emissions to atmosphere. All loading arms are purged with nitrogen prior to disconnection, preventing any emissions to atmosphere. Truck loading emissions, resulting from disconnection of the loading line, are vented to atmosphere, and expected to be minimal. Truck loading operations are performed under pressure to prevent emissions to atmosphere, with minimal VOC emissions resulting from disconnection of the loading line to the tanker trucks.

Vapors displaced during loading of natural gasoline into barges were sampled during several loading events to develop a site-specific emission factor.

The propane and butane tanks are pressurized and have natural gas blanket for vacuum protection. The refrigerated propane storage tank is an atmospheric fixed-roof tank equipped with a refrigeration system that maintains the propane product in liquid phase. Any vapors that flash-off from the propane product are captured by a VRU, condensed and routed back into the storage tank. The natural gasoline storage tanks are equipped with a natural gas blanket for vacuum protection. The emissions from these tanks are captured and compressed via VRU and routed to the hot oil heater fuel system.

G.4. Hot Oil System

The hot oil systems provide heat to the Plant processes. By using oil, the heat can be transferred to the Plant processes with a minimum loss of heat to the oil, allowing for a quicker recovery to the desired temperature in a closed-loop system. The hot oil system is a network of piping that circulates hot oil through each of the units and provides heat as needed.

The combustion of sweet natural gas in the heaters results in combustion-related emissions.

G.5. Natural Gas-Fired Engines

The Plant has natural gas-fired engines for back-up electricity generation during the unavoidable loss of electric service at the Plant. These engines are operated in nonemergency situations for less than 100 hr/yr for testing and maintenance to ensure reliability during emergency situations.

G.6. Diesel-Fired Engines

The Plant has two existing emergency diesel fire water pumps in case of fire. These engines are operated in nonemergency situations for less than 100 hr/yr for testing and maintenance to ensure reliability during emergency situations.

ATTACHMENT H: SAFETY DATA SHEETS

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

<u>SDS</u>	<u>Page</u>
Natural Gas Liquids	H-1
Natural Gas	H-11
Isobutane	H-19
N-Butane	H-28
Mixed Butane.....	H-36
Natural Gasoline	H-44
Propane (Odorized).....	H-54
Propane (Non-odorized).....	H-62
Triethylene Glycol	H-69
Representative Amine.....	H-79
Heat Medium Oil	H-87
Representative Lube Oils.....	H-97
Ethyl Mercaptan.....	H-119
Diesel Fuel Oil No. 2	H-132

SAFETY DATA SHEET



1. Identification

Product identifier Natural Gas Liquids
Other means of identification NGLs, Raw Product, Petroleum Hydrocarbons
Recommended Use Raw material for fuel production
Recommended restrictions None

Manufacturer / Importer / Supplier / Distributor information

Company Name / Address Blueracer Midstream, LLC
5949 Sherry Lane, Suite 1300, Dallas, TX 75225
Telephone 214-580-3700
Email www.blueracermidstream.com
Contact Person Safety Department
Emergency phone number 214-580-3700

2. Hazard(s) identification

Physical hazards

Flammable gas - **Category 1**
Gas under pressure - Liquefied Gas

Health hazards

Aspiration hazard – **Category 1**
Skin frostbite hazard
Asphyxiation hazard
Reproductive toxicity – **Category 2**
Narcotic effect by inhalation – **Category 2**
Specific target organ systemic toxicity – repeated exposure, **Category 2**, Nervous System
Specific target organ systemic toxicity – single exposure, **Category 3**, Central nervous system

Label Elements

Hazard symbol



Signal word

Danger

Hazard statement Extremely flammable liquid and gas
 May be fatal if swallowed and enters airways
 Can displace oxygen and lead to asphyxiation
 Corrosive to skin due to cold burns from liquid contact with skin
 Suspected of damaging fertility or the unborn child
 May cause drowsiness or dizziness
 May cause damage to organs (Nervous System) through prolonged or repeated exposure

Precautionary statement

Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands and contaminated skin thoroughly after handling. Wear protective gloves. Store locked up.

Response

If exposed or concerned: Get medical advice/attention. If on skin (or hair): Wash with plenty of water. Rinse skin with water/shower. If frostbite occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. In case of fire: Use foam, carbon dioxide, dry powder or water fog to extinguish.

Storage

Store locked up. Store in a well ventilated place. Keep cool. Keep container tightly closed.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

Environmental Hazards

Hazardous to the aquatic environment, chronic toxicity

3. Composition / information on ingredients

Substance

Hazardous Components Chemical Name	Common Name and Synonyms	CAS Number		%
Ethane		74-84-0	1-4	
Propane		74-98-6	1-50	
n-Butane		106-97-8	1-20	
Isobutane		75-28-5	1-11	
Isopentane	2-methyl butane	78-78-4	1-7	
Pentanes		109-66-0	1-4	
Hexane	n-hexane	110-54-3	1-6	
N-Pentane		-	1-6	

Composition comments

All concentrations are in percent by weight.

4. First-aid measures

Inhalation	Move victim to area of fresh air. For respiratory distress give air, oxygen or administer cardiopulmonary resuscitation if needed. Seek medical attention -- call 911 or emergency medical services.
Skin contact	Immediately flush skin with water for 15 minutes. Frozen tissue should be gradually warmed using warm water. Clothing frozen to the skin should be thawed before removal. Do not use hot water! Cryogenic burns may occur as evidenced by blistering. Protect affected area with dry gauze and get prompt medical attention.
Eye contact	Flush eyes gently with water for at least 15 minutes. If illness or adverse symptoms develop, seek medical attention.
Ingestion	Seek immediate medical attention due to ingestion and aspiration hazard (vapor inhalation due to ingested liquid).
Most important symptoms/ effects, acute and delayed	Acute: Asphyxiation hazard, headache, drowsiness, dizziness, loss of coordination, frostbite, disorientation and fatigue. Delayed: Dry skin and irritation after repeated or prolonged exposure.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	First aid personnel must be aware of own risk during rescue.

5. Firefighting measures

Suitable extinguishing media	Dry chemical powder, foam, or CO ₂
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.
Specific hazards arising from the chemical	The product is extremely flammable, and explosive vapor/air mixtures may be formed even at normal room temperatures. Vapors are heavier than air and may travel along the ground to some distant source of ignition and flash back. Liquid petroleum gases will vaporize rapidly at well below ambient temperatures and readily forms flammable mixtures with air. Flames impinging on product storage vessels above the liquid level will cause sudden vessel failure, resulting in a BLEVE (Boiling Liquid Expanding Vapor Explosion), unless the vessel surfaces are kept cooled with water. If this cannot be done, evacuate the area.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in fire-fighting situations.
Firefighting equipment/instructions	Evacuate area of all unnecessary personnel. Shut off product source and allow fire to burn itself out. Use water fog or spray to cool exposed containers and equipment to prevent overheating, flashbacks or explosions. Firefighters directly addressing the fire must use proper protective equipment include breathing apparatus to protect against hazardous combustion products and/or oxygen deficiencies.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	<p>All non-essential personnel should be evacuated. Stay upwind. Ventilate enclosed areas to prevent formation of flammable or oxygen-deficient atmospheres. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Liquid spills will vaporize rapidly and produce vapor cloud. Be alert for latent pooling of liquid portion. Because vapors are heavier than air they will not readily disperse. Avoid vapor cloud even with proper respiratory equipment.</p> <p>Avoid contact with skin. Wear suitable protective clothing, gloves and eye/face protection. For personal protection, see section 8 of the SDS.</p> <p>In the event of a large spill, self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.</p>
Methods and materials for containment and cleaning up	<p>Stop the flow of material, if this is without risk. Dike far ahead of spill for later disposal. Remove sources of ignition. Beware of the explosion danger.</p> <p>Small Spills: Absorb spillage with non-combustible, absorbent material.</p> <p>Large Spills: Remove with vacuum trucks or pump to storage/salvage vessels. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Ensure that waste and contaminated materials are collected and removed from the work area as soon as possible in a suitably labeled container. Wash area with soap and water. If necessary dike the product with dry earth, sand or similar non-combustible materials.</p>

Environmental precautions

Prevent spreading over a wide area (e.g. by containment or oil barriers). Do not contaminate water. Contact local authorities in case of spillage to drain/aquatic environment.

7. Handling and storage

Precautions for safe handling

Access to work area should be restricted to people handling the product only. Should be handled in closed systems, if possible. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Use self-contained breathing apparatus (SCBA) in release situations where exposure concentration is unknown or cannot be controlled.

Use explosion-proof equipment and non-sparking tools in areas where explosive vapors may form. Electrostatic charge may accumulate and create a hazardous condition when handling or processing. Electrically ground and bond shipping container, transfer line and receiving container. Refer to NFPA-70 and/or API RP2003 for specific bonding/grounding requirements. Material may be at elevated temperatures and/or pressures. Exercise care when opening tank hatches, sampling ports and/or bleeder valves.

Extremely flammable. May vaporize easily at ambient temperatures. Vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open containers slowly to relieve pressure. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29 CFR 1910.146 (OSHA Confined Space Entry Standard). Do not wear contaminated clothing or shoes. Keep contaminated clothing away from ignition sources.

Conditions for safe storage, including any incompatibilities

Keep containers tightly closed. Keep away from heat, open flames, or other sources of ignition. No smoking or open lighting. Outside or detached storage is preferred. Keep away from oxidizers, e.g. chlorine, oxygen, bleaches, fertilizers.

Empty containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, or other sources of ignition.

They may explode and cause injury or death. Empty containers should be completely drained and properly close prior to disposal or sent for reconditioning. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations

8. Exposure controls / personal protection

Occupational exposure limits

U.S. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

<u>Components</u>	<u>Type</u>	<u>Value</u>
Propane	PEL	1000 ppm (1800 mg/m ³)
Pentanes	PEL	1000 ppm (2950 mg/m ³)
Hexane	PEL	500 ppm (1800 mg/m ³)

U.S. OSHA Table Z-2 Limits for Air Contaminants (29 CFR 1910.1000)

None

U.S. ACGIH Threshold Limit Values

Ethane	Asphyxiation hazard (Appendix F)	
Propane	Asphyxiation hazard (Appendix F)	
n-Butane	TLV-STEL	1000 ppm (2370 mg/m ³)
Isobutane	TLV-STEL	1000 ppm (2370 mg/m ³)
Isopentane	TLV-TWA	1000 ppm (2950 mg/m ³)
Pentanes	TLV-TWA	1000 ppm (2950 mg/m ³)
Hexane	TLV-TWA (skin)	50 ppm (176 mg/m ³)

U.S. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Ethane	REL-TWA	1000 ppm (1800 mg/m ³)
n-Butane	REL-TWA	800 (1900 mg/m ³)
Isobutane	REL	800 ppm (1900 mg/m ³)
Isopentane	See Pentanes	120 ppm (350 mg/m ³)
Pentanes	REL-TWA	610 ppm (1800 mg/m ³)
n-Hexane	REL-TWA	50 ppm (180 mg/m ³)

Biological limit values:

U.S. ACGIH.BEIs. Biological Exposure Indices (2016 Edition)

Components	Type	Value
Hexane	2,5-Hexanedion in urine, end of shift and end of work week	04. mg/l

Exposure guidelines:

U.S. ACGIH (2016 Edition)

Hexane Can be absorbed through the skin.

U.S. California Code of Regulations, Title 8, Section 5155, Airborne Contaminants

Hexane Can be absorbed through the skin.

Appropriate engineering controls

Observe occupational exposure limits and minimize the risk of inhalation of vapors. Provide easy access to water supply and eye wash facilities. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear goggles / face shield.

Skin protection / Hand protection Wear protective gloves. Nitrile gloves are recommended but be aware that the liquid may penetrate the gloves. Frequent change is advisable. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Suitable gloves can be recommended by the glove supplier.

Respiratory protection Protection suit must be worn. Anti-static and flame-retardant protective clothing is recommended.

In case of inadequate ventilation, use air supplied full mask. See advice from local supervisor.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General Hygiene Considerations

When using, do not eat, drink or smoke. Wash hands after handling. Launder contaminated clothing before reuse. Private clothes and working clothes should be kept separately. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical properties

Appearance

Physical state Liquid

Form Liquid

Color Colorless to straw colored

Odor Petroleum

Odor threshold Not available

PH Not available

Melting point / freezing point	Not available
Initial boiling point and boiling range	Not Available
Flash point	-100 °F (-73 °C) estimated
Evaporation rate	Moderately fast
Flammability (solid, gas)	Flammable

Upper / lower flammability or explosive limits

Flammability limit – lower	2.0
Flammability limit – upper	2.9
Vapor pressure	Not established
Vapor density	>1 (Air=1)
Relative density	<1
Solubility (ies)	Negligible
Partition coefficient	
Auto-ignition temperature	882 °F (472 °C) estimated
Decomposition temperature	Not available
Viscosity	Not available

Other Information

Bulk density	Not applicable
Explosive properties	Not explosive
Oxidizing properties	Not oxidizing

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable at normal conditions
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Heat, sparks, flames, elevated temperatures. Contact with incompatible materials.
Incompatible materials	Oxygen. Strong oxidizing agents.
Hazardous decomposition products	Carbon oxides and various hydrocarbons

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not a likely route of exposure. Aspiration hazard. May be fatal if swallowed and enters airways.
Inhalation	At high concentrations a simple asphyxiant. May produce nausea, diarrhea, loss of appetite, dizziness, disorientation, headache, excitation, rapid respiration, drowsiness, labored breathing, anesthesia and other central nervous system effects. May cause lung paralysis and asphyxiation. Extreme overexposure may cause unconsciousness and respiratory arrest.
Skin contact	May cause slight irritation. Extreme exposure may produce discoloration, muscle weakness, breathing difficulties and other central nervous system effects. Direct contact may cause frostbite.

Eye contact

Symptoms related to the physical, chemical and toxicological characteristics

May cause irritation including pain, blurred vision, redness, tearing and superficial corneal turbidity. Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Dry skin and possible irritation with repeated or prolonged exposure.

Acute toxicity

Human evidence indicates that the product has very low acute oral, dermal or inhalation toxicity.

However, it can produce severe injury if taken into the lung as a liquid, and there may be profound central nervous system depression following prolonged exposure to high levels of vapor.

Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Breathing of high concentrations may cause dizziness,

Light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness. Irritant effect on skin. May irritate and cause stomach pain, vomiting, diarrhea and nausea.

<u>Components</u>	<u>Species</u>	<u>Test Results</u>
Pentane Acute inhalation LC50	Rat	364 mg/l, 4 hours
Propane Acute inhalation LC50	Rat	>1442.847 mg/l, 15 minutes
Butane Acute inhalation LC50	Rat	658 mg/l, 4 hours
n-hexane	Rat	627,000 mg/m ³ , 3 minute

Skin corrosion/irritation

Causes skin irritation. Pre-existing skin conditions including dermatitis might be aggravated by exposure to this product.

Serious eye damage/eye irritation

May cause eye irritation on direct contact

Respiratory sensitization

Not a respiratory sensitizer

Skin sensitization

Not a skin sensitizer

Germ cell mutagenicity

May cause genetic defects

Carcinogenicity – Not Classified

IARC Monographs. Overall Evaluation of Carcinogenicity - No ingredients listed.

NTP Report on Carcinogens - No ingredients listed.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) - None

Reproductive toxicity

Some evidence of adverse effects on sexual function and fertility and/or on development based on animal experiments.

Specific target organ toxicity - single exposure

May cause drowsiness or dizziness. Aspiration hazard. Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious.

Specific target organ toxicity - repeated exposure

Repeated exposure can lead to central nervous system effects related to peripheral neuropathy (damage to or disease affecting nerve function, which may impair sensation, movement, gland or organ function, etc., depending on nerve types affected).

Chronic effects

Prolonged or repeated contact with skin may cause redness, itching, irritation, eczema/chapping and oil acne. Peripheral Neuropathy may occur.

Further Information

Components of the product may be absorbed into the body through the skin to elicit health effects in addition to exposure through inhalation.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Species	Test Results
Ethane 96 hour LC50 ¹	Fish (unknown species)	27.98 – 147.54 mg/L
Propane 96 hour LC50 ¹	Fish (unknown species)	27.98 – 147.54 mg/L
Butane 96 hour LC50 ¹	Fish (unknown species)	27.98 – 147.54 mg/L
Isobutane 96 hour LC50 ¹	Fish (unknown species)	34.05 mg/L
Isopentane 96 hour LC50	Oncorhynchus mykiss	4.26 mg/L
Pentane 96 hour LC50	Oryzias latipes	> 1000 mg/L

¹The value estimated is greater than the solubility of the substance in water; therefore, the value is only of academic interest. Source: US Environmental Protection Agency's (2008) Office of Pollution Prevention and Toxics and Syracuse Research Corporation (SRC).

Persistence and degradability

Expected to be inherently biodegradable.

Bioaccumulative and persistence potential

The substances in this mixture are biodegradable and unlikely to persist in the environment.

Partition coefficient n-octanol / water (log Kow)

Propane	2.36
Pentane	3.39
Isobutane	2.76
Hexane	3.90

Mobility in soil

The product has a low potential of being absorbed in the soil.

Mobility in general

The product is insoluble in water. It will spread on the water surface while some of the components will eventually sediment in water systems. The volatile components of the product will spread in the atmosphere.

Other adverse effects

The product contains volatile organic compounds which have a photochemical ozone creation potential. Oil spills are generally hazardous to the environment.

13. Disposal considerations

Disposal instructions

Dispose in accordance with all applicable regulations. This material and/or its container must be disposed of as hazardous waste.

Local disposal regulations

Dispose of in accordance with local regulations.

Hazardous waste code

D001 (Ignitability characteristics)

Waste from residues / unused products

The transportation, storage, treatment and disposal of RCRA waste material must be conducted in compliance with 40 CFR 262, 263, 264, 268, and 270. Disposal can occur only in properly permitted facilities. Check state regulations. Chemical additions, processing or otherwise altering this material may make the waste management information presented in this SDS incomplete, inaccurate or otherwise inappropriate. Disposal of this material must be conducted in compliance with all federal, state and local regulations.

14. Transportation

DOT

UN number	UN1075
UN proper shipping name	Petroleum gases, liquefied or liquefied petroleum gas
Commodity Description / Technical Name	
Hazard class	2.1
Subsidiary class	
Packing group	None
Special precautions for user	Not available
Labels required	Flammable gas (2.1)
Special provision	T50, N95
Packaging exceptions	173.306
Packaging non bulk	173.304
Packaging bulk	173.314, 173.315
ERG number	115

Special precautions for user
Transport in bulk according
to Annex II of MARPOL
73/78 and the IBC Code

Not available

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200 (OSHA) and 8 CCR § 5194 (Cal/OSHA).
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpart D) Not regulated

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) None

CERCLA Hazardous Substance List (40 CFR 302.4) n-Hexane 5000 lbs

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard – Yes
Delayed Hazard – Yes
Fire Hazard – Yes
Pressure Hazard – Yes
Reactivity Hazard - No

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical Yes

SARA Section 313 This material contains the following chemical subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372: n-Hexane

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Hexane (CAS 110-54-3)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Propane (CAS) 10,000 lbs
Butane (CAS) 10,000 lbs
Isobutane (CAS) 10,000 lbs
Isopentane (CAS 78-28-4) 10,000 lbs
Pentane (CAS 109-66-0) 10,000 lbs

Safe Drinking Water Act (SDWA) – No constituents on the List of Contaminants

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

None

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

None

Food and Drug Administration (FDA) – Not regulated

DEA Exempt Chemical Mixtures Code Number - None Food and Drug Administration. (FDA) Not regulated.

16. Other information, including date of preparation or last version

NFPA Ratings:

NFPA health hazard : 3 – Can cause serious or permanent injury

NFPA fire hazard : 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

HMIS III Rating:

Health : **3** - Major injury likely unless prompt action is taken and medical treatment is given.

Flammability : **4** - Flammable gases, or very volatile flammable liquids with flash points below 73 °F (23 °C), and boiling points below 100 °F (38 °C). Materials may ignite spontaneously with air

Physical : **0** - Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives

References

IARC Monographs. Overall Evaluation of Carcinogenicity (Volumes 1-102) Registry of Toxic Effects of Chemical Substances (RTECS)
National Library of Medicine, Wisser Database
ECHA Registered Substances
ACGIH TLVs and BEIs, 2016 Edition
NIOSH Pocket Guide to Chemical Hazards
EU Regulation 1272/2008
29 CFR 1910.1200

SDS Version History

Most recent version date: February 16, 2017
Previous version date: September 24, 2013

Disclaimer

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

SAFETY DATA SHEET



1. Identification

Product identifier NATURAL GAS

Other means of identification

Product code 8006-14-2

Recommended use Residential and Commercial applications.

Recommended restrictions None known.

Manufacturer / Importer / Supplier / Distributor information

Company name Blueracer Midstream, LLC

Address 5949 Sherry Lane, Suite 1300, Dallas, TX 75225

Telephone 214-580-3700

E-mail www.blueracermidstream.com

Contact person Safety Department


Emergency phone number 214-580-3700

2. Hazard(s) identification

Physical hazards Flammable gases, Gases under pressure – **Category 1**

Health hazards Skin corrosion (cold burns)
Specific target organ systemic toxicity (Respiratory and Central Nervous Systems)
– single exposure - **Category 2**
Simple asphyxiant

Label elements

Hazard symbols 

Signal word Danger

Hazard statement Extremely flammable gas
May displace oxygen and cause rapid suffocation
May cause damage to the central nervous and respiratory systems
Gasses rapidly escaping from a cylinder may be very cold and cause frostbite. Severe frostbite can lead to serious permanent skin damage

Precautionary statement

Prevention Contains gas under pressure; may explode if heated. Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Response Leaking gas fire: Do not extinguish unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage Protect from sunlight. Store in a well-ventilated place.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

3. Composition/information on ingredients

Mixture

Hazardous components	Common name and Synonyms	CAS number	%
Methane		74-82-8	70-99
Ethane		74-84-0	1-12
Carbon dioxide		124-38-9	0-6
Helium		7440-59-7	0-6
Nitrogen		7727-37-9	0-6
Propane		74-98-6	0-5

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation Move injured person into fresh air and keep person calm under observation. If breathing is difficult, give oxygen. Get medical attention if any discomfort continues.

Skin contact Frostbite: Do not remove clothes, but flush with copious amounts of lukewarm water. Call an ambulance and continue to flush during transportation to hospital.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.

Ingestion This material is a gas under normal atmospheric conditions and ingestion is unlikely.

Most important symptoms/effects, acute and delayed Suffocation, Narcosis. Behavioral Changes. Decrease in motor functions.

Indication of immediate medical attention and special treatment needed Treat symptomatically

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Extinguish with foam, carbon dioxide, dry powder or water fog.

Unsuitable extinguishing media None

Specific hazards arising from the chemical Cylinders can burst violently when heated, due to excess pressure build-up. Gas may travel considerable distance to a source of ignition and flash back. Gases may form explosive mixtures with air. Fire or high temperatures create: Carbon monoxide, Carbon oxides, Sulfur oxides.

Special protective equipment and precautions for firefighters Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with full face-piece operated in positive pressure mode. Use approved gas detection equipment in confined spaces.

Fire-fighting equipment/instructions Evacuate area. Remove pressurized gas cylinders from the immediate vicinity. Cool containers exposed to flames with water until well after the fire is out. Close the valve if no risk is involved. Do not extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and there is no danger to surrounding area allow the fire to burn out. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Stay upwind. Keep unnecessary personnel away. No action shall be taken involving any personal risk or without suitable training. Ventilate closed spaces before entering. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). For large gas releases, notify persons down wind of the release while isolating the immediate release area and keep unauthorized personnel out. Wear suitable protective clothing, gloves and eye/face protection. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up Ventilate well, stop flow of gas or liquid if possible. Remove ignition sources. Do not allow chemical to enter confined spaces such as sewers due to explosion risk. Sewers designed to preclude formation of explosive concentrations of vapor may be permitted.

Environmental precautions Stop leak if possible. Sewers must be covered and basements and workpits evacuated.

7. Handling and storage

Precautions for safe handling Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, and flammability. Provide adequate ventilation. Avoid contact with eyes, skin, and clothing. Material may deplete oxygen from the air to dangerously low levels. Avoid breathing gas. Wear appropriate personal protective equipment. The product is extremely flammable and may form explosive mixtures with air. Avoid heat, sparks, open flames and other ignition sources. Ground container and transfer equipment to eliminate static electric sparks. Use of explosion proof equipment is recommended and may be required (see appropriate fire codes. Refer to NFPA-70 and/or API RP2003 for specific bonding/grounding requirements). Do not enter confined spaces such as tanks or pits where gas may be stored or may accumulate without following proper entry procedures such as ASTM D-4276, and OSHA 1910.146. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities Store material in flammable compressed gas storage. Keep away from heat, sparks and open flame. Keep in a cool, well-ventilated place. Store material away from incompatible materials.

Empty containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze solder, drill, grind or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. Gas cylinders should be stored outdoors or in well ventilated storerooms at no lower than ground level and should be quickly removable in an emergency.

8. Exposure controls/personal protection

Occupational exposure limits

U.S. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Propane	PEL	1000 ppm (1800 mg/m ³)
U.S. ACGIH Threshold Limit Value		

Components	Type	Value
Butane (CAS 106-97-8)	STEL	1000 ppm (2370 mg/m ³)
Carbon Dioxide (CAS 124-38-9)	TWA	5000 pm (9000 mg/m ³)

U.S. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Butane (CAS 106-97-8)	REL	800 ppm (1900 mg/m ³)
Carbon Dioxide (CAS 124-38-9)	REL	5000 ppm (9000 mg/m ³)
Propane (CAS 74-98-6)	REL-STEL REL	30000 ppm (54000 mg/m ³) 1000 ppm (1800 mg/m ³)

Biological limit values	No biological exposure limits noted for the ingredient(s).
Exposure guidelines	No exposure standards allocated.
Appropriate engineering controls	Observe Occupational Exposure Limits and minimize the risk of inhalation. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment:

Eye/face protection	Risk of contact: Wear goggles/face shield.
Skin protection	
Hand protection	Risk of contact: Wear cold insulating gloves. Suitable gloves can be recommended by the glove supplier.
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation, use SCBA. Seek advice from local supervisor. A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant use of respiratory protection.

General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice.
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9. Physical and chemical properties

Appearance	Colorless gas
Physical state	Gas
Form	Gas Color Colorless
Odor	Odorless without odorant
Odor threshold	Not available
pH	Not applicable
Melting point/ freezing point	Not available
Initial boiling point and boiling range	-259 °F (-161.7 °C)
Flash point	Not available
Evaporation rate	Not available
Flammability (solid, gas)	Extremely flammable gas

Upper/lower flammability or explosive limits

Flammability limit – lower(%)	4.5 %
Flammability limit – upper(%)	15 %
Vapor Pressure	Not applicable
Vapor Density	
Relative Density	Not available
Solubility	Not available
Partition coefficient (in-octanol/water)	Not available
Auto-ignition temperature	1050-1150°F (565.56 – 621.11°C)
Decomposition temperature	Not applicable
Viscosity	Not applicable

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of storage and transport.
Chemical stability	Stable under normal temperature conditions and recommended use.
Possibility of hazardous reactions	Polymerization will not occur.
Conditions to avoid	Heat, sparks, flames, elevated temperatures. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.
Incompatible materials	Oxidizing agents.
Hazardous decomposition products	Carbon oxides, and nitrogen oxides.

11. Toxicological information

Information on likely routes of exposure

Ingestion	This material is a gas under normal atmospheric conditions and ingestion is unlikely.
Inhalation	High concentrations: Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. In high concentrations, vapors are narcotic and may cause headache, fatigue, dizziness and nausea.
Skin contact	Contact with pressurized containers rapidly releasing gas can become extremely cold and may cause damage (frostbite) due to rapid evaporative cooling.
Eye contact	Contact with pressurized containers rapidly releasing gas can become extremely cold and may cause damage (frostbite) due to rapid evaporative cooling.
Symptoms related to the physical, chemical and toxicological characteristics	Exposure to rapidly expanding gas may cause frostbite ("cold burn"). Contact with evaporating liquid may cause frostbite or freezing of skin. Narcosis. Behavioral changes. Decrease in motor functions. Eyes. Skin. Central nervous system.

Information on toxicological effects

Acute toxicity	Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").
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Components	Species	Test Results
Butane (CAS 106-97-8)		
Acute Inhalation LC50	Rat	658 mg/l, 4 Hours
Methane (CAS 74-82-8)		
Acute Inhalation LC50	Mouse	326 mg/m3, 2 hours
Propane (CAS 74-98-6)		
Acute Inhalation LC50	Rat	> 1442.847 mg/l, 15 Minutes
Skin corrosion/irritation	Not classified.	

Serious eye damage/eye	Not classified.
Respiratory sensitization	Not classified.
Skin sensitization	Not a skin sensitizer.
Germ cell mutagenicity	Not classified.
Carcinogenicity	Not classified.
Reproductive toxicity	Not classified.
Specific target organ toxicity - single exposure	Central Nervous and Respiratory System - May cause drowsiness or dizziness.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not classified.
Chronic effects	Not classified.

12. Ecological information

Ecotoxicity	Not expected to be harmful to aquatic organisms.
Persistence and degradability	Not available.
Bioaccumulative potential	

Partition coefficient n-octanol / water (log Kow)	
Nitrogen	0.67
Methane	1.09
Ethane	1.81
Propane	2.36
Butane	2.89

Mobility in soil	Not relevant, due to the form of the product.
Mobility in general	The product is a volatile substance, which may spread in the atmosphere.
Other adverse effects	The product is a volatile organic compound which has a photochemical ozone creation potential.

13. Disposal considerations

Disposal instructions	Dispose in accordance with all applicable regulations. Return the empty cylinder to the supplier.
Local disposal regulations	Dispose of in accordance with local regulations.
Hazardous waste code	Not regulated.
Waste from residues / unused products	Dispose of in accordance with local regulations.
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT (US Department of Transportation)

UN number	UN1971
UN proper shipping name	Natural gas, compressed
Transportation hazard class	Flammable gas, 2.1
Subsidiary class(es)	-
Packaging group	-
Special precautions for user	-
Labels required	Flammable gas 2.1
Special provisions	None
Packaging exceptions	306
Packaging non-bulk	302
Packaging bulk	302
Quantity limitations – passenger aircraft	Forbidden
Quantity limitations – cargo aircraft only	150 kg
Vessel storage - Location	E
Vessel storage - Other	40

Special precautions for user	Not available
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	

15. Regulatory information

U.S. federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

U.S. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not on regulatory list.

CERCLA Hazardous Substance List (40 CFR 302.4)

Butane (CAS 106-97-8)	LISTED
Ethane (CAS 74-84-0)	LISTED
Methane (CAS 74-82-8)	LISTED
Propane (CAS 74-98-6)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes
	Delayed Hazard - No
	Fire Hazard - Yes
	Pressure Hazard - Yes
	Reactivity Hazard - No

SARA 302 Extremely hazardous substance	No
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SARA 311/312 Hazardous chemical	Yes
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Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Butane (CAS 106-97-8)
Ethane (CAS 74-84-0)
Methane (CAS 74-82-8)
Propane (CAS 74-98-6)

Safe Drinking Water Act (SDWA)	Not regulated.
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Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA)	Not regulated.
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US state regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

U.S. Massachusetts RTK - Substance List

Butane (CAS 106-97-8)
Carbon dioxide (CAS 124-38-9)
Ethane (CAS 74-84-0)
Helium (CAS 7440-59-7)
Methane (CAS 74-82-8)
Nitrogen (CAS 7727-37-9)
Propane (CAS 74-98-6)

U.S. New Jersey Worker and Community Right-to-Know Act

Butane (CAS 106-97-8) 500 LBS
Ethane (CAS 74-84-0) 500 LBS
Methane (CAS 74-82-8) 500 LBS
Propane (CAS 74-98-6) 500 LBS

U.S. Pennsylvania RTK - Hazardous Substances

Butane (CAS 106-97-8)
Carbon dioxide (CAS 124-38-9)
Ethane (CAS 74-84-0)
Helium (CAS 7440-59-7)
Methane (CAS 74-82-8)
Nitrogen (CAS 7727-37-9)
Propane (CAS 74-98-6)

U.S. Rhode Island RTK

Butane (CAS 106-97-8)
Carbon dioxide (CAS 124-38-9)
Ethane (CAS 74-84-0)
Helium (CAS 7440-59-7)
Methane (CAS 74-82-8)
Nitrogen (CAS 7727-37-9)
Propane (CAS 74-98-6)

U.S. California Proposition 65

U.S. - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance
Not listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version

References

IARC Monographs. Overall Evaluation of Carcinogenicity (Volumes 1-102)
NIOSH Registry of Toxic Effects of Chemical Substances (RTECS)
ACGIH TLVs, 2016 Edition
National Library of Medicine, Wisser Database
ECHA Registered Substances
NIOSH Pocket Guide to Chemical Hazards
EU Regulation 1272/2008
29 CFR 1910.1200

NFPA Ratings:

NFPA health hazard : **1** – Slightly hazardous

NFPA fire hazard : **4** - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity : **0** - Normally stable, even under fire exposure conditions. and are not reactive with water.

HMIS III Rating:

Health : **1** - Irritation or minor reversible injury possible.

Flammability : **4** - Flammable gases, or very volatile flammable liquids with flash points below 73 °F (23 °C), and boiling points below 100 °F (38 °C). Materials may ignite spontaneously with air

Physical : **0** - Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

SDS Version History

Most recent version date: February 16, 2017

Previous version date: September 24, 2013

Disclaimer

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

SAFETY DATA SHEET



1. Identification

Product identifier ISOBUTANE
Other means of identification Liquefied Petroleum Gas
Recommended Use Raw material for fuel production
Recommended restrictions None

Manufacturer / Importer / Supplier / Distributor information

Company Name / Address Blueracer Midstream, LLC
5949 Sherry Lane, Suite 1300, Dallas, TX 75225
Telephone 214-580-3700
Email www.blueracermidstream.com
Contact Person Safety Department
Emergency phone number 214-580-3700

2. Hazard(s) identification

Physical hazards Flammable gas - **Category 1**
Gas under pressure - Liquefied Petroleum Gas

Health hazards Asphyxiation hazard
Skin, eye, respiratory tract frostbite hazard
Specific target organ systemic toxicity (Respiratory and Central Nervous Systems) – single exposure - **Category 2**

Label Elements

Hazard symbol



Signal word Danger

Hazard statement Extremely flammable liquid and vapor
May displace oxygen and lead to suffocation
Contact with skin and eyes may cause frostbite
May cause temporary effects to the central nervous and respiratory systems.

Precautionary statement

Prevention

Obtain special instructions before use.
Contains gas under pressure; may explode if heated
May form explosive mixtures with air
Do not handle until all safety precautions have been read and understood.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces.
No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection. Wash hands and

contaminated skin thoroughly after handling.
Wear insulated gloves where liquid contact and frostbite hazard is possible.

Response	Leaking gas fire: do not extinguish unless leak can be stopped safely; Eliminate all ignition sources if safe to do so; Use foam, carbon dioxide, dry powder or water fog to extinguish fires; If exposed or concerned: Get medical advice/attention. If on skin (or hair): Wash with plenty of water. Rinse skin with water/shower. Remove contaminated clothing and wash before reuse. If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting.
Storage	Store in secured, locked areas. Store in well-ventilated place. Keep cool. Keep containers tightly closed.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Carcinogenicity	No ingredient in this product at levels greater than or equal to 0.1% is identified as a probable, possible, anticipated or confirmed human carcinogen by IARC, NTP, ACGIH or OSHA.

3. Composition / information on ingredients

Hazardous components Chemical Name	CAS Number	%
Isobutane (CAS 75-28-5)	75-28-5	95
Butane (CAS 106-97-8)	74-98-6	3
Propane (CAS 74-98-6)	106-97-8)	2

Composition comments All concentrations are in percentage by weight.

4. First-aid measures

Inhalation	Move victim to area of fresh air. For respiratory distress give air, oxygen or administer cardiopulmonary resuscitation if needed. Seek medical attention -- call 911 or emergency medical services.
Skin contact	Immediately flush skin with water for 15 minutes. Frozen tissue should be gradually warmed using warm water. Clothing frozen to the skin should be thawed before removal. Do not use hot water! Cryogenic burns may occur as evidenced by blistering. Protect affected area with dry gauze and get prompt medical attention.
Eye contact	Flush eyes gently with water for at least 15 minutes. If illness or adverse symptoms develop, seek medical attention.
Ingestion	Risk of ingestion is extremely low. However, if oral exposure occurs, seek immediate medical attention.
Most important symptoms/ effects, acute and delayed	Acute: Contact with liquid (eyes and skin) - Frostbite, Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue from inhalation, asphyxiation hazard. Delayed: None
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Rescue and first aid personnel must be aware of own risk during rescue and treatment.

5. Firefighting measures

Suitable extinguishing media	Extinguish with dry chemical foam, carbon dioxide, dry powder or water fog.
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Specific hazards arising from the chemical	The product is extremely flammable, and explosive vapor/air mixtures may be formed even at normal room temperatures. Vapors are heavier than air and may travel along the ground to some distant source of ignition and flash back. Liquid petroleum gases will vaporize rapidly at well below ambient temperatures and readily forms flammable mixtures with air. Flames impinging on product storage vessels above the liquid level will cause sudden vessel failure, resulting in a BLEVE (Boiling Liquid Expanding Vapor Explosion), unless the vessel surfaces are kept cooled with water. If this cannot be done, evacuate the area.
Special protective equipment and precautions for firefighters	Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. Firefighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with full face-piece operated in positive pressure mode. Use approved gas detectors in confined space.
Firefighting equipment/instructions	Evacuate area of all unnecessary personnel. Shut off product source and allow fire to burn itself out. Use water fog or spray to cool exposed containers and equipment to prevent overheating, flashbacks or explosions. Firefighters directly addressing the fire must use proper protective equipment include breathing apparatus to protect against hazardous combustion products and/or oxygen deficiencies.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	All non-essential personnel should be evacuated. Stay upwind. Ventilate enclosed areas to prevent formation of flammable or oxygen-deficient atmospheres. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Liquid spills will vaporize rapidly and produce vapor cloud. Be alert for latent pooling of liquid portion. Because vapors are heavier than air they will not readily disperse. Avoid vapor cloud even with proper respiratory equipment.
Methods and materials for containment and cleaning up	Avoid contact with skin. Wear suitable protective clothing, gloves and eye/face protection. For personal protection, see section 8 of the SDS. In the event of a large spill, self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Stop the flow of material, if this is without risk. Dike far ahead of spill for later disposal. Remove sources of ignition. Beware of the explosion danger. Small Spills: Absorb spillage with non-combustible, absorbent material. Large Spills: Remove with vacuum trucks or pump to storage/salvage vessels. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Ensure that waste and contaminated materials are collected and removed from the work area as soon as possible in a suitably labeled container. Wash area with soap and water. If necessary dike the product with dry earth, sand or similar non-combustible materials.
Environmental precautions	Prevent spreading over a wide area (e.g. by containment or oil barriers). Do not contaminate water. Contact local authorities in case of spillage to drain/aquatic environment.

7. Handling and storage

Precautions for safe handling	Access to work area should be restricted to people handling the product only. Should be handled in closed systems, if possible. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Use self-contained breathing apparatus (SCBA) if appropriate. Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, and flammability. Provide adequate ventilation. Avoid contact with eyes, skin, and clothing. Material may deplete oxygen from the air to dangerously low levels. Avoid breathing gas. Wear appropriate personal protective equipment. The product is extremely flammable. May form explosive mixtures with air. Avoid heat, sparks, open flames and other ignition sources. Ground container and transfer equipment to eliminate static electric sparks. Use of explosion proof equipment is recommended and may be required (see appropriate fire codes. Refere to NFPA-70 and/or API RP2003 for specific bonding/grounding requirements). Do not enter confined spaces such as tanks or pits where gas may be stored or may accumulate without following proper entry procedures such as ASTM D-4276, and OSHA 1910.146. Observe good industrial hygiene practices. Avoid aerosol formation.
Conditions for safe storage, including any incompatibilities	Keep containers tightly closed. Keep away from heat, open flames, or other sources of ignition. No smoking or open lighting. Outside or detached storage is preferred. Keep away from oxidizers, e.g. chlorine, oxygen, bleaches, fertilizers.

8. Exposure controls / personal protection

Occupational exposure limits

U.S. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

<u>Components</u>	<u>Type</u>	<u>Value</u>
Propane (CAS 74-98-6)	PEL-TWA	1000 ppm (2370 mg/m ³)

U.S. OSHA Table Z-2 Limits for Air Contaminants (29 CFR 1910.1000) - None

U.S. ACGIH Threshold Limit Values

Butane (CAS 106-97-8)	TLV-STEL	1000 ppm (2370 mg/m ³)
Isobutane (CAS 75-28-5)	TLV-STEL	1000 ppm (2370 mg/m ³)

U.S. NIOSH: Pocket Guide to Chemical Hazards

<u>Components</u>	<u>Type</u>	<u>Value</u>
Butane (CAS 106-97-8)	REL-TWA	800 ppm (1900 mg/m ³)
Isobutane (CAS 75-28-5)	REL-TWA	800 ppm (1900 mg/m ³)
Propane (CAS 74-98-6)	REL-TWA	1000 ppm (1800 mg/m ³)

Biological limit values: None

Exposure guidelines: No exposure standards allocated.

Appropriate engineering controls Observe occupational exposure limits and minimize the risk of inhalation of vapors. Provide easy access to water supply and eye wash facilities. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear goggles / face shield.

Skin protection / Hand protection Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear antistatic protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Respiratory protection Use a properly fitted, air-purifying or air-supply respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Thermal hazards Wear appropriate thermal protective clothing, when liquid contact may occur.

9. Physical and Chemical properties

Appearance

Physical state	Liquefied gas
Form	Liquid
Color	Colorless to straw colored
Odor	Petroleum
Odor threshold	Not available
PH	Not available
Melting point / freezing point	Not available
Initial boiling point and boiling range	Not Available
Flash point	-117 °F (-82.8 °C) estimated
Evaporation rate	Moderately fast
Flammability (solid, gas)	Flammable

Upper / lower flammability or explosive limits

Flammability limit – lower	1.8%
Flammability – upper	8.5%
Vapor pressure	50 – 60 psi (100 °F)
Vapor density	1.1 (Air=1)
Relative density	2 (Air = 1)
Solubility (ies)	0.564 (Water = 1)
Partition coefficient	(n-octanol/ water) Not available
Auto-ignition temperature	860 °F (460 °C) estimated
Decomposition temperature	Not available
Viscosity	Not available

Other Information

Bulk density	Not applicable
Explosive properties	Not applicable
Oxidizing properties	Not applicable

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable at normal conditions
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Heat, sparks, flames, elevated temperatures. Contact with incompatible materials.
Incompatible materials	Oxygen. Strong oxidizing agents.
Hazardous decomposition products	Carbon dioxide, carbon monoxide and various hydrocarbons.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not a likely route of exposure. Aspiration hazard. May be fatal if swallowed and enters airways.
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Inhalation	At high concentrations a simple asphyxiant. May produce nausea, diarrhea, loss of appetite, dizziness, disorientation, headache, excitation, rapid respiration, drowsiness, labored breathing, anesthesia and other central nervous system effects. May cause lung paralysis and asphyxiation. Extreme overexposure may cause unconsciousness and respiratory arrest.
Skin contact	May cause slight irritation. Extreme exposure may produce discoloration, muscle weakness, breathing difficulties and other central nervous system effects. Direct contact may cause freeze burns.
Eye contact	
Symptoms related to the physical, chemical and toxicological characteristics	May cause irritation including pain, blurred vision, redness, tearing and superficial corneal turbidity. Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Dry skin and possible irritation with repeated or prolonged exposure.
Acute toxicity	Human evidence indicates that the product has very low acute oral, dermal or inhalation toxicity. However, it can produce severe injury if taken into the lung as a liquid, and there may be profound central nervous system depression following prolonged exposure to high levels of vapor. Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Breathing of high concentrations may cause dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness. Irritant effect on skin. May irritate and cause stomach pain, vomiting, diarrhea and nausea.

<u>Components</u>	<u>Species</u>	<u>Test Results</u>
Propane – Acute Inhalation LC50	Rat	1442.847 mg/l, 15 minutes
Butane – Acute inhalation LC50	Rat	658 mg/l, 4 hours

Skin corrosion/irritation	Rapid evaporation of the liquid may cause frostbite. Repeated contact with the skin may result in defating and possible dermatitis.
Serious eye damage/eye irritation	Not an eye irritant. Contact with liquid or refrigerated gas can cause cold burns and frostbite
Respiratory sensitization	Not classified.
Skin sensitization	Not a skin sensitizer
Germ cell mutagenicity	Not classified

Carcinogenicity

IARC Monographs. Overall Evaluation of Carcinogenicity - No ingredients listed.

NTP Report on Carcinogens - No ingredients listed.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) - None

Reproductive toxicity	Not classified
Specific target organ toxicity - single exposure	Inhalation of gas may cause drowsiness or dizziness. Aspiration hazard. Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious exposure.
Specific target organ toxicity - repeated exposure	No information about adverse effects due to exposure. Inhalation of gas may result in Chemical pneumonitis.
Chronic effects	Prolonged or repeated contact with skin may cause redness, itching, irritation, eczema/chapping and oil acne.

12. Ecological information

Ecotoxicity	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Bioaccumulative and persistence potential	The substances in this mixture are biodegradable and unlikely to persist in the environment.

Partition coefficient n-octanol / water (log Kow)

Butane (CAS 106-97-8)	2.89
Isobutane (CAS 75-28-5)	2.76
Propane (CAS 74-98-6)	2.36

Mobility in soil

The product has a low potential of being absorbed in the soil.

Mobility in general

The product is insoluble in water. It will spread on the water surface while some of the components will eventually sediment in water systems. The volatile components of the product will spread in the atmosphere.

Other adverse effects

The product contains volatile organic compounds which have a photochemical ozone creation potential. Oil spills are generally hazardous to the environment.

13. Disposal considerations

Disposal instructions

Dispose in accordance with all applicable regulations. This material and/or its container must be disposed of as hazardous waste.

Local disposal regulations

Dispose of in accordance with local regulations.

Hazardous waste code

D001

Waste from residues / unused products

The transportation, storage, treatment and disposal of RCRA waste material must be conducted in compliance with 40 CFR 262, 263, 264, 268, and 270. Disposal can occur only in properly permitted facilities. Check state regulations. Chemical additions, processing or otherwise altering this material may make the waste management information presented in this SDS incomplete, inaccurate or otherwise inappropriate. Disposal of this material must be conducted in compliance with all federal, state and local regulations.

Contaminated packaging

Non-empty contaminated packaging should be disposed of as hazardous waste.

14. Transportation

DOT

UN number

UN1075

UN proper shipping name

Liquefied Petroleum Gas

Commodity Description /

Technical Name

Isobutane, Non Odorized

Hazard class

2.1

Subsidiary class

Packing group

None

Special precautions for user

Not available

Labels required

Flammable gas (2.1)

Special provision

T50

Packaging exceptions

306

Packaging non bulk

304

Packaging bulk

314

ERG number

115

Transport in bulk
according to Annex II of
MARPOL
73/78 and the IBC Code

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200 (OSHA) and 8 CCR § 5194 (Cal/OSHA). All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpart D) Not regulated

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) None

CERCLA Hazardous Substance List (40 CFR 302.4) Butane (CAS 106-97-8) LISTED
Isobutane (CAS 75-28-5) LISTED
Propane (CAS 74-98-6) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard – Yes
Delayed Hazard – No
Fire Hazard – Yes
Pressure Hazard – Yes
Reactivity Hazard - No

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical Yes (see hazard categories above)

SARA Section 313 This material contains the following chemical subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372: n-Hexane

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List No

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Butane (CAS 106-97-8) 10,000 lb.

Isobutane (CAS 75-28-5) 10,000 lb.

Propane (CAS 74-98-6) 10,000 lb.

Safe Drinking Water Act (SDWA) – No constituents on the List of Contaminants

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number – None

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c)) – None

DEA Exempt Chemical Mixtures Code Number - None Food and Drug Administration. (FDA) Not regulated.

16. Other information, including date of preparation or last version

References IARC Monographs. Overall Evaluation of Carcinogenicity (Volumes 1-102)
Registry of Toxic Effects of Chemical Substances (RTECS)
National Library of Medicine, Wisser Database
ECHA Registered Substances
ACGIH TLVs and BEIs, 2016 Edition
NIOSH Pocket Guide to Chemical Hazards
EU Regulation 1272/2008
29 CFR 1910.1200

NFPA Ratings:

NFPA health hazard : 3 – Can cause serious or permanent injury

NFPA fire hazard : 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity

: 0 - Normally stable, even under fire exposure conditions. and are not reactive with water.

HMIS III Rating:

Health : **3** - Major injury likely unless prompt action is taken and medical treatment is given.

Flammability : **4** - Flammable gases, or very volatile flammable liquids with flash points below 73 °F (23 °C), and boiling points below 100 °F (38 °C). Materials may ignite spontaneously with air

Physical : **0** - Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

SDS Version History

Most recent version date: February 16, 2017

Previous version date: September 24, 2013

Disclaimer

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

SAFETY DATA SHEET



1. Identification

Product identifier	NORMAL BUTANE
Other means of identification	N-Butane, Butyl Hydride, C4H10, Normal Butane, Liquefied Petroleum Gas
CAS No	106-97-8
Recommended restrictions	None
Manufacturer / Importer / Supplier / Distributor information	
Company Name / Address	Blueracer Midstream, LLC 5949 Sherry Lane, Suite 1300, Dallas, TX 75225
Telephone	214-580-3700
Email	www.blueracermidstream.com
Contact Person	Safety Department
Emergency phone number	214-580-3700

2. Hazard(s) identification

Physical hazards	Flammable gases - Category 1 Gases under pressure. Liquefied Gas.
Specific Target Organ Toxicity	Single Exposure - Category 3 (central nervous system)
Health hazards	Asphyxiation hazard Eye irritant – Category 2 Skin and eye frostbite hazard Specific target organ systemic toxicity (Respiratory and Central Nervous Systems) – single exposure - Category 2
GHS Label Elements	
Hazard symbol	
Signal word	Danger
Hazard statement	Extremely flammable liquid under pressure May displace oxygen and lead to suffocation Contact with skin and eyes may cause frostbite Contact with the eyes may cause irritation Gas inhalation may cause drowsiness and disorientation
Precautionary statement	
Prevention	Obtain special instructions before use. Contains gas under pressure; may explode if heated May form explosive mixtures with air Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. No smoking.

Keep container tightly closed.
 Ground/bond container and receiving equipment.
 Use explosion-proof electrical/ventilating/lighting equipment.
 Use only non-sparking tools.
 Take precautionary measures against static discharge.
 Wear protective gloves/protective clothing/eye protection/face protection. Wash hands and contaminated skin thoroughly after handling.
 Wear insulated gloves where liquid contact and frostbite hazard is possible.

Response
 Leaking gas fire: do not extinguish unless leak can be stopped safely;
 Eliminate all ignition sources if safe to do so;
 Use foam, carbon dioxide, dry powder or water fog to extinguish fires;
 If exposed or concerned: Get medical advice/attention.
 If on skin (or hair): Wash with plenty of water. Rinse skin with water/shower.
 Remove contaminated clothing and wash before reuse.
 If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting.
 Dispose of contents/container in accordance with local/regional/national/international regulations.

Storage
 Store in secured, locked areas.
 Store in well-ventilated place.
 Keep cool.

Disposal
 Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)
 May cause frostbite upon sudden release of liquefied gas. May cause asphyxia.

3. Composition / information on ingredients

Substance

<u>Hazardous components</u> <u>Chemical Name</u>	<u>Common name and synonyms</u>	<u>CAS Number</u>	<u>%</u>
Butane n-		106-97-8	100

Composition comments All concentrations are in percentage by weight.

4. First-aid measures

Inhalation Move victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Skin contact If frostbite effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Eye contact Flush eyes gently with water for at least 15 minutes. If illness or adverse symptoms develop, seek medical attention.

Ingestion Ingestion is not considered a potential route of exposure.

Most important symptoms/ effects, acute and delayed Asphyxiation potential, potential frostbite on skin; CNS effects (narcotic) from inhalation.

Indication of immediate medical attention and special treatment needed Treat symptomatically.

General information First aid personnel must be aware of own risk during rescue.

5. Firefighting measures

Fire Hazard EXTREMELY FLAMMABLE GAS. SEVERE EXPLOSION HAZARD. Vapor/air mixtures are explosive. The vapor is heavier than air. Vapor or gases may ignite at distant ignition and flash back.

Suitable extinguishing media	Carbon dioxide, Dry Chemical, Water spray or fog.
Unsuitable extinguishing media	None
Special protective equipment and precautions for firefighters	Wear full protective firefighting gear including self-contained breathing apparatus (SCBA) for protection against possible exposure.
Firefighting equipment/instructions	Evacuate area. Remove pressurized cylinders from the immediate vicinity. Cool containers exposed to flames with water until well after the fire is out. Close the valve if no risk is involved. Do not extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and no danger to surrounding area allow the fire to burn out. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.
Fire-fighting equipment/instructions	Evacuate area of all unnecessary personnel. Shut off product source and allow fire to burn itself out. Use water fog or spray to cool exposed containers and equipment to prevent overheating, flashbacks or explosions. Firefighters directly addressing the fire must use proper protective equipment include SCBA to protect against hazardous combustion products and/or oxygen deficiencies. Use approved gas detectors in confined space.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	All non-essential personnel should be evacuated. Stay upwind. Ventilate enclosed areas to prevent formation of flammable or oxygen-deficient atmospheres. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Liquid spills will vaporize rapidly and produce vapor cloud. Be alert for latent pooling of liquid portion. Because vapors are heavier than air they will not readily disperse. Avoid vapor cloud even with proper respiratory equipment.
Methods and materials for containment and cleaning up	Avoid contact with skin. Wear suitable protective clothing, gloves and eye/face protection. For personal protection, see section 8 of the SDS. In the event of a large spill, self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Stop the flow of material, if this is without risk. Dike far ahead of spill for later disposal. Remove sources of ignition. Beware of the explosion danger. Small Spills: Absorb spillage with non-combustible, absorbent material. Large Spills: Remove with vacuum trucks or pump to storage/salvage vessels. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Ensure that waste and contaminated materials are collected and removed from the work area as soon as possible in a suitably labeled container. Wash area with soap and water. If necessary dike the product with dry earth, sand or similar non-combustible materials.
Environmental precautions	Prevent spreading over a wide area (e.g. by containment or oil barriers). Do not contaminate water. Contact local authorities in case of spillage to drain/aquatic environment.

7. Handling and storage

Precautions for safe handling	Access to work area should be restricted to people handling the product only. Should be handled in closed systems, if possible. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Use self-contained breathing apparatus (SCBA) if appropriate. Keep away from heat, hot surfaces, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment. Store only where temperature will not exceed 125 °F (52 °C). Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, and flammability. Provide adequate ventilation. Avoid contact with eyes, skin, and clothing. Material may deplete oxygen from the air to dangerously low levels. Avoid breathing gas. Wear appropriate personal protective equipment. The product is extremely flammable. May form explosive mixtures with air. Avoid heat, sparks, open flames and other ignition sources. Ground container and transfer equipment to eliminate static electric sparks. Use of explosion proof equipment is recommended and may be required (see appropriate fire codes. Refer to NFPA-70 and/or API RP2003 for specific bonding/grounding requirements). Do not enter confined spaces such as tanks or pits where gas may be stored or may accumulate without following proper entry procedures such as ASTM D-4276, and OSHA 1910.146. Observe good industrial hygiene practices. Avoid aerosol formation.
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Conditions for safe storage, including any incompatibilities

Store and handle in accordance with all current regulations and standards. Store in well-ventilated place. Protect from sunlight. Keep container tightly closed. Store locked up. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.110. U.S. OSHA 29 CFR 1910.101. Keep separated from oxidizing chemicals.

8. Exposure controls / personal protection

Occupational exposure limits - n-Butane (CAS No. 106-97-8)

Components	Type	Value
ACGIH TLVs (2016 Edition)	TLV-STEL	1000 ppm (2370 mg/m ³)
U.S. OSHA Table Z-1, (29 CFR 1910.1000)	None assigned	None assigned
NIOSH	REL-TWA	800 ppm (1900 mg/m ³)

Biological limit values:

None

Exposure guidelines:

No exposure standards allocated.

Appropriate engineering controls

Observe occupational exposure limits and minimize the risk of inhalation of vapors. Provide easy access to water supply and eye wash facilities. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection

For the gas: Eye protection not required, but recommended. For the liquid: Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Hand protection

Wear protective gloves. Frequent change is advisable. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Suitable gloves can be recommended by the glove supplier.

Other

Chemical protective suit should be worn. Anti-static and flame-retardant protective clothing are recommended.

Respiratory protection

In case of inadequate ventilation, or when exposure concentration is not known, use SCBA. Seek advice from local supervisor.

Thermal hazards

Wear cold insulating gloves when trans-filling or breaking transfer connections.

General hygiene considerations

When using, do not eat, drink or smoke. Wash hands after handling. Launder contaminated clothing before reuse. Private clothes and working clothes should be kept separately. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical properties

Appearance

Colorless gas

Physical state

Gas

Molecular Mass

58 g/mol

Form

Compressed liquefied gas

Color

Colorless to straw colored

Odor

Petroleum

Odor threshold

5000 ppm

PH

Not available

Melting point / freezing point

-47 °F

Initial boiling point and boiling range

Flash point

-60 °C TCC

Evaporation rate

Moderately fast

Flammability (solid,

Extremely Flammable

gas)

Upper / lower flammability or explosive limits

Flammability limit – lower	Not available
Flammability – upper	12.5%
Vapor pressure	37 psi @ 100 °F
Relative density	0.6
Solubility/Water	Slightly
Auto-ignition temperature	400 °C
Decomposition temperature	Not available
Viscosity	Not available
Other Information	
Bulk density	Not applicable
Explosive properties	1.4 9.4 vol%
Oxidizing properties	Not applicable

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable at normal conditions
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Heat, sparks, flames, elevated temperatures. Contact with incompatible materials.
Incompatible materials	Oxidizing agents, Nickel carbonyl, Oxygen Mixtures
Hazardous decomposition products	Thermal decomposition or burning may produce carbon monoxide, carbon dioxide, and hydrogen. Other decomposition products of normal originate from the volatilization, reaction or oxidation of the material being worked.

11. Toxicological information

Information on likely routes of exposure

Acute Toxicity

Butane n- (106-97-8)

LC50 inhalation rat 658 g/m³ (exposure time: 4h)

Ingestion Not a likely route of exposure. Aspiration hazard. May be fatal if swallowed and enters airways.

Inhalation 680000 mg/m³/2 hour Inhalation Mouse LC50

658000 mg/m³/4 hour Inhalation Rat LC50

Immediate Effects: Suffocation, frostbite, central nervous system effects

Skin contact May cause slight irritation. Extreme dermal exposure may produce discoloration, muscle weakness, breathing difficulties and other central nervous system effects. Direct contact may cause freeze burns.

Eye contact

symptoms related to the physical, chemical and toxicological May cause irritation including pain, blurred vision, redness, tearing and superficial

characteristics	corneal turbidity. Headache, drowsiness, dizziness, loss of coordination, cardiac arrhythmia disorientation and fatigue. Dry skin and possible irritation with repeated or prolonged exposure.
Acute toxicity	Human evidence indicates that the product has very low acute oral, dermal or inhalation toxicity. However, it can produce severe injury if taken into the lung as a liquid, and there may be profound central nervous system depression following prolonged exposure to high levels of vapor. Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Breathing of high concentrations may cause dizziness, Light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness. Irritant effect on skin. May irritate and cause stomach pain, vomiting, diarrhea and nausea.
Skin corrosion/irritation	May cause slight skin irritation. Pre-existing skin conditions including dermatitis might be aggravated by exposure to this product.
Serious eye damage/eye irritation	May cause eye irritation on direct contact.
Respiratory sensitization	Not classified.
Skin sensitization	Not a skin sensitizer
IARC Monographs. Overall Evaluation of Carcinogenicity – No ingredients listed	
NTP Report on Carcinogens	No ingredients listed
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) - None	
Specific target organ toxicity - single exposure	May cause drowsiness or dizziness. Aspiration hazard. Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious respiratory exposure affecting the central nervous system.
Specific target organ toxicity - repeated exposure	Central nervous system

12. Ecological information

Ecology General No ecological damage caused by this product.

Bioaccumulative Potential

Partition coefficient n-octanol / water (log Kow)

Butane n- (106-97-8)

Log Pow 2.89

Log Kow Not applicable

Bioaccumulative Potential Bioconcentration potential in aquatic organisms is moderate based on BCF value of 33.

Persistence and degradability Expected to be inherently biodegradable.

Mobility in soil No data available

Other adverse effects Effect on ozone layer - None

13. Disposal considerations

Disposal instructions Dispose in accordance with all applicable regulations. This material and/or its container must be disposed of as hazardous waste.

Local disposal regulations Dispose of in accordance with local regulations.

Hazardous waste code D001

Waste from residues / unused products Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

Contaminated packaging

Non-empty contaminated packaging should be disposed of as hazardous waste.

14. Transportation**DOT**

UN number	UN1075
UN proper shipping name	Liquidified Petroleum Gases
Commodity Description / Technical Name	Normal Butane, Non Odorized
Hazard class	2.1
Subsidiary class	
Packing group	None
Special precautions for user	Not available
Labels required	Flammable gas (2.1)
Special provision	19, T50
Packaging exceptions	306
Packaging non bulk	304
Packaging bulk	314
ERG number	115

15. Regulatory information**US federal regulations**

None of these products components are listed under SARA Sections 302/304, SARA Section 313, CERCLA, TSCA or require an OSHA process safety plan.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard – Yes
	Delayed Hazard – No
	Fire Hazard – Yes
	Pressure Hazard – Yes
	Reactivity Hazard - No

**SARA 311 Hazardous categories
substance** See above

SARA 311/312 Hazardous chemical Yes

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List – Not regulated

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130) – Butane (CAS 106-97-8)

California Proposition 65 This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

State regulations

Massachusetts	: This material is listed.
New York	: This material is not listed.
New Jersey	: This material is listed.
Pennsylvania	: This material is listed.

16. Other information, including date of preparation or last version**NFPA Ratings:**

NFPA health hazard : 3 – Can cause serious or permanent injury
(frostbite; asphyxiation hazard)

NFPA fire hazard : 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions. and are not reactive with water.

HMIS III Rating:

Health : **3** - Major injury likely unless prompt action is taken and medical treatment is given (frostbite; asphyxiation hazard).
Flammability : **4** - Flammable gases, or very volatile flammable liquids with flash points below 73 °F (23 °C), and boiling points below 100 °F (38 °C). Materials may ignite spontaneously with air
Physical : **0** - Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

References IARC Monographs. Overall Evaluation of Carcinogenicity (Volumes 1-102)
NIOSH Registry of Toxic Effects of Chemical Substances (RTECS)
ACGIH TLVs, 2016 Edition
National Library of Medicine, Wisner Database
ECHA Registered Substances
NIOSH Pocket Guide to Chemical Hazards
EU Regulation 1272/2008
29 CFR 1910.1200

SDS Version History Most recent version date: February 16, 2017
Previous version date: September 24, 2013

Disclaimer This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.


SAFETY DATA SHEET



1. Identification

Product identifier	MIXED BUTANE
Other means of identification	N-Butane, Butyl Hydride, C ₄ H ₁₀ , Normal Butane, Liquefied Petroleum Gas
CAS No	
Recommended restrictions	Raw material for fuel production
Manufacturer / Importer / Supplier / Distributor information	
Company Name / Address	Blueracer Midstream, LLC 5949 Sherry Lane, Suite 1300, Dallas, TX 75225
Telephone	214-580-3700
Email	www.blueracermidstream.com
Contact Person	Safety Department
Emergency phone number	214-580-3700

2. Hazard(s) Identification

Physical hazards	Flammable Gas - Category 1 Gases under pressure – Liquefied gas
Specific Target Organ Toxicity	Single Exposure, Category 3 (central nervous system)
Health hazards	Asphyxiation hazard Skin and eye frostbite hazard Specific target organ systemic toxicity (Respiratory and Central Nervous Systems) – single exposure - Category 2
GHS Label Elements	
Hazard symbol	
Signal word	Danger
Hazard statement	Extremely flammable gas. Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation. May cause frostbite, and freeze burns to skin and eyes May cause damage to the central nervous and respiratory systems.
Precautionary statement	
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, sparks, open flame, and hot surfaces – No Smoking. Keep container tightly closed. Avoid breathing gas. Use only outdoors or in a well-ventilated area. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wear protective gloves/protective clothing/eye protection/face protection.

Response	<p>Wash hands and contaminated skin thoroughly after handling.</p> <p>Leaking gas fire: Do not extinguish, unless leak can be stopped safely with foam, carbon dioxide, dry powder, or water fog.</p> <p>Eliminate all ignition sources if safe to do so.</p> <p>If INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.</p> <p>If exposed or concerned: Get medical advice/attention.</p> <p>If on skin (or hair): Wash with plenty of water. Rinse skin with water/shower.</p> <p>If skin irritation occurs: Get medical advice/attention.</p> <p>Take off contaminated clothing and wash before reuse.</p> <p>If swallowed: Immediately call a poison center/doctor.</p> <p>Do NOT induce vomiting.</p>
Storage	Store locked up. Store in well-ventilated place. Keep cool. Keep container tightly closed.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	May cause frostbite upon sudden release of liquefied gas. Gas accumulation in confined or low areas can displace oxygen and lead to asphyxiation.

3. Composition / Information on Ingredients

Substance

<u>Hazardous Components Chemical Name</u>	<u>Common name and synonyms</u>	<u>CAS Number</u>	<u>%</u>
n-Butane		106-97-8	54-100
Propane		74-98-6	0-28
n-Pentane		109-66-0	0-10
Isobutane		75-28-5	0-43.5

Composition comments All concentrations are in percentage by weight.

4. First-Aid Measures

Inhalation	Move victim to uncontaminated fresh air. Keep victim warm and rested. For respiratory distress give air, oxygen, or administer cardiopulmonary resuscitation if needed. Seek medical attention – call 911 or Emergency Medical Services.
Skin contact	If frostbite effects occur, remove to uncontaminated area. Immediately flush skin with water for 15 minutes. Clothing frozen to the skin should be thawed before removal. Do not use hot water! Cryogenic burns may occur as evidenced by blistering. Protect affected area with dry gauze and get prompt medical attention. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel.
Eye contact	Flush eyes gently with water for at least 15 minutes. If illness or adverse symptoms develop, seek medical attention.
Ingestion	Seek immediate medical attention.
Most important symptoms/ effects, acute and delayed	Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation, and fatigue. Delayed: Dry skin and irritation after repeated or prolonged exposure.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	First aid personnel must be aware of own risk during rescue.

5. Firefighting Measures

Fire Hazard	EXTREMELY FLAMMABLE GAS. SEVERE EXPLOSION HAZARD. Vapor/air mixtures are explosive. The vapor is heavier than air. Vapor or gases may ignite at distant ignition and flash back.
Suitable extinguishing media	Extinguish with dry chemical foam, carbon dioxide dry powder, or water fog.

Unsuitable extinguishing media	Do not use water jet as an extinguisher as this will spread the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.
Specific hazards arising from the chemical	The product is extremely flammable, and explosive vapor/air mixtures may be formed even at normal room temperatures. Vapors are heavier than air and may travel along the ground to some distant source of ignition and flash back. Liquid propane will vaporize rapidly at well below ambient temperatures and readily forms flammable mixtures with air. Flames impinging on product storage vessels above the liquid level will cause sudden vessel failure, resulting in a BLEVE (Boiling Liquid Expanding Vapor Explosion), unless the vessel surfaces are kept cooled with water. If this cannot be done, evacuate the area. Gasoline portion may continue to pool after propane and butane vaporize.
Special protective equipment and precautions for firefighters	Wear full protective firefighting gear including self-contained breathing apparatus (SCBA) with full face-piece operated in positive pressure mode for protection against possible exposure. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. Firefighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) Use approved gas detectors in confined space.
Firefighting equipment/instructions	Evacuate area of all unnecessary personnel. Remove pressurized cylinders from the immediate vicinity. Cool containers exposed to flames with water until well after the fire is out. Close the valve if no risk is involved. Do not extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and no danger to surrounding area allow the fire to burn out. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures	All non-essential personnel should be evacuated. Stay upwind. Ventilate enclosed areas to prevent formation of flammable or oxygen-deficient atmospheres. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Liquid spills will vaporize rapidly and produce vapor cloud. Be alert for latent pooling of gasoline portion. Because vapors are heavier than air they will not readily disperse. Avoid vapor cloud even with proper respiratory equipment. Wear personal protective clothing and equipment.
Methods and materials for containment and cleaning up	<p>Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed space before entering. Avoid contact with skin. Wear suitable protective clothing, gloves and eye/face protection. For personal protection, see section 8 of the SDS.</p> <p>In the event of a large spill, self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.</p> <p>Stop the flow of material, if this is without risk. Dike far ahead of spill for later disposal. Remove sources of ignition. Beware of the explosion danger.</p> <p>Small Spills: Absorb spillage with non-combustible, absorbent material.</p> <p>Large Spills: Remove with vacuum trucks or pump to storage/salvage vessels. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Ensure that waste and contaminated materials are collected and removed from the work area as soon as possible in a suitably labeled container. Wash area with soap and water. If necessary dike the product with dry earth, sand or similar non-combustible materials.</p>
Environmental precautions	Avoid release to the environment. Prevent spreading over a wide area (e.g. by containment or oil barriers). Do not contaminate water. Contact local authorities in case of spillage to drain/aquatic environment.

7. Handling and Storage

Precautions for safe handling	<p>Keep away from heat, hot surfaces, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment. Store only where temperature will not exceed 125 °F (52 °C).</p> <p>Access to work area should be restricted to people handling the product only. Should be handled in closed systems, if possible. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Use self-contained breathing apparatus (SCBA) in situations where exposure potential is unknown or when exposure is known to exceed applicable occupational exposure limits.</p> <p>Use explosion-proof equipment and non-sparking tools in areas where explosive vapors may form. Electrostatic charge may accumulate and create a hazardous condition when handling or processing. Electrically ground and bond shipping container, transfer line</p>
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and receiving container. Refer to NFPA-70 and/or API RP2003 for specific bonding/grounding requirements. Material may be at elevated temperatures and/or pressures. Exercise care when opening tank hatches, sampling ports and/or bleeder valves.

Extremely flammable. May vaporize easily at ambient temperatures. Vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open containers slowly to relieve pressure. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29 CFR 1910.146 (OSHA Confined Space Entry Standard). Do not wear contaminated clothing or shoes. Keep contaminated clothing away from ignition sources.

Conditions for safe storage, including any incompatibilities

Store and handle in accordance with all current regulations and standards. Store in well-ventilated place. Protect from sunlight. Keep container tightly closed. Store locked up. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.110. U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances. No Smoking. Keep away from oxidizers, e.g. chlorine, bleaches, fertilizers.

8. Exposure Controls / Personal Protection

Occupational Exposure Limits

<u>Components</u>	<u>ACGIH: (2016 Edition)</u>	<u>OSHA</u>
Butane n- (106-97-8); & Isobutane (75-28-5)	TWA: 1000 ppm (2370 mg/m ³)	--
Propane (74-98-6)	Asphyxiation hazard (Re: Appendix F)	TWA: 1000 ppm (1800 mg/m ³)
n-Pentane (109-66-0)	TWA: 1000 ppm (2950 mg/m ³)	TWA: 1000 ppm (2950 mg/m ³)

Biological limit values:

None

Exposure guidelines:

No exposure standards allocated.

Appropriate engineering controls

Observe occupational exposure limits and minimize the risk of inhalation of vapors. Provide easy access to water supply and eye wash facilities. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection

For the gas: Wear goggles/face shield. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

**Skin protection/
Hand protection**

Wear protective gloves. Nitrile gloves are recommended but be aware that the liquid may penetrate the gloves. Frequent change is advisable. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Suitable gloves can be recommended by the glove supplier.

Other

Protective suit should be worn. Anti-static and flame-retardant protective clothing is recommended.

Respiratory protection

In case of inadequate ventilation where exposure concentrations are known, use air-supplied full-mask. In situations where concentrations are unknown, use SCBA. Seek advice from local supervisor.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary. Wear cold insulating gloves when transfilling or breaking transfer connections.

General hygiene considerations

When using, do not eat, drink or smoke. Wash hands after handling. Launder contaminated clothing before reuse. Private clothes and working clothes should be kept separately. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical Properties

Appearance

Colorless gas

Physical state	Liquefied Gas
Odor	Petroleum
Odor threshold	No data
pH	Not applicable
Vapor Pressure	2600 mm Hg @ 77°F / 25°C
Vapor Density (air=1)	2
Initial Boiling Point/ Range	11°F / -12°C -47 °F
Melting/Freezing Point	No data
Solubility in Water	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No Data
Specific Gravity (water=1)	0.55-0.60 @ 77°F / 25°C (estimated)
Evaporation Rate (nBuAc=1)	>1
Flash Point	< -60°F / < -51°C
Test Method	(estimate)
Lower Exposure Limits (vol % in air)	1.9
Upper Exposure Limits (vol % in air)	8.5
Auto-ignition Temperature	752 °F / 400 °C

10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid all possible sources of ignition. Heat will increase pressure in the storage tank.

Materials to Avoid (Incompatible Materials): Avoid contact with acids, aluminum chloride, chlorine, chlorine dioxide, halogens and other oxidizing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

Acute Toxicity

Butane n- (106-97-8)

LC₅₀ inhalation

Rat

658 g/m³ (exposure time: 4h)

Propane (CAS 74-98-6)

Acute

LC₅₀ Inhalation

Rat

>1442.847 mg/l, 15 minutes

Aspiration Hazard: Not applicable

Skin Corrosion/Irritation: Not expected to be irritating. Contact with the liquefied or pressurized gas may cause frostbite ("cold" burn). Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Not expected to be irritating. Contact with the liquefied or pressurized gas may cause momentary freezing followed by swelling and eye damage.

Signs and Symptoms: Light hydrocarbon gases are simple asphyxiants and can cause anesthetic effects at high concentrations. Symptoms of overexposure, which are reversible if exposure is stopped, can include shortness of breath, drowsiness, headaches, confusion, decreased coordination, visual disturbances and vomiting. Continued exposure can lead to hypoxia (inadequate oxygen), rapid breathing, cyanosis (bluish discoloration of the skin), numbness of the extremities, unconsciousness and death.

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: Not expected to be a respiratory sensitizer.

Specific Target Organ Toxicity (Single Exposure): Central Nervous System

Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure.

Carcinogenicity: Not expected to cause cancer. This substance is not listed as a carcinogen by IARC, NTP or OSHA.

Germ Cell Mutagenicity: Not expected to cause genetic effects.

Reproductive Toxicity: Not expected to cause reproductive effects.

Other Comments: High concentrations may reduce the amount of oxygen available for breathing, especially in confined spaces. Hypoxia (inadequate oxygen) during pregnancy may have adverse effects on the developing fetus.

Information on Toxicological Effects of Components

n-Butane

Target Organs: No systemic or neurotoxic effects were noted in rats exposed to concentrations of butane as high as 9,000 ppm for 28 days.

Reproductive Toxicity: No adverse reproductive or developmental effects were observed in rats exposed to butane; no observed adverse effect level = 12,000 ppm.

Propane

Target Organs: No systemic or neurotoxic effects were noted in rats exposed to concentrations of propane as high as 12,000 ppm for 28 days.

Reproductive Toxicity: No adverse reproductive or developmental effects were observed in rats exposed to propane; no observed adverse effect level = 12,000 ppm.

Isobutane

Target Organs: No systemic or neurotoxic effects were noted in rats exposed to concentrations of isobutane as high as 9,000 ppm for 28 days.

Reproductive Toxicity: No adverse developmental effects were observed in rats exposed to concentrations of isobutane as high as 9000 ppm. Fertility and mating indices may have been affected at 9000 ppm but no effects were observed at 3000 ppm (NOAEL).

12: Ecological Information

Toxicity: Petroleum gases will readily evaporate from the surface and would not be expected to have significant adverse effects in the aquatic environment. Classification: No classified hazards.

Persistence and Degradability: The hydrocarbons in this material are expected to be inherently biodegradable. In practice, hydrocarbon gases are not likely to remain in solution long enough for biodegradation to be a significant loss process. Hydrogen sulfide, if present in refinery gas streams, will be rapidly oxidized in water and insoluble sulfides precipitated from water when metallic radicals are present.

Bioaccumulative Potential: Since the log Kow values measured for refinery gas constituents are below 3, they are not regarded as having the potential to bioaccumulate.

Mobility in Soil: Due to the extreme volatility of petroleum gases, air is the only environmental compartment in which they will be found. In air, these hydrocarbons undergo photodegradation by reaction with hydroxyl radicals with half-lives ranging from 3.2 days for n-butane to 7 days for propane.

Other Adverse Effects: None anticipated.

13: Disposal Considerations

This material is a gas and would not typically be managed as a waste.

14: Transport Information

U.S. Department of Transportation (DOT)

UN number	UN1075
UN proper shipping name	Liquified Petroleum Gases
Commodity Description / Technical Name	Mixed Butane, Non Odorized
Hazard class	2.1
Subsidiary class	
Packing group	None
Special precautions for user	Not available
Labels required	Flammable gas (2.1)
Special provision	19, T50
Packaging exceptions	306
Packaging non bulk	304
Packaging bulk	314
ERG number	115

15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health:	Yes
Chronic Health:	No
Fire Hazard:	Yes
Pressure Hazard:	Yes
Reactive Hazard:	No

CERCLA/SARA - Section 313 and 40 CFR 372:

This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

EPA (CERCLA) Reportable Quantity (in pounds):

EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

California Proposition 65:

This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

National Chemical Inventories

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA All components are either on the DSL, or are exempt from DSL listing

16. Other information, including date of preparation or last version

NFPA Ratings

NFPA health hazard	: 3 – Can cause serious or permanent injury
NFPA fire hazard	: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.
NFPA reactivity	: 0 - Normally stable, even under fire exposure conditions. and are not reactive with water.

HMIS III Rating:

Health : **3** - Major injury likely unless prompt action is taken and medical treatment is given.
Flammability : **4** - Flammable gases, or very volatile flammable liquids with flash points below 73 °F (23 °C), and boiling points below 100 °F (38 °C). Materials may ignite spontaneously with air.
Physical : **0** - Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

References

IARC Monographs. Overall Evaluation of Carcinogenicity (Volumes 1-102)
Registry of Toxic Effects of Chemical Substances (RTECS)
National Library of Medicine, Wisser Database
ECHA Registered Substances
ACGIH TLVs & BEIs, 2016 Edition
NIOSH Pocket Guide to Chemical Hazards
EU Regulation 1272/2008
29 CFR 1910.1200

SDS Version History

Most recent version date: February 16, 2017
Previous version date: September 24, 2013

Disclaimer

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

SAFETY DATASHEET

1. Identification

Product identifier **NATURAL GASOLINE**

Other means of identification **Not Available**

Recommended restrictions None

Manufacturer / Importer / Supplier / Distributor information

Company Name / Address Blueracer Midstream, LLC
5949 Sherry Lane, Suite 1300, Dallas, TX 75225

Telephone 214-580-3700

Email www.blueracermidstream.com

Contact Person Safety Department

Emergency phone number 214-580-3700

2. Hazard(s) identification

Physical hazards Flammable liquid - **Category 1**

Health hazards Skin corrosion / irritation - **Category 2**
Germ cell mutagenicity – **Category 1B**
Carcinogenicity – **Category 1B**
Specific target organ toxicity, single exposure – **Category 2** (vascular system)
Specific target organ toxicity, single exposure – **Category 3** (narcotic effects)
Aspiration hazard – **Category 1**

Label Elements

Hazard symbol



Signal word

Danger

Hazard statement

Extremely flammable liquid and vapor. May be fatal if swallowed and enters airways. Causes skin irritation. Suspected of damaging fertility or the unborn child. May cause cancer. Vapor buildup in enclosed areas can displace oxygen and create an asphyxiation hazard.

Precautionary statement

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not handle until all safety precautions have been read and understood.

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands and contaminated skin thoroughly after handling.

Storage

Store locked up. Store in a well-ventilated place. Keep cool. Keep container tightly closed.

Response If exposed or concerned: Get medical advice/attention. If on skin (or hair): Wash with plenty of water. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. In case of fire: Use foam, carbon dioxide, dry powder or water fog to extinguish.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

3. Composition / information on ingredients

Substance			
<u>Hazardous components</u> <u>Chemical Name</u>	<u>Common name and synonyms</u>	<u>CAS Number</u>	<u>%</u>
C4 – C12		--	100
Cyclohexane		110-82-7	3.4
Toluene		108-88-3	0.75
Benzene		71-43-2	0.45
Xylene		1330-20-7	0.29

Composition comments All concentrations are in percentage by weight.

4. First-aid measures

Inhalation Move victim to area of fresh air. For respiratory distress give air, oxygen or administer cardiopulmonary resuscitation if needed. Seek medical attention -- call 911 or emergency medical services.

Skin contact Remove contaminated shoes and clothing, and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops, seek medical attention. Wash contaminated clothing before reuse.

Eye contact Flush eyes gently with water for at least 15 minutes. If illness or adverse symptoms develop, seek medical attention.

Ingestion Seek immediate medical attention.

Most important symptoms/ effects, acute and delayed Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Delayed: Dry skin and irritation after repeated or prolonged exposure.

Indication of immediate medical attention and special treatment needed Treat symptomatically.

General information First aid personnel must be aware of own risk during rescue.

5. Firefighting measures

Suitable extinguishing media Extinguish with foam, carbon dioxide, dry powder or water fog.

Unsuitable extinguishing media None

Specific hazards arising from the chemical Cylinders can burst violently when heated, due to excess pressure build-up. Gas may travel considerable distance to a source of ignition and flash back. Gases may form explosive mixtures with air. Fire or high temperatures create carbon monoxide. Carbon oxides.

Special protective equipment and precautions for firefighters Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. Firefighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with full face-piece operated in positive pressure mode. Use approved gas detectors in confined space.

Firefighting equipment/instructions Evacuate area. Remove pressurized cylinders from the immediate vicinity. Cool containers exposed to flames with water until well after the fire is out. Close the valve if no risk is involved. Do not extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and no danger to surrounding area allow the fire to burn out. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.

Special protective equipment and precautions for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire-fighting equipment/instructions

Evacuate area of all unnecessary personnel. Shut off product source and allow fire to burn itself out. Use water fog or spray to cool exposed containers and equipment to prevent overheating, flashbacks or explosions. Firefighters directly addressing the fire must use proper protective equipment include breathing apparatus to protect against hazardous combustion products and/or oxygen deficiencies.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

All non-essential personnel should be evacuated. Stay upwind. Ventilate enclosed areas to prevent formation of flammable or oxygen-deficient atmospheres. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Liquid spills will vaporize rapidly and produce vapor cloud. Be alert for latent pooling of gasoline portion. Because vapors are heavier than air they will not readily disperse. Avoid vapor cloud even with proper respiratory equipment.

Methods and materials for containment and cleaning up

Avoid contact with skin. Wear suitable protective clothing, gloves and eye/face protection. For personal protection, see section 8 of the SDS.

In the event of a large spill, self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

Stop the flow of material, if this is without risk. Dike far ahead of spill for later disposal. Remove sources of ignition. Beware of the explosion danger.

Small Spills: Absorb spillage with non-combustible, absorbent material.

Large Spills: Remove with vacuum trucks or pump to storage/salvage vessels. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Ensure that waste and contaminated materials are collected and removed from the work area as soon as possible in a suitably labeled container. Wash area with soap and water. If necessary dike the product with dry earth, sand or similar non-combustible materials.

Environmental precautions

Prevent spreading over a wide area (e.g. by containment or oil barriers). Do not contaminate water. Contact local authorities in case of spillage to drain/aquatic environment.

7. Handling and storage

Precautions for safe handling

Access to work area should be restricted to people handling the product only. Should be handled in closed systems, if possible. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Use self-contained breathing apparatus (SCBA) if appropriate.

Use explosion-proof equipment and non-sparking tools in areas where explosive vapors may form. Electrically ground and bond shipping container, transfer line and receiving container. Material may be at elevated temperatures and/or pressures. Exercise care when opening tank hatches, sampling ports and/or bleeder valves.

Conditions for safe storage, including any incompatibilities

Keep containers tightly closed. Keep away from heat, open flames, or other sources of ignition.

No smoking or open lighting. Outside or detached storage is preferred. Keep away from oxidizers, e.g. chlorine, oxygen, bleaches, fertilizers.

8. Exposure controls / personal protection

Occupational exposure limits		
Components	Type	Value
U.S. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)		
Benzene (CAS 71-43-2)	PEL TWA	1 ppm (3 mg/m ³)
	PEL STEL	5 ppm (15 mg/m ³)

<u>Components</u>	<u>Type</u>	<u>Value</u>	
<u>U.S. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)</u>			
Cyclohexane (CAS 110-82-7)	PEL TWA	300 ppm (1050 mg/m ³)	
<u>U.S. ACGIH Threshold Limit Values (2016 Edition)</u>			
Benzene (CAS 71-43-2) - Skin	TLV TWA	0.5 ppm (1.6 mg/m ³)	
	TLV STEL	2.5 ppm (8 mg/m ³)	
Cyclohexane (CAS 110-82-7)	TLV TWA	100 ppm (344 mg/m ³)	
<u>U.S. NIOSH: Pocket Guide to Chemical Hazards</u>			
Benzene (CAS 71-43-2)	REL TWA	0.1 ppm	
	REL STEL	1 ppm	
Cyclohexane (CAS 110-82-7)	REL TWA	300 ppm (1050 mg/m ³)	
Biological limit values			
<u>US, ACGIH, BEIs, Biological Exposure Indices (2016 Edition)</u>			
<u>Components</u>	<u>Value</u>	<u>Determinant</u>	<u>Sampling Time</u>
Benzene (CAS 71-43-2)	25 µg/g creatinine	S-Phenylmercapturic acid in urine	End of shift
	500 µg/g creatinine	t,t-Muconic acid in urine	End of shift

Exposure guidelines:

Appropriate engineering controls

Observe occupational exposure limits and minimize the risk of inhalation of vapors. Provide easy access to water supply and eye wash facilities. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear goggles / face shield.

Skin protection / Hand Protection

Wear protective gloves. Nitrile gloves are recommended, but be aware that the liquid may penetrate the gloves. Frequent change is advisable. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Suitable gloves can be recommended by the glove supplier.

Other

Protection suit must be worn. Anti-static and flame-retardant protective clothing is recommended.

Respiratory protection

In case of inadequate ventilation, use air-supplied full-mask. Seek advice from local supervisor.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

When using, do not eat, drink or smoke. Wash hands after handling. Launder contaminated clothing before reuse. Private clothes and working clothes should be kept separately. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical Properties

Appearance	Clear, Colorless Gas
Physical State	Liquid
Form	Liquefied gas
Color	Colorless
Odor	Hydrocarbon
Odor threshold	Not available
PH	Not available
Melting Point/Freezing Point	Not available
Initial boiling point and boiling range	80°F (26.7 °C)
Flash Point	-45oF (-42.8 oC)
Evaporation rate	Moderately Fast
Flammability (solid, gas)	Not applicable

Upper / lower flammability or explosive limits

Flammability limit – lower	>1.4
Flammability – upper	>7.6
Vapor pressure	11 - 14 psi (100° F/38° C)
Vapor density	3 - 4 (Air=1)
Relative density	0.67
Solubility (ies)	Slightly soluble
Partition coefficient	Not available
Auto-ignition temperature	536 °F (280 °C)
Decomposition temperature	Not available

Viscosity Not available

Other Information

Bulk density	Not applicable
Explosive properties	Not applicable
Oxidizing properties	Not explosive

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable at normal conditions
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Heat, sparks, flames, elevated temperatures. Contact with incompatible materials.
Incompatible materials	Oxygen. Strong oxidizing agents.
Hazardous decomposition products	Carbon oxides and various hydrocarbons.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not a likely route of exposure. Aspiration hazard. May be fatal if swallowed and enters airways.
Inhalation	At high concentrations a simple asphyxiant. May produce nausea, diarrhea, loss of appetite, dizziness, disorientation, headache, excitation, rapid respiration, drowsiness, labored breathing, anesthesia and other central nervous system effects. May cause lung paralysis and asphyxiation. Extreme overexposure may cause unconsciousness and respiratory arrest.
Skin contact	May cause slight irritation. Extreme exposure may produce discoloration, muscle weakness, breathing difficulties and other central nervous system effects. Direct contact may cause freeze burns.

Eye contact**Symptoms related to the physical, chemical and toxicological characteristics**

May cause irritation including pain, blurred vision, redness, tearing and superficial corneal turbidity.

Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Dry skin and possible irritation with repeated or prolonged exposure.

Acute Toxicity

Human evidence indicates that the product has very low acute oral, dermal or inhalation toxicity.

However, it can produce severe injury if taken into the lung as a liquid, and there may be profound central nervous system depression following prolonged exposure to high levels of vapor.

Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Breathing of high concentrations may cause dizziness, Light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness. Irritant effect on skin. May irritate and cause stomach pain, vomiting, diarrhea and nausea.

<u>Components</u>	<u>Species</u>	<u>Test Results</u>
Benzene (CAS 71-73-2) Acute Oral LD50	Rat	930 mg/kg
Cyclohexane (CAS 110-82-7) Acute Oral LD50	Rat	12705 mg/kg

Skin corrosion/irritation

Causes skin irritation. Pre-existing skin conditions including dermatitis might be aggravated by exposure to this product.

Serious eye damage/eye irritation

May cause eye irritation on direct

Respiratory sensitization

Not a respiratory sensitizer

Skin sensitization

Not a skin sensitizer

Germ cell mutagenicity

May cause genetic defects.

Carcinogenicity

May cause cancer

IARC Monographs. Overall Evaluation of Carcinogenicity

Benzene (CAS 71-73-2)

Class 1 Carcinogen to humans

Toluene (CAS 108-88-3)

Class 3 Not classified as to carcinogenicity to humans

Xylene (CAS 1330-20-7)

Class 3 Not classified as to carcinogenicity to humans

NTP Report on Carcinogens

Benzene (CAS 71-73-2)

Known to be Human Carcinogen

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) - None

Benzene (CAS 71-73-2)

Cancer hazard

Reproductive toxicity

Suspected of damaging fertility or the unborn child.

Specific target organ toxicity-single exposure

May cause drowsiness or dizziness. Aspiration hazard. Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious

Specific target organ toxicity-repeated exposure

No information about adverse effects due to exposure. Chemical pneumonia.

Chronic effects

Prolonged or repeated contact with skin may cause redness, itching, irritation, eczema/chapping and oil acne. May cause damage to the liver.

Further information

Components of the product may be absorbed into the body through the skin.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

<u>Components</u>	<u>Species</u>	<u>Test Results</u>
Benzene (CAS 71-73-2) Aquatic Crustacea – EC50 Fish – LC50	Water Flea (Daphnia Magna) Rainbow Trout, Donaldson Trout (Oncorhynchus mkgiss)	8.76 – 15.6 mg/l, 48 hours 5 mg/l, 96 hours
Cyclohexane (CAS 110-82-7) Aquatic – LC50 Fish	Fathead Minnow (Pimephales promelas)	3.61 – 5.181 mg/l, 96 hours
Toluene (CAS 108-88-3) Aquatic Crustacea – EC50 Fish - LC50	Water Flea (Daphnia Magna) Coho Salmon, Silver Salmon (Oncorhynchus kisutch)	5.46 – 9.83 mg/l, 48 hours 5.5 mg/l, 96 hours
Xylene (CAS 1330-20-7) Aquatic Crustacea Fish – LC50	Rainbow Trout, Donaldson Trout (Oncorhynchus mkgiss)	7 mg/l, 96 hours

Bioaccumulative potential

Has the potential to bioaccumulate

Partition coefficient n-octanol / water (log Kow)

Benzene (CAS 71-73-2)	2.13
Toluene (CAS 108-88-3)	2.73
Xylene (CAS 1330-20-7)	3.2
Cyclohexane (CAS 110-82-7)	3.44

Persistence and degradability

Expected to be inherently biodegradable. The product has a low potential of being absorbed in the soil.

Mobility in soil

The product is insoluble in water. It will spread on the water surface while some of the components will eventually sediment in water systems. The volatile components of the product will spread in the atmosphere.

Mobility in general

The product contains volatile organic compounds which have a photochemical ozone creation potential. Oil spills are generally hazardous to the environment.

13. Other adverse effects**Disposal considerations**

Dispose in accordance with all applicable regulations. This material and/or its container must be disposed of as hazardous waste.

Disposal instructions

Dispose of in accordance with local regulations.

Local disposal regulations

D001

Hazardous waste code

The transportation, storage, treatment and disposal of RCRA waste material must be conducted in compliance with 40 CFR 262, 263, 264, 268, and 270. Disposal can occur only in properly permitted facilities. Check state regulations. Chemical additions, processing or otherwise altering this material may make the waste management information presented in this SDS incomplete, inaccurate or otherwise inappropriate. Disposal of this material must be conducted in compliance with all federal, state and local regulations.

Waste from residues / unused products

Non-empty contaminated packaging should be disposed of as hazardous waste.

14. Transportation**DOT**

UN number	UN1268
UN proper shipping name	Petroleum Distillates, n.o.s.
Commodity Description / Technical Name	Natural Gasoline
Hazard class	3
Subsidiary class	None
Packing group	I
Special precautions for user	Not Available
Labels required	3
Special provision	N/A
Packaging exceptions	150
Packaging non bulk	201
Packaging bulk	243

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200 (OSHA) and 8 CCR § 5194 (Cal/OSHA). All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpart D) Not regulated

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) Benzene (CAS 71-73-2) 29 CFR 1910, 1029

CERCLA Hazardous Substance List (40 CFR 302.4)

- Benzene (CAS 71-73-2) - Listed
- Toluene (CAS 108-88-3) - Listed
- Xylene (CAS 1330-20-7) - Listed
- Cyclohexane (CAS 110-82-7) – Listed

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Immediate Hazard – Yes
Delayed Hazard – Yes
Fire Hazard – Yes
Pressure Hazard – No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical Yes

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Benzene (CAS 71-73-2)

Toluene (CAS 108-88-3)

Xylene (CAS 1330-20-7)

Cyclohexane (CAS 110-82-7)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130) – Not Regulated

Safe Drinking Water Act (SDWA) – Not Regulated

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number - Toluene (CAS 108-88-3)

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c)) - Toluene (CAS 108-88-3)

DEA Exempt Chemical Mixtures Code Number - None Food and Drug Administration. (FDA) - Toluene (CAS 108-88-3)

16. Other information, including date of preparation or last version

NFPA Ratings:

NFPA health hazard : 2 – Hazardous

NFPA fire hazard : 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions. and are not reactive with water.

HMIS III Rating:

Health : **3** - Major injury likely unless prompt action is taken and medical treatment is given.

Flammability : **4** - Flammable gases, or very volatile flammable liquids with flash points below 73 °F (23 °C), and boiling points below 100 °F (38 °C). Materials may ignite spontaneously with air

Physical : **0** - Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

References

IARC Monographs. Overall Evaluation of Carcinogenicity (Volumes 1-102)
Registry of Toxic Effects of Chemical Substances (RTECS)
National Library of Medicine, Wisner Database
ECHA Registered Substances
ACGIH TLVs and BEIs, 2016 Edition
NIOSH Pocket Guide to Chemical Hazards
EU Regulation 1272/2008
29 CFR 1910.1200

SDS Version History

Most recent version date: February 16, 2017

Previous version date: September 24, 2013

Disclaimer

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

SAFETY DATA SHEET

1. Identification

Product identifier PROPANE (ODORIZED)
Other means of identification Liquefied Petroleum Gas (LPG)
Recommended Use Fuel
Recommended restrictions None
Manufacturer / Importer / Supplier / Distributor information
Company Name Blue Racer Midstream, LLC
Address 5949 Sherry Lane, Suite 1300, Dallas, TX 75225
Telephone 214-580-3700
Email www.blueracermidstream.com
Contact Person Safety Department
Emergency phone number 800-300-3333

2. Hazard(s) identification

Physical hazards Flammable gases: Category 1
 Gases under pressure. Liquefied Gas.
Health hazards
 Asphyxiation hazard
 Skin and eye frostbite hazard
 Specific target organ systemic toxicity (Respiratory and Central Nervous Systems) – single exposure - **Category 2**

Label Elements
Hazard symbol



Signal word Danger

Hazard statement
 Extremely flammable gas.
 Contains gas under pressure; may explode if heated.
 May displace oxygen and cause rapid suffocation.
 May cause frostbite, and freeze burns to skin and eyes
 May cause damage to the central nervous and respiratory systems.

Precautionary statement
Prevention Keep away from heat, sparks, open flames, hot surfaces. No smoking.
 Do not breath fume/gas/mist/vapors/spray.
 Wash thoroughly after handling.
 Do not eat, drink or smoke when using this product.

Response Leaking gas fire; Do not extinguish, unless leak can be stopped safely.
 Eliminate all ignition sources if safe to do so.

Storage Protect from sunlight. Store in a well-ventilated area.
Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

3. Composition / Information on Ingredients

Mixture

<u>Hazardous components</u>	<u>Common name and synonyms</u>	<u>CAS Number</u>	<u>%</u>
<u>Chemical Name</u>			
Propane		74-98-6	>90
Ethane		74-84-0	>7
C4 Hydrocarbons		- -	<5
Ethyl Mercaptan		75-08-1	16-25 ppm

Composition comments

All concentrations are in percentage by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

WARNING:

The intensity of the chemical odorant (ethyl mercaptan) may fade or diminish due to chemical oxidation, adsorption or absorption. Individuals with nasal perception problems may not be able to smell the odorant. Leaking propane from underground gas lines may lose its odor as it passes through certain soils. No odorant is effective 100% of the time. Therefore, circumstances can exist when individuals are in the presence of leaking propane and not be alerted to the smell. Contact your supplier for more information about odor, propane gas detectors and other safety considerations associated with handling, storage and use of propane.

4. First-aid measures**Inhalation**

Move victim to area of fresh air. For respiratory distress give air, oxygen or administer cardiopulmonary resuscitation if needed. Seek medical attention -- call 911 or emergency medical services.

Skin contact

Immediately flush skin with water for 15 minutes. Frozen tissue should be gradually warmed using warm water. Clothing frozen to the skin should be thawed before removal. Do not use hot water! Cryogenic burns may occur as evidenced by blistering. Protect affected area with dry gauze and get prompt medical attention.

Eye contact

Flush eyes gently with water for at least 15 minutes. If illness or adverse symptoms develop, seek medical attention.

Ingestion

Risk of ingestion is extremely low. However, if oral exposure occurs, seek immediate medical attention.

Most important symptoms/effects, acute and delayed

Frostbite. Narcosis. Behavioral changes. Decrease in motor functions.

Indication of immediate Medical attention and special treatment needed

Treat symptomatically.

General information

First aid personnel must be aware of own risk during rescue.

5. Firefighting measures**Suitable extinguishing media**

Extinguish with foam, carbon dioxide, dry powder or water fog.

Unsuitable extinguishing media

None

Specific hazards arising from the chemical

Cylinders can burst violently when heated, due to excess pressure build-up. Gas may travel considerable distance to a source of ignition and flash back. Gases may form explosive mixtures with air. Fire or high temperatures can create carbon monoxide.

Special protective equipment and precautions for firefighters

Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. Firefighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with full face-piece operated in positive pressure mode. Use approved gas detectors in confined space.

Firefighting equipment/instructions

Evacuate area. Remove pressurized cylinders from the immediate vicinity. Cool containers exposed to flames with water until well after the fire is out. Close the valve if no risk is involved. Do not extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and no danger to surrounding area allow the fire to burn out. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.

Special protective equipment and precautions for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in fire-fighting situations.

Fire-fighting equipment/instructions

Evacuate area of all unnecessary personnel. Shut off product source and allow fire to burn out. Use water fog or spray to cool exposed containers and equipment to prevent overheating, flashbacks or explosions. Firefighters directly addressing the fire must use proper protective equipment including SCBA to protect against hazardous combustion products and/or oxygen deficiencies.

6. Accidental release measures**Personal precautions,**

All non-essential personnel should be evacuated. Stay upwind. Ventilate enclosed

protective equipment and emergency procedures

areas to prevent formation of flammable or oxygen-deficient atmospheres. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Liquid spills will vaporize rapidly and produce vapor cloud. Be alert for latent pooling of gasoline portion. Because vapors are heavier than air they will not readily disperse. Avoid vapor cloud even with proper respiratory equipment.

Methods and materials for containment and cleaning up

Avoid contact with skin. Wear suitable protective clothing, gloves and eye/face protection. For personal protection, see section 8 of the SDS.

In the event of a large spill, self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

Stop the flow of material, if this is without risk. Dike far ahead of spill for later disposal. Remove sources of ignition. Beware of the explosion danger.

Small Spills: Absorb spillage with non-combustible, absorbent material.

Large Spills: Remove with vacuum trucks or pump to storage/salvage vessels. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Ensure that waste and contaminated materials are collected and removed from the work area as soon as possible in a suitably labeled container. Wash area with soap and water. If necessary dike the product with dry earth, sand or similar non-combustible materials.

Environmental precautions

Stop leak if possible if possible to do so safely. Sewers must be covered and basements and work pits evacuated.

7. Handling and storage

Precautions for safe handling

Access to work area should be restricted to people handling the product only. Should be handled in closed systems, if possible. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Use self-contained breathing apparatus (SCBA) in release situations where exposure concentration is unknown or cannot be controlled.

Use explosion-proof equipment and non-sparking tools in areas where explosive vapors may form. Electrostatic charge may accumulate and create a hazardous condition when handling or processing. Electrically ground and bond shipping container, transfer line and receiving container. Refer to NFPA-70 and/or API RP2003 for specific bonding/grounding requirements. Material may be at elevated temperatures and/or pressures. Exercise care when opening tank hatches, sampling ports and/or bleeder valves.

Extremely flammable. May vaporize easily at ambient temperatures. Vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open containers slowly to relieve pressure. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29 CFR 1910.146 (OSHA Confined Space Entry Standard). Do not wear contaminated clothing or shoes. Keep contaminated clothing away from ignition sources.

Conditions for safe storage, including any incompatibilities

Keep containers tightly closed. Keep away from heat, open flames, or other sources of ignition. Flammable compressed gas storage. Keep in a cool well-ventilated place.

No smoking or open lighting. Outside or detached storage is preferred. Keep away from oxidizers, e.g. chlorine, oxygen, bleaches, fertilizers and incompatible materials.

8. Exposure controls / personal protection

Occupational exposure limits

U.S. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

<u>Components</u>	<u>Type</u>	<u>Value</u>
Propane (CAS 74-98-6)	PEL	1000 ppm
Ethyl Mercaptan (CAS 75-08-1)	Ceiling	(1800 mg/m ³) 10 ppm (25 mg/m ³)

U.S. ACGIH Threshold Limit Values (2016 Edition)

Ethane (74-84-0)	Asphyxiation hazard (Appendix F)
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Propane (74-98-6)	Asphyxiation hazard (Appendix F)	
Ethyl Mercaptan (75-08-1)	Ceiling	0.5 ppm (1.3 mg/m ³)

U.S. NIOSH: Pocket Guide to Chemical Hazards

Propane (74-98-6)	REL	1000 ppm (1800 mg/m ³)
Ethyl Mercaptan (75-08-1)	Ceiling	0.5ppm (1.3 mg/m ³) [15-minute]

Biological limit values:	None
Exposure guidelines:	No exposure standards allocated.
Appropriate engineering controls	Observe occupational exposure limits and minimize the risk of inhalation of vapors. Provide easy access to water supply and eye wash facilities. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear goggles / face shield.
Skin protection	
Hand protection	Wear protective gloves. Nitrile gloves are recommended but be aware that the liquid may penetrate the gloves. Frequent change is advisable. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Suitable gloves can be recommended by the glove supplier.
Other	Protection suit must be worn. Anti-static and flame-retardant protective clothing is recommended.
Respiratory protection	In case of inadequate ventilation where exposure concentrations are known, use air-supplied full-mask. In situations where concentrations are unknown, use SCBA. Seek advice from local supervisor.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	When using, do not eat, drink or smoke. Wash hands after handling. Launder contaminated clothing before reuse. Private clothes and working clothes should be kept separately. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical properties

Appearance	Colorless gas
Physical state	Gas
Form	Compressed liquefied gas
Color	Colorless to straw colored
Odor	Petroleum
Odor threshold	Not available
PH	Not available
Melting point / freezing point	Not available
Initial boiling point and boiling range	-47 °F (-43.9 °C) 1 atm
Flash Point	-156 °F (-104.4 °C)
Evaporation rate	Not available
Flammability (solid, gas)	Flammable

Upper / lower flammability or explosive limits

Flammability limit – lower	>2%
Flammability – upper	10%
Vapor pressure	208 psi
Vapor density	1.8 (Air=1)
Relative density	0.5 @-42.2 °F (Water =1)
Solubility (ies)	Not Available

Partition coefficient	(n-octanol/ water) Not available
Auto-ignition temperature	874 °F (467.78 °C) estimated
Decomposition temperature	Not available
Viscosity	Not available
Other Information	
Bulk density	Not applicable
Explosive properties	Not applicable
Oxidizing properties	Not applicable

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable at normal conditions
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Heat, sparks, flames, elevated temperatures. Contact with incompatible materials.
Incompatible materials	Oxygen. Strong oxidizing agents.
Hazardous decomposition products	Carbon oxides, sulfur oxides and various hydrocarbons.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not a likely route of exposure.
Inhalation	At high concentrations a simple asphyxiant. May produce nausea, diarrhea, loss of appetite, dizziness, disorientation, headache, excitation, rapid respiration, drowsiness, labored breathing, anesthesia and other central nervous system effects. May cause lung paralysis and asphyxiation. Extreme overexposure may cause unconsciousness and respiratory arrest.
Skin contact	May cause slight irritation. Extreme exposure may produce discoloration, muscle weakness, breathing difficulties and other central nervous system effects. Direct contact may cause frostbite or freeze burns.
Eye contact	May cause irritation including pain, blurred vision, redness, tearing and superficial corneal turbidity. Direct contact with the liquid can cause freeze burns and possibly permanent vision loss.
Symptoms related to the physical, chemical and toxicological characteristics	Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn"). Contact with evaporating liquid may cause frostbite or freezing of skin. Narcosis. Behavioral changes. Decrease in motor functions. Eyes. Skin. Central nervous system.
Acute toxicity	Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Dry skin and possible irritation with repeated or prolonged exposure. Human evidence indicates that the product has very low acute oral, dermal or inhalation toxicity. However, it can produce severe injury if taken into the lung as a liquid, and there may be profound central nervous system depression following prolonged exposure to high levels of vapor. Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Breathing of high concentrations may cause dizziness, Light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness. Irritant effect on skin. May irritate and cause stomach pain, vomiting, diarrhea and nausea.

Components

Ethane (74-84-0)

Acute

Inhalation

Species

Test Results

LC50	Rat	658 mg/l, 4 hours
Propane (CAS 74-98-6)		
Acute		
Inhalation		
LC50	Rat	>1442.847 mg/l, 15 minutes
Ethyl Mercaptan (CAS 75-08-1)		
Acute		
Dermal		
LD50	Rat	>2000 mg/kg
Acute		
Inhalation		
LC50	Mouse	4420 mg/L, 4 hours
Acute		
Oral		
LD50	Rat	682 mg/kg

- Serious eye damage/eye irritation** Not classified.
- Respiratory sensitization** Not classified.
- Skin sensitization** Not a skin sensitizer
- Germ cell mutagenicity** May cause genetic defects.
- Chronic effects** Prolonged exposure may cause chronic effects.
- IARC Monographs. Overall Evaluation of Carcinogenicity** – No ingredients listed
- NTP Report on Carcinogens** No ingredients listed
- US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)** - None
- Reproductive toxicity** Not classified.
- Specific target organ toxicity - single exposure** Not classified.
- Specific target organ toxicity - repeated exposure** Not classified.

12. Ecological information

- Exotoxicity** This product causes substances which are toxic to aquatic organisms and which may cause long-term adverse effects in the aquatic environment.
- Bioaccumulative potential** Has the potential to bioaccumulate.
- Partition coefficient n-octanol / water (log Kow)**
- Ethane 1.81
- Propane 2.36
- C4 Hydrocarbons 2.89
- Persistence and degradability** Not available.
- Mobility in soil** Not relevant, due to the form of the product.
- Mobility in general** This product is a volatile substance, which may spread in the atmosphere.
- Other adverse effects** The product contains volatile organic compounds which have a photochemical ozone creation potential. Oil spills are generally hazardous to the environment.

13. Disposal considerations

- Disposal instructions** Dispose in accordance with all applicable regulations. This material and/or its container must be disposed of as hazardous waste.
- Local disposal regulations** Dispose of in accordance with local regulations.
- Hazardous waste code** Not regulated.
- Waste from residues / unused products** Dispose of in accordance with local regulations.
- Contaminated packaging** Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. **Transportation**

DOT

UN number	UN1075
UN proper shipping name	Liquefied Petroleum Gas
Commodity Description / Technical Name	Propane, Odorized
Hazard class	2.1
Subsidiary class	Not available.
Packing group	None
Special precautions for user	Not available.
Labels required	Flammable gas (2.1)
Special provision	T50
Packaging exceptions	306
Packaging non bulk	304

15. **Regulatory information**

US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200 (OSHA). All components are on the U.S. EPA TSCA Inventory List.
TSCA Section 12(b) Export Notification (40 CFR 707, Subpart. D)	Not regulated
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)	None
CERCLA Hazardous Substance List (40 CFR 302.4)	
C4 Hydrocarbons	LISTED
Ethane (CAS74-84-0)	LISTED
Propane (CAS74-98-6)	LISTED
Ethyl Mercaptan (CAS 75-08-1)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard – Yes Delayed Hazard – No Fire Hazard – Yes Pressure Hazard – Yes Reactivity Hazard - No
SARA 302 Extremely hazardous substance	No
SARA 311/312 Hazardous chemical	Yes
SARA Section 313	This material contains the following chemical subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372: n-Hexane

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List:

Not regulated

Clean Air Act (CAA) Section 112 Accidental Release Prevention (40CFR68.130):

- C4 Hydrocarbons
- Ethane (CAS 74-84-0)
- Propane (CAS 74-98-6)
- Ethyl Mercaptan (CAS 75-08-1)

Safe Drinking Water Act (SDWA) – No constituents on the List of Contaminants

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number – None

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c)) – None

DEA Exempt Chemical Mixtures Code Number - None Food and Drug Administration. (FDA) Not regulated.

16. Other information, including date of preparation or last version

NFPA Ratings

NFPA health hazard	: 3 – Can cause serious or permanent injury
NFPA fire hazard	: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.
NFPA reactivity	: 0 - Normally stable, even under fire exposure conditions. and are not reactive with water.

HMIS III Rating:

Health : **3** - Major injury likely unless prompt action is taken and medical treatment is given.
Flammability : **4** - Flammable gases, or very volatile flammable liquids with flash points below 73 °F (23 °C), and boiling points below 100 °F (38 °C). Materials may ignite spontaneously with air.
Physical : **0** - Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

References

IARC Monographs. Overall Evaluation of Carcinogenicity (Volumes 1-102)
Registry of Toxic Effects of Chemical Substances (RTECS)
National Library of Medicine, Wisser Database
ECHA Registered Substances
ACGIH TLVs & BEIs, 2016 Edition
NIOSH Pocket Guide to Chemical Hazards
EU Regulation 1272/2008
29 CFR 1910.1200

SDS Version History

Most recent version date: February 16, 2017

Previous version date: September 24, 2013

Disclaimer

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

SAFETY DATA SHEET

1. Identification

Product identifier PROPANE
Other means of identification Not Available
Recommended restrictions None
Manufacturer / Importer / Supplier / Distributor information
Company Name / Address Blueracer Midstream, LLC
5949 Sherry Lane, Suite 1300, Dallas, TX 75225
Telephone 214-580-3700
Email www.blueracermidstream.com
Contact Person Safety Department
Emergency phone number 214-580-3700

2. Hazard(s) identification

Physical hazards Flammable gases: Category 1
Gases under pressure. Liquefied Gas.

Health hazards Not Classified

Label Elements

Hazard symbol



Signal word Danger

Hazard statement Extremely flammable gas. Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.

Precautionary statement Keep away from heat, sparks, open flames, hot surfaces. No smoking.

Prevention Response Leaking gas fire; Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known

3. Composition / Information on Ingredients

Substance

<u>Hazardous components</u>	<u>Chemical Name</u>	<u>Common name and synonyms</u>	<u>CAS Number</u>	<u>%</u>
	Propane		74-98-6	>90
	Ethane		74-84-0	>7
	C4 Hydrocarbons		--	<5

Composition comments All concentrations are in percentage by weight.

4. First-aid measures

Inhalation Move victim to area of fresh air. For respiratory distress give air, oxygen or administer cardiopulmonary resuscitation if needed. Seek medical attention -- call 911 or emergency medical services.

Skin contact Immediately flush skin with water for 15 minutes. Frozen tissue should be gradually warmed using warm water. Clothing frozen to the skin should be thawed before removal. Do not use hot water! Cryogenic burns may occur as evidenced by blistering. Protect affected area with dry gauze and get prompt medical attention.

Eye contact	Flush eyes gently with water for at least 15 minutes. If illness or adverse symptoms develop, seek medical attention.
Ingestion	Seek immediate medical attention.
Most important symptoms/ effects, acute and delayed	Narcosis. Behavioral changes. Decrease in motor functions.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	First aid personnel must be aware of own risk during rescue.

5. Firefighting measures

Suitable extinguishing media	Extinguish with foam, carbon dioxide, dry powder or water fog.
Unsuitable extinguishing media	None
Specific hazards arising from the chemical	Cylinders can burst violently when heated, due to excess pressure build-up. Gas may travel considerable distance to a source of ignition and flash back. Gases may form explosive mixtures with air. Fire or high temperatures create carbon monoxide. Carbon oxides.
Special protective equipment and precautions for firefighters	Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. Firefighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with full face-piece operated in positive pressure mode. Use approved gas detectors in confined space.
Firefighting equipment/instructions	Evacuate area. Remove pressurized cylinders from the immediate vicinity. Cool containers exposed to flames with water until well after the fire is out. Close the valve if no risk is involved. Do not extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and no danger to surrounding area allow the fire to burn out. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire-fighting equipment/instructions	Evacuate area of all unnecessary personnel. Shut off product source and allow fire to burn itself out. Use water fog or spray to cool exposed containers and equipment to prevent overheating, flashbacks or explosions. Firefighters directly addressing the fire must use proper protective equipment including breathing apparatus to protect against hazardous combustion products and/or oxygen deficiencies.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	All non-essential personnel should be evacuated. Stay upwind. Ventilate enclosed areas to prevent formation of flammable or oxygen-deficient atmospheres. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Liquid spills will vaporize rapidly and produce vapor cloud. Be alert for latent pooling of gasoline portion. Because vapors are heavier than air they will not readily disperse. Avoid vapor cloud even with proper respiratory equipment.
Methods and materials for containment and cleaning up	Avoid contact with skin. Wear suitable protective clothing, gloves and eye/face protection. For personal protection, see section 8 of the SDS. In the event of a large spill, self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Stop the flow of material, if this is without risk. Dike far ahead of spill for later disposal. Remove sources of ignition. Beware of the explosion danger. Small Spills: Absorb spillage with non-combustible, absorbent material. Large Spills: Remove with vacuum trucks or pump to storage/salvage vessels. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Ensure that waste and contaminated materials are collected and removed from the work area as soon as possible in a suitably labeled container. Wash area with soap and water. If necessary dike the product with dry earth, sand or similar non-combustible materials.
Environmental precautions	Prevent spreading over a wide area (e.g. by containment or oil barriers). Do not contaminate water. Contact local authorities in case of spillage to drain/aquatic environment.

7. Handling and storage

Precautions for safe handling

Access to work area should be restricted to people handling the product only. Should be handled in closed systems, if possible. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Use self-contained breathing apparatus (SCBA) if appropriate.

Use explosion-proof equipment and non-sparking tools in areas where explosive vapors may form. Electrically ground and bond shipping container, transfer line and receiving container. Material may be at elevated temperatures and/or pressures. Exercise care when opening tank hatches, sampling ports and/or bleeder valves.

Conditions for safe storage, including any incompatibilities

Keep containers tightly closed. Keep away from heat, open flames, or other sources of ignition. No smoking or open lighting. Outside or detached storage is preferred. Keep away from oxidizers, e.g. chlorine, oxygen, bleaches, fertilizers.

8. Exposure controls / personal protection

Occupational exposure limits

U.S. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

<u>Components</u>	<u>Type</u>	<u>Value</u>
Propane 74-98-6	PEL	1800 mg/m ³

U.S. ACGIH Threshold Limit Values

C4 Hydrocarbons	TWA	1000 ppm
Ethane 74-84-0	TWA	1000 ppm
Propane 74-98-6	TWA	1000 ppm

U.S. NIOSH: Pocket Guide to Chemical Hazards

C4 Hydrocarbons	REL	1900 mg/me 800 ppm
Propane 74-98-6	REL	1800 mg/me 1000 ppm

Biological limit values: None

Exposure guidelines: No exposure standards allocated.

Appropriate engineering controls Observe occupational exposure limits and minimize the risk of inhalation of vapors. Provide easy access to water supply and eye wash facilities. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear goggles / face shield.

Skin protection

Hand protection

Wear protective gloves. Nitrile gloves are recommended, but be aware that the liquid may penetrate the gloves. Frequent change is advisable. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Suitable gloves can be recommended by the glove supplier.

Other

Protection suit must be worn. Anti-static and flame-retardant protective clothing is recommended.

Respiratory protection

In case of inadequate ventilation, use air-supplied full-mask. Seek advice from local supervisor.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

When using, do not eat, drink or smoke. Wash hands after handling. Launder contaminated clothing before reuse. Private clothes and working clothes should be kept separately. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical properties

Appearance	Colorless gas
Physical state	Gas
Form	Compressed liquefied gas
Color	Colorless to straw colored
Odor	Petroleum
Odor threshold	Not available
PH	Not available
Melting point / freezing point	Not available
Initial boiling point and boiling range	-47 °F (-43.9 °C) 1 atm
Flash Point	-156 °F (-104.4 °C)
Evaporation rate	Not available
Flammability (solid, gas)	Flammable

Upper / lower flammability or explosive limits

Flammability limit – lower	>2%
Flammability – upper	10%
Vapor pressure	208 psi
Vapor density	1.8 (Air=1)
Relative density	0.5 @-42.2 °F (Water =1)
Solubility (ies)	Not Available
Partition coefficient	(n-octanol/ water) Not available
Auto-ignition temperature	874 °F (467.78 °C) estimated
Decomposition temperature	Not available
Viscosity	Not available
Other Information	
Bulk density	Not applicable
Explosive properties	Not applicable
Oxidizing properties	Not applicable

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable at normal conditions
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Heat, sparks, flames, elevated temperatures. Contact with incompatible materials.
Incompatible materials	Oxygen. Strong oxidizing agents.
Hazardous decomposition products	Carbon oxides and various hydrocarbons.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Not a likely route of exposure.
Inhalation	At high concentrations a simple asphyxiant. May produce nausea, diarrhea, loss of appetite, dizziness, disorientation, headache, excitation, rapid respiration, drowsiness, labored breathing, anesthesia and other central nervous system effects. May cause lung paralysis and asphyxiation. Extreme overexposure may cause unconsciousness and respiratory arrest.

Skin contact

May cause slight irritation. Extreme exposure may produce discoloration, muscle weakness, breathing difficulties and other central nervous system effects. Direct contact may cause freeze burns.

Eye contact**symptoms related to the physical, chemical and toxicological characteristics**

May cause irritation including pain, blurred vision, redness, tearing and superficial corneal turbidity.

Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Dry skin and possible irritation with repeated or prolonged exposure.

Acute toxicity

Human evidence indicates that the product has very low acute oral, dermal or inhalation toxicity.

However, it can produce severe injury if taken into the lung as a liquid, and there may be profound central nervous system depression following prolonged exposure to high levels of vapor.

Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Breathing of high concentrations may cause dizziness,

Light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness. Irritant effect on skin. May irritate and cause stomach pain, vomiting, diarrhea and nausea.

Components**Species****Test Results**

C4 Hydrocarbons

Acute

Inhalation

LC50

Rat

658 mg/l, 4 hours

Propane 74-98-6

Acute

Inhalation

LC5

Rat

>1442.847 mg/l, 15 minutes

Skin corrosion/irritation

Not classified.

Serious eye damage/eye irritation

Not classified.

Respiratory sensitization

Not classified.

Skin sensitization

Not a skin sensitizer

Germ cell mutagenicity

May cause genetic defects.

Chronic effects

Prolonged exposure may cause chronic effects.

IARC Monographs. Overall Evaluation of Carcinogenicity – No ingredients listed**NTP Report on Carcinogens**

No ingredients listed

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050) - None**Reproductive toxicity**

Not classified.

Specific target organ toxicity - single exposure

Not classified.

Specific target organ toxicity - repeated exposure

Not classified.

12. Ecological information**Exotoxicity**

This product causes substances which are toxic to aquatic organisms and which may cause long-term adverse effects in the aquatic environment.

Bioaccumulative potential

Has the potential to bioaccumulate.

Partition coefficient n-octanol / water (log Kow)

Ethane 1.81

Propane 2.36

C4 Hydrocarbons 2.89

Persistence and degradability

Not available.

Mobility in soil

Not relevant, due to the form of the product.

Mobility in general
Other adverse effects

This product is a volatile substance, which may spread in the atmosphere.
The product contains volatile organic compounds which have a photochemical ozone creation potential. Oil spills are generally hazardous to the environment.

13. Disposal considerations

Disposal instructions

Dispose in accordance with all applicable regulations. This material and/or its container must be disposed of as hazardous waste.

Local disposal regulations

Dispose of in accordance with local regulations.

Hazardous waste code

Not regulated.

Waste from residues / unused products

Dispose of in accordance with local regulations.

Contaminated packaging

Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transportation

DOT

UN number	UN1978
UN proper shipping name	Propane
Hazard class	2.1
Subsidiary class	Not available.
Packing group	None
Special precautions for user	Not available.
Labels required	Flammable gas (2.1)
Special provision	19. T50
Packaging exceptions	306
Packaging non bulk	304
Packaging bulk	314.315

IATA

UN number	UN1978
UN proper shipping name	Propane
Transport hazard class	2.1
Subsidiary class	
Packaging group	None
Environmental hazards	NA
Labels required	Flammable gas (2.1)
Special provision	Not available.
ERG Code	10L
Special precautions for user	Not available

IMDG

UN number	UN1978
UN proper shipping name	Propane
Transport hazard class	Flammable gas (2.1)
Subsidiary class	
Packaging group	None
Environmental hazards	NA
Marien pollutant labels required	None
EmS	F-D S-U
Special precautions for users	Not available

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200 (OSHA). All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)	Not regulated	
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)	None	
CERCLA Hazardous Substance List (40 CFR 302.4)	C4 Hydrocarbons	LISTED
	Ethane (CAS74-84-0)	LISTED
	Propane (CAS74-98-6)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard – Yes
	Delayed Hazard – No
	Fire Hazard – Yes
	Pressure Hazard – Yes
	Reactivity Hazard - No
SARA 302 Extremely hazardous substance	No
SARA 311/312 Hazardous chemical	Yes
SARA Section 313	This material contains the following chemical subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372: n-Hexane

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List – Not regulated

C4 Hydrocarbons
Ethane (CAS74-84-0)
Propane (CAS74-98-6)

Safe Drinking Water Act (SDWA) – No constituents on the List of Contaminants

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number – None

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c)) – None

DEA Exempt Chemical Mixtures Code Number - None Food and Drug Administration. (FDA) Not regulated.

16. Other information, including date of preparation or last version

References

IARC Monographs. Overall Evaluation of Carcinogenicity (Volumes 1-102)
Registry of Toxic Effects of Chemical Substances (RTECS)
National Library of Medicine, Wisser Database
ECHA Registered Substances
NIOSH Pocket Guide to Chemical Hazards
EU Regulation 1272/2008
29 CFR 1910.1200

Disclaimer

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

MATERIAL SAFETY DATA SHEET

SECTION 1 – Chemical Product

Product/Chemical Name: TRIETHYLENE GLYCOL
Chemical Formula: (CH₂OCH₂CH₂OH)₂
CAS Number: 112-27-6
Synonyms: TEG

SECTION 2 – Hazards Identification

Acute Effects:

Inhalation: Short term harmful health effects are not expected from vapor generated at ambient temperatures. No evidence of short term harmful effects from respirable aerosol based on available information.

Eye: Splashing in eye causes irritation with transitory disturbances of corneal epithelium. However, these effects diminish and no permanent injury is expected. Vapors are non-irritating.

Skin: Prolonged exposure may cause skin irritation.

Ingestion: Abdominal discomfort, nausea and vomiting may occur.

Carcinogenicity: Not Classifiable as a Human Carcinogen.

Medical Conditions Aggravated by Long-Term Exposure: A knowledge of the available toxicology information and of the physical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

Chronic Effects: Exposure to high concentrations of aerosol generated at room temperature may cause lung injury and liver dysfunction.

SECTION 3 – First Aid Measures

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Skin Contact: Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention.

Ingestion: If large amounts are swallowed, give water to drink and get medical advice. Never give anything by mouth to an unconscious person. Get medical attention.

SECTION 4 – Fire Fighting Measures

Flash Point: 350°F (176.6°C)

Flash Point Method: CC

Burning Rate: Not available

Autoignition Temperature: 700°F (371°C)

LEL: 0.9% v/v

UEL: 9.2% v/v

Flammability Classification: Slight fire hazard when exposed to heat or flame.

Extinguishing Media: Dry chemical, foam or carbon dioxide. Water or foam may cause frothing. Water spray may be used to extinguish surrounding fire and cool exposed containers. Water spray will also reduce fume and irritant gases.

Unusual Fire or Explosion Hazards: Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Containers may explode when involved in a fire. LEAKS INTO POROUS INSULATION MATERIAL MAY IGNITE AT TEMPERATURES FAR BELOW PUBLISHED AUTOIGNITION OR IGNITION TEMPERATURES, POTENTIALLY EVEN BELOW THE NORMAL FLASH POINT.

SECTION 4 – Fire Fighting Measures – continued

Hazardous Combustion Products: Carbon Dioxide and Carbon Monoxide may form when heated to decomposition. May produce smoke and irritating fumes when heated to decomposition.

Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways.

Fire-Fighting Equipment: Wear full protective clothing and NIOSH approved self-contained breathing apparatus with full facepiece in the pressure demand or positive pressure mode.

SECTION 5 – Accidental Release Measures

Spill/Leak Procedures: Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Use non-sparking tools and equipment. Do not flush to sewer.

Small Spills: Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculate, dry sand), and place in a chemical waste container. Do not use combustible materials, such as saw dust.

Large Spills:

Containment: Wear respirator and protective clothing as appropriate. Shut off source of leak if safe to do so. For large spills, dike far ahead of liquid spill for later disposal. Do not release into sewers or waterways.

Cleanup: Contain and recover liquid when possible. Collect liquid in appropriate container. Absorb residue with an inert material. Consult with your environmental department for detailed clean up instructions.

Regulatory Requirements: Follow applicable OSHA regulations (29CFR 1910.120). CERCLA requires reporting spills and release to soil, water and air in excess of reportable quantities.

SECTION 6 – Handling and Storage

Handling Precautions: Potential peroxide former. Store away from heat and light. If peroxide formation is suspected, do not open or move container.

Storage Requirements: Store in a cool, dry ventilated area. Separate from acids and oxidizing materials.

Regulatory Requirements: This product contains the following chemical(s) subject to the reporting requirements of SARA Title III Section 311, 312, and 313: None

SECTION 7 – Exposure Controls/Personal Protection

Engineering Controls: Controls should be such that adequate ventilation is provided.

Ventilation: Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary wear a MSHA/NIOSH approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or non-routine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program.

Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye and face protection regulations (29CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment.

Comments: Never eat, drink or smoke in work areas. Practice good personal hygiene after using this material.

SECTION 7 – Physical and Chemical Properties

Physical State: Liquid

Appearance and Odor: Clear, Colorless, mild odor

Odor Threshold: NA

Vapor Pressure: <0.01 mm Hg @ 20 C

Vapor Density (Air=1): 5.2

Formula Weight: 150.7

Density: 9.3 lbs/gal @ 20⁰ C

Specific Gravity (H₂O=1, @ 4⁰C): 1.12

pH: NA

Water Solubility: Soluble

Other Solubilities: Alcohols, methyl isosbutyl carbitol

Boiling Point: 285⁰ C (545⁰F)

Freezing/Melting Point: -5⁰ C (23⁰ F)

Viscosity: 29cP @ 20⁰ C

Refractive Index: 1.447 @ 20⁰C

Surface Tension: 47 dyne/cm @ 20⁰C

% Volatile: Negligable @ 25⁰ C

Evaporation Rate: NA

SECTION 8 – Stability and Reactivity

Stability: Stable, however forms peroxides of unknown stability.

Polymerization: Hazardous polymerization will not occur.

Chemical Incompatibilities: Strong oxidizing agents, strong bases.

Conditions to Avoid: Heat, flames, ignition sources, and incompatibles.

Hazardous Decomposition Products: Carbon dioxide and carbon monoxide may form when heated to decomposition.

SECTION 9 – Disposal Considerations

Disposal: Follow applicable Federal, state, and local regulations.

Container Cleaning and Disposal: Dispose of container and unused contents in accordance with Federal state and local requirements.

SECTION 10 – Transport Information

Shipping Name: Triethylene Glycol

ID No.: NA

Label: NA

Hazard Class: NA

Packing Group: NA

SECTION 11 – Other Information

Disclaimer: This product is FOR INDUSTRIAL USE ONLY. Keep out of reach of children. Do not take internally.

Best Chemical Corporation believes that the information and recommendations contained herein are accurate as of the date hereof. No warranty of fitness for any particular purpose, warranty of merchantability, or any other warranty expressed or implied, is made concerning the information provided herein. The information provided herein relates on to the specific product designated and may not be valid where such product is used in combination with any other materials or in any process. Further, since the conditions and methods of use of the product and the information referred to herein are beyond the control of Best Chemical, Best Chemical expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

For addition product information contact Best Chemical Corporation at: P.O. Box 4284, Victoria, Texas 77903, or by phone at 361/575-6184 (24 hour answering service number), or fax at 361/572-8977.

Material Safety Data Sheet

HUNTSMAN
Enriching lives through innovation

1. Product and company identification

Product name : **DIGLYCOLAMINE® AGENT (DGA)**

MSDS # 00033118

Product Use : Welding and cutting of metals.

Huntsman Petrochemical Corporation
P.O. Box 4980
The Woodlands, TX 77387-4980

TELEPHONE NUMBERS

Transportation Emergency

Company: (800) 328-8501

CHEMTREC: (800) 424-9300

Medical Emergency: (409) 722-9673 (24 Hour)

General MSDS Assistance: (281) 719-6000

Technical Information: (281) 719-7780

E-MAIL: MSDS@huntsman.com

Validation date : 12/6/2007.

In Case of Emergency

Spills Leaks Fire or Exposure Call Chemtrec: (800) 424-9300

Medical Emergency Information: (800) 328-8501

In Mexico: 01 800 00 214 00

2. Hazards identification

- Physical state** : Liquid.
- Odor** : Amine-like.
- OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
- Emergency overview** : **DANGER!**
CAUSES EYE AND SKIN BURNS.
CAUSES RESPIRATORY TRACT IRRITATION.
MAY BE HARMFUL IF SWALLOWED.
ASPIRATION HAZARD IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE
- Corrosive to the skin. Causes burns. Harmful if swallowed. Irritating to eyes and respiratory system. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

GENERAL INFORMATION : Read the entire MSDS for a more thorough evaluation of the hazards.

DIGLYCOLAMINE® AGENT (DGA)

3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
2-(2-Aminoethoxy)ethanol	929-06-6	60 - 100

4. First aid measures

Eye contact	Get medical attention immediately. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
Skin contact	Get medical attention immediately. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Inhalation	Get medical attention immediately. Move exposed person to fresh air. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Ingestion	Get medical attention immediately. Wash out mouth with water. Move exposed person to fresh air. Do not induce vomiting unless directed to do so by medical personnel. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person.
Notes to physician	: Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

5. Fire-fighting measures

Flash point	: Closed cup: 124°C (255.2°F)
Products of combustion	: Decomposition products may include the following materials: carbon oxides nitrogen oxides
Extinguishing media	
Suitable	: Use an extinguishing agent suitable for the surrounding fire.
Not suitable	: None known.
Special exposure hazards	: In a fire or if heated, a pressure increase will occur and the container may burst. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Keep away from acids. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Separate from acids. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Consult local authorities for acceptable exposure limits.

- Preventive Measures** : 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** : Use local exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. For guidance on engineering control measures refer to publications such as the ACGIH current edition of 'Industrial Ventilation, a manual of Recommended Practice.'
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

DIGLYCOLAMINE® AGENT (DGA)

8. Exposure controls/personal protection

- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

9. Physical and chemical properties

General information

Appearance

- Physical state** : Liquid.
- Color** : Clear.
- Odor** : Amine-like.
- Odor threshold** : Not available.

Important health, safety and environmental information

- pH** : 11.8
- Boiling point** : 221°C (429.8°F)
- Melting point** : -12.2°C (10°F)
- Flash point** : Closed cup: 124°C (255.2°F)
- Oxidizing properties** : Not available.
- Vapor pressure** : <0.0013 kPa (<0.01 mm Hg)
- Relative density** : 1.06 (Specific gravity)
- Octanol/water partition coefficient** : -1.2
- Viscosity** : Kinematic: 0.075 cm²/s (7.5cSt at 51.7°C)
- Vapor density** : 3.6 [Air = 1]
- Auto-ignition temperature** : 370°C (698°F)
- VOC content** : 99%

10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Extremely reactive or incompatible with the following materials: acids.
Reactive or incompatible with the following materials: metals.
- Hazardous polymerization** : Will not occur.
- Hazardous decomposition products** : Decomposition products may include the following materials:
carbon oxides
nitrogen oxides

11. Toxicological information

Toxicity data

Acute toxicity

Product/ingredient name	Test	Species	Result	Exposure
2-(2-Aminoethoxy)ethanol	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	2560 to 3000 mg/kg	-
	LD50 Oral	Mouse	2825 mg/kg	-

11 . Toxicological information

Potential acute health effects

Ingestion : Harmful if swallowed. May cause burns to mouth, throat and stomach.
Inhalation : Irritating to respiratory system.
Eyes : Corrosive to eyes. Causes burns.
Skin : Corrosive to the skin. Causes burns.

Potential chronic health effects

Target organs : None known.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

12 . Ecological information

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
2-(2-Aminoethoxy)ethanol	-	Acute EC50 190 mg/L	Daphnia	48 hours
	-	Acute IC50 160 mg/L	Algae	72 hours
	-	Acute LC50 460 mg/L	Fish	96 hours

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
2-(2-Aminoethoxy)ethanol	-1.2	-	low

Environmental effects : This product shows a low bioaccumulation potential.

13 . Disposal considerations





Waste disposal : The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

14 . Transport information

Transportation Emergency Number 1-800-424-9300 (CHEMTREC).

DIGLYCOLAMINE® AGENT (DGA)

14 . Transport information

Regulatory information	UN number	Proper shipping name	Class	PG*	Label	Additional information
DOT Classification	UN3055	2-(2-Aminoethoxy)ethanol	8	III		
TDG Classification	UN3055	2-(2-Aminoethoxy)ethanol	8	III		-
IMDG Class	UN3055	2-(2-Aminoethoxy)ethanol	8	III		Emergency schedules (EmS) F-A, S-B
IATA-DGR Class	UN3055	2-(2-Aminoethoxy)ethanol	8	III		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Corrosive material

U.S. Federal regulations : **United States inventory (TSCA 8b):** All components are listed or exempted.

CERCLA: Hazardous substances. : No ingredients listed.

SARA 313 : No ingredients listed.

This product does not contain nor is it manufactured with ozone depleting substances.

California Prop 65 : No ingredients listed.

Canada

WHMIS (Canada) : Class E: Corrosive material

CEPA : **Canada inventory:** All components are listed or exempted.

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

16 . Other information

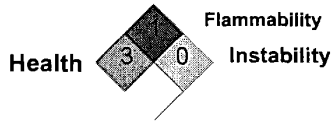
Label requirements : CAUSES EYE AND SKIN BURNS.
CAUSES RESPIRATORY TRACT IRRITATION.
MAY BE HARMFUL IF SWALLOWED.
ASPIRATION HAZARD IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE

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

Health	3
Fire hazard	1
Reactivity	0

16 . Other information

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



Date of printing : 12/6/2007.
Date of issue : 12/6/2007.
Date of previous issue : No previous validation.

Notice to reader

While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.

IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity, and behavior of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behavior should be determined by the user and made known to handlers, processors and end users.

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE, OR MAKE AVAILABLE, DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE. NO PART OF THIS DATA SHEET MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM, OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM HUNTSMAN. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO HUNTSMAN, MANAGER, PRODUCT SAFETY, AT THE ABOVE ADDRESS.



April 08, 2009

THOMAS PETROLEUM
PO BOX 1876
VICTORIA, TX 77902
USA

RECEIVED

JUN 08 2009

CL THOMAS
Risk Management

Dear Customer:

Enclosed please find a Material Safety Data Sheet (MSDS) for the product(s) identified at the bottom of this page. Please make this MSDS available to employees in your organization, including health and safety personnel, and your customers who could come in contact with this product.

We are in the process of updating our MSDSs. On some of the MSDSs, the actual hazard profile of the product will be different, since the process of conversion included a re-evaluation of each product. Please read over the MSDS carefully to determine if any changes will require a re-evaluation of your handling procedures. The amended sections will be highlighted with a triangle-sign at the beginning of the section (⚠).

Applicable MSDSs are routinely mailed to our customers with the purchase of our products and, subsequently, with first purchases in every calendar year. Any significant changes in MSDS information also will result in mailing of the revised MSDS with the next order placed. MSDSs also are available upon request for any of our products.

We appreciate your business and we wish to continue serving your business needs. If you have any questions regarding our MSDSs or need copies, please call our MSDS Information Helpline on 1-800-257-5547

MSDS Details			
Products:	Code:	Order Number:	Product No.:
DIGLYCOLAMINE AGENT	33118	55198144	800123

Enclosure

8600 Gosling Rd, The Woodlands, Texas 77381 *281-719-7400 *Fax 281-719-7500



Material Safety Data Sheet

The Dow Chemical Company

Product Name: DOWTHERM* T HEAT TRANSFER FLUID

Issue Date: 11/19/2008

Print Date: 21 Jan 2009

The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name

DOWTHERM* T HEAT TRANSFER FLUID

COMPANY IDENTIFICATION

The Dow Chemical Company
2030 Willard H. Dow Center
Midland, MI 48674
USA

Customer Information Number:

800-258-2436

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact:

989-636-4400

Local Emergency Contact:

989-636-4400

2. Hazards Identification

Emergency Overview

Color: Yellow

Physical State: Liquid

Odor: Odorless

Hazards of product:

CAUTION! May cause eye irritation. May cause skin irritation. May cause central nervous system effects; may cause respiratory tract irritation. Highly toxic to fish and/or other aquatic organisms. Isolate area. Keep upwind of spill. Avoid temperatures above 310 °C (590 °F).

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause slight eye irritation. May cause slight corneal injury.

Skin Contact: Prolonged contact may cause moderate skin irritation with local redness.

Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

®(TM)*Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow

Inhalation: At room temperature, exposure to vapor is minimal due to low volatility. Vapor from heated material may cause respiratory irritation and other effects. May cause respiratory irritation and central nervous system depression. Symptoms may include headache, dizziness and drowsiness, progressing to incoordination and unconsciousness.

Ingestion: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

Effects of Repeated Exposure: In animals, effects have been reported on the following organs: Blood.

3. Composition Information

Component	CAS #	Amount
Benzene, C14-30-alkyl derivatives	68855-24-3	100.0 %

4. First-aid measures

Eye Contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Skin Contact: Wash skin with plenty of water.

Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Ingestion: No emergency medical treatment necessary.

Notes to Physician: Maintain adequate ventilation and oxygenation of the patient. If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. Fire Fighting Measures

Extinguishing Media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Do not use direct water stream. May spread fire. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Do not use direct water stream. May spread fire. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Avoid accumulation of water. Product may be carried across water surface spreading fire or contacting an ignition source. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this (M)SDS.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Unusual Fire and Explosion Hazards: Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Liquid mist of this product can burn. Flammable concentrations of vapor can accumulate at temperatures above flash point; see Section 9.

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Hydrocarbons. Carbon monoxide. Carbon dioxide.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Small spills: Absorb with materials such as: Non-combustible material. Collect in suitable and properly labeled containers. Large spills: Dike area to contain spill. Pump into suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

Personal Precautions: Isolate area. Keep upwind of spill. Ventilate area of leak or spill. Keep unnecessary and unprotected personnel from entering the area. Refer to Section 7, Handling, for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling

General Handling: Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Storage

Do not store in: Opened or unlabeled containers. Store away from incompatible materials. See STABILITY AND REACTIVITY section. Store in tightly closed container. See Section 10 for more specific information. Additional storage and handling information on this product may be obtained by calling your Dow sales or customer service contact.

8. Exposure Controls / Personal Protection

Exposure Limits

None established

Personal Protection

Eye/Face Protection: Use chemical goggles.

Skin Protection: Wear clean, body-covering clothing.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl alcohol ("PVA"). Polyvinyl chloride ("PVC" or "vinyl"). Styrene/butadiene rubber. Viton. Examples of acceptable glove barrier materials include: Butyl rubber. Chlorinated polyethylene. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. The following should be effective types of air-purifying respirators: Organic vapor cartridge.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Physical State	Liquid
Color	Yellow
Odor	Odorless
Odor Threshold	Odorless
Flash Point - Closed Cup	> 170 °C (> 338 °F) <i>ASTM D93</i>
Flammability (solid, gas)	Not applicable to liquids
Flammable Limits In Air	Lower: Not determined Upper: Not determined
Autoignition Temperature	375 °C (707 °F) <i>ASTM D2155</i>
Vapor Pressure	< 0.01 mmHg @ 20 °C <i>Measured</i>
Boiling Point (760 mmHg)	> 320 °C (> 608 °F) <i>ASTM D86 (@ 1 atmosphere).</i>
Vapor Density (air = 1)	Not determined
Specific Gravity (H2O = 1)	0.86 - 0.89 <i>Literature</i>
Freezing Point	< -40 °C (< -40 °F) <i>Literature</i> Pour point
Melting Point	Not applicable to liquids
Solubility in Water (by weight)	0.0001 % <i>Literature</i>
pH	Not applicable
Decomposition Temperature	No test data available
Evaporation Rate (Butyl Acetate = 1)	Not applicable
Kinematic Viscosity	12 - 27 mm ² /s @ 40 °C <i>ASTM D7042</i>

10. Stability and Reactivity

Stability/Instability

Thermally stable at typical use temperatures.

Conditions to Avoid: Avoid temperatures above 310 °C (590 °F). Avoid contact with air (oxygen). Exposure to elevated temperatures can cause product to decompose.

Incompatible Materials: Avoid contact with oxidizing materials.

Hazardous Polymerization

Will not occur.

Thermal Decomposition

Decomposition products depend upon temperature, air supply and the presence of other materials.

11. Toxicological Information

Acute Toxicity**Ingestion**

LD50, Rat > 5,000 mg/kg

Skin Absorption

LD50, Rabbit > 2,000 mg/kg

Repeated Dose Toxicity

In animals, effects have been reported on the following organs: Blood.

Genetic Toxicology

In vitro genetic toxicity studies were negative.

12. Ecological Information

ENVIRONMENTAL FATE

Movement & Partitioning

Bioconcentration potential is high (BCF > 3000 or Log Pow between 5 and 7).

Persistence and Degradability

Biodegradation may occur under aerobic conditions (in the presence of oxygen).

ECOTOXICITY

Material is very highly toxic to aquatic organisms on an acute basis (LC50/EC50 <0.1 mg/L in most sensitive species).

Fish Acute & Prolonged Toxicity

LC50, rainbow trout (*Oncorhynchus mykiss*), 96 h: > 100 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, water flea *Daphnia magna*, 48 h, immobilization: 0.05 mg/l

Aquatic Plant Toxicity

EC50, green alga *Pseudokirchneriella subcapitata* (formerly known as *Selenastrum capricornutum*), 96 h: > 1,000 mg/l

13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Recycler. Reclaimer. Incinerator or other thermal destruction device. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details.

14. Transport Information

DOT Non-Bulk

NOT REGULATED

DOT Bulk

NOT REGULATED

IMDG

NOT REGULATED

ICAO/IATA

NOT REGULATED

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	Yes
Delayed (Chronic) Health Hazard	No
Fire Hazard	No
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

US. Toxic Substances Control Act

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16. Other Information

Hazard Rating System

NFPA	Health	Fire	Reactivity
	1	1	0

Recommended Uses and Restrictions

Heat transfer fluid. Intended as a heat transfer fluid for closed-loop systems. For industrial use only. We recommend that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact your sales or technical service representative.

Revision

Identification Number: 81478 / 1001 / Issue Date 11/19/2008 / Version: 3.0

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.



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MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: MOBIL DTE OIL HEAVY MEDIUM
Product Description: Base Oil and Additives
Product Code: 201560501590, 600163-00, 970172
Intended Use: Turbine oil

COMPANY IDENTIFICATION

Supplier: EXXON MOBIL CORPORATION
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA
24 Hour Health Emergency 609-737-4411
Transportation Emergency Phone 800-424-9300
ExxonMobil Transportation No. 281-834-3296
Product Technical Information 800-662-4525, 800-947-9147
MSDS Internet Address <http://www.exxon.com>, <http://www.mobil.com>

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

No Reportable Hazardous Substance(s) or Complex Substance(s).

SECTION 3 HAZARDS IDENTIFICATION

This material is not considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL HEALTH EFFECTS

Low order of toxicity. Excessive exposure may result in eye, skin, or respiratory irritation. High-pressure injection under skin may cause serious damage.

NFPA Hazard ID: Health: 0 Flammability: 1 Reactivity: 0
HMIS Hazard ID: Health: 0 Flammability: 1 Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use

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adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Smoke, Fume, Aldehydes, Sulfur oxides, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: >223C (433F) [ASTM D-92]

Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0

Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

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PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders. For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7

HANDLING AND STORAGE

HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers. Keep away from incompatible materials.

SECTION 8

EXPOSURE CONTROLS / PERSONAL PROTECTION

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Exposure limits/standards for materials that can be formed when handling this product: When mists/aerosols can occur the following are recommended: 5 mg/m³ - ACGIH TLV (inhalable fraction), 5 mg/m³ - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:
No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:
No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

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ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
 Color: Amber
 Odor: Characteristic
 Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.87
 Flash Point [Method]: >223C (433F) [ASTM D-92]
 Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
 Autoignition Temperature: N/D
 Boiling Point / Range: > 316C (600F) [Estimated]
 Vapor Density (Air = 1): > 2 at 101 kPa [Estimated]
 Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 C [Estimated]
 Evaporation Rate (n-butyl acetate = 1): N/D
 pH: N/A
 Log Pow (n-Octanol/Water Partition Coefficient): > 3.5 [Estimated]
 Solubility in Water: Negligible
 Viscosity: 67.9 cSt (67.9 mm²/sec) at 40 C | 8.7 cSt (8.7 mm²/sec) at 100C
 Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
 Melting Point: N/A
 Pour Point: -27°C (-17°F)
 DMSO Extract (mineral oil only), IP-346: < 3 %wt
 Decomposition Temperature: N/D

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
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Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on test data for structurally similar materials.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

Additional information is available by request.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC
2 = NTP SUS

3 = IARC 1
4 = IARC 2A

5 = IARC 2B
6 = OSHA CARC

SECTION 12

ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

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BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. **DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.**

SECTION 14 TRANSPORT INFORMATION

LAND (DOT): Not Regulated for Land Transport

LAND (TDG): Not Regulated for Land Transport

SEA (IMDG): Not Regulated for Sea Transport according to IMDG-Code

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purposes, this material is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.



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Complies with the following national/regional chemical inventory requirements:: DSL, IECSC, TSCA, EINECS, PICCS, AICS

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY: This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
PHOSPHORODITHOIC ACID, O,O-DI C1-14-ALKYL ESTERS, ZINC SALTS (2:1) (ZDDP)	68849-42-3	15

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16	OTHER INFORMATION
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N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:

- Section 06: Notification Procedures - Header was modified.
- Section 13: Disposal Considerations - Disposal Recommendations was modified.
- Section 10 Stability and Reactivity - Header was modified.
- Section 13: Disposal Recommendations - Note was modified.
- Section 13: Empty Container Warning was modified.
- Section 09: Phys/Chem Properties Note was modified.
- Section 09: Boiling Point C(F) was modified.
- Section 09: Flash Point C(F) was modified.
- Section 09: n-Octanol/Water Partition Coefficient was modified.
- Section 08: Personal Protection was modified.
- Section 08: Hand Protection was modified.
- Section 07: Handling and Storage - Handling was modified.
- Section 07: Handling and Storage - Storage Phrases was modified.
- Section 11: Dermal Lethality Test Data was modified.

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Section 11: Oral Lethality Test Data was modified.
Section 05: Hazardous Combustion Products was modified.
Section 06: Accidental Release - Spill Management - Water was modified.
Section 09: Relative Density - Header was modified.
Section 09: Flash Point C(F) was modified.
Section 09: Viscosity was modified.
Section 14: Sea (IMDG) - Header was modified.
Section 14: Air (IATA) - Header was modified.
Section 14: LAND (TDG) - Header was modified.
Section 14: LAND (DOT) - Header was modified.
Section 15: List Citation Table - Header was modified.
Section 14: LAND (DOT) - Default was modified.
Section 14: LAND (TDG) Default was modified.
Section 14: Sea (IMDG) - Default was modified.
Section 14: Air (IATA) - Default was modified.
Section 15: National Chemical Inventory Listing - Header was modified.
Section 15: National Chemical Inventory Listing was modified.
Section 16: Code to MHCs was modified.
Section 08: Exposure limits/standards was modified.
Hazard Identification: OSHA - May be Hazardous Statement was modified.
Section 06: Notification Procedures was modified.
Section 09: Oxidizing Properties was modified.
Section 01: Company Contact Methods Sorted by Priority was modified.
Section 06: Protective Measures was added.
Section 06: Accidental Release - Protective Measures - Header was added.
Section 15: Chemical Name - Header was added.
Section 15: CAS Number - Header was added.
Section 15: List Citations - Header was added.
Section 15: List Citations Table was added.
Section 09: Decomposition Temperature was added.
Section 09: Decomposition Temp - Header was added.
Section 09: Vapor Pressure was added.

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Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2007083XUS (1013293)



Product Name: MOBIL DTE OIL HEAVY MEDIUM
Revision Date: 19 Aug 2011
Page 10 of 10

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MATERIAL SAFETY DATA SHEET	AIRDYNE INTERNATIONAL, LTD 149 10 Henry Rd., Houston, TX 77060 (281) 820-0000
---------------------------------------	--

DATE: 10/23/07

REVISED:

SUPERSEDES:

PRODUCT IDENTIFICATION

Trade Name:	PNEUTECH XD680
Chief Constituent:	Polyol Ester Blend
Hazardous Ingredients/OSHA:	None
Carcinogenic Ingredients/OSHA/NTP/IARC:	None
Ingredients Regulated by SARA Title 3, Section 313:	None

II. WARNING STATEMENTS

This product is non-hazardous as defined in 29 CFR 1910.1200.

III. PHYSICAL AND CHEMICAL DATA

Appearance and Odor:	Bright and Clear, Mild Odor
Specific Gravity:	< 1.0
Boiling Point:	> 600°F
Vapor Pressure:	< 0.035 mm Hg @ 300°F

IV. FIRE PROTECTION

Flash Point:	> 450°F _(COC)
Extinguishing Media:	Water fog, dry chemical, foam or CO ₂
Special Firefighting Procedure:	Burning will produce toxic fumes. Wear self-contained breathing apparatus and full turn out gear to fight fire. Avoid spreading liquid and fire by water flooding.
Unusual Fire Hazard:	Exposure to heat builds up pressure in closed containers. Cool with water spray.

V. REACTIVITY DATA

Thermal Stability:	Stable
Materials to Avoid:	Strong oxidizers
Hazardous Polymerization:	Will not occur
Hazardous Decomposition Products:	Burning will produce toxic fumes

VI. HEALTH HAZARD DATA

Exposure Limits:	Not applicable
Effects of Overexposure:	Low oral and dermal toxicity. Prolonged or repeated exposure may cause irritation, nausea, and vomiting.

VII. PHYSIOLOGICAL EFFECTS SUMMARY

ACUTE:	
Eyes:	Irritating and may injure eye tissue if not removed promptly.
Skin:	Believed to be minimally irritating
Respiratory System:	Believed to be minimally irritating
CHRONIC:	Not determined
OTHER:	None

VIII. PRECAUTIONS FOR SAFE HANDLING

For general personal hygiene, wash hands thoroughly after handling material. Avoid contact with skin and eyes.

IX. PROTECTION AND CONTROL MEASURES

Protective Equipment: Impermeable gloves, splash goggles, eye wash and safety shower.
Respiratory Protection: If overheated, use approved respiratory protective equipment.
Ventilation: Local exhaust and mechanical recommended.

X. EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Flush eyes with water for 15 minutes. Call a physician if irritation develops.
Skin Contact: Wash skin with soap and water.
Inhalation: Remove to fresh air. Give artificial respiration or oxygen if necessary.
Ingestion: First Aid not normally required. If uncomfortable, call physician.

XI. NOTES

HAZARD RATING INFORMATION				
	NPCA/HMIS	NFPA	KEY	
Health	1	1	4 = Severe	1 = Slight
Flammability	1	1	3 = Serious	0 = Minimal
Reactivity	0	0	2 = Moderate	

XII. SPILL AND DISPOSAL PROCEDURES

Environmental Impact: Report spills as required to appropriate authorities. U. S. Coast Guard regulations require immediate reporting of spills that could reach any waterway including intermittent dry creeks. Report spill to Coast Guard Toll Free Number (800) 424-8802.

Procedures if Material is Released or Spilled: Absorb on fire retardant treated sawdust, diatomaceous earth, etc. Shovel up and dispose of at an appropriate waste disposal facility in accordance with current applicable laws and regulations, and product characteristics at time of disposal.

Waste Management: Dispose of according to Federal, State and Local regulations.

Toxic Substance Inventory Control Act: All components are included on the TSCA Inventory and are in compliance with the TSCA.

FOR ADDITIONAL INFORMATION CONTACT:

AIRDYNE INTERNATIONAL, LTD
14910 Henry Road
Houston, TX 77060
(281) 820-0000

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Cameron Compression
Systems TurboBlend™ 46
Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Cameron Compression Systems TurboBlend™ 46
MSDS Code: 775472
Intended Use: Compressor Oil
Responsible Party: ConocoPhillips Lubricants
600 N. Dairy Ashford
Houston, Texas 77079-1175
Customer Service: 888-766-7676
Technical Information: 800-255-9556
MSDS Information: Internet: <http://w3.conocophillips.com/NetMSDS/>
Emergency Telephone Numbers: Chemtrec: 800-424-9300 (24 Hours)
California Poison Control System: 800-356-3219

2. HAZARDS IDENTIFICATION

Emergency Overview:

This material is not considered hazardous according to OSHA criteria.

NFPA



Appearance: Clear and bright
Physical Form: Liquid
Odor: Petroleum

Potential Health Effects:

Eye: Contact may cause mild eye irritation including stinging, watering, and redness.

Skin: Contact may cause mild skin irritation including redness and a burning sensation. Prolonged or repeated contact can defat the skin, causing drying and cracking of the skin, and possibly permanent irritation. A component of this material may cause an allergic skin reaction. No harmful effects from skin absorption are expected.

Inhalation (Breathing): No information available on acute toxicity.

Ingestion (Swallowing): Low degree of toxicity by ingestion.

Signs and Symptoms: Effects of overexposure may include irritation of the digestive tract, nausea and diarrhea. Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.

Pre-Existing Medical Conditions: Conditions aggravated by exposure may include skin disorders.

See Section 11 for additional Toxicity Information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS	Concentration (wt.%)
Lubricant Base Oil (Petroleum)	VARIOUS	>99
Additives	PROPRIETARY	<1

4. FIRST AID MEASURES

Eye: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Notes to Physician: Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

5. FIRE-FIGHTING MEASURES

NFPA 704 Hazard Class

Health: 0 Flammability: 1 Instability: 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. The use of explosion-proof electrical equipment is recommended. Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done with minimal risk. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements.

Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling: Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment.

Do Not Use this product in any compressor operating indoors or in closed circulation that produces "breathing air."
Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Conditions for safe storage: Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Component	ACGIH	OSHA	Other
Lubricant Base Oil (Petroleum)	TWA: 5mg/m ³ STEL: 10 mg/m ³ as Oil Mist, if generated	TWA: 5 mg/m ³ as Oil Mist, if generated	---

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Personal Protective Equipment (PPE):

Eye/Face: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the performance of their products. Suggested protective materials: Nitrile.

Respiratory: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (MUC) as directed by regulation or the manufacturer's instructions, in oxygen deficient (less than 19.5 percent oxygen) situations, or other conditions that are immediately dangerous to life and health (IDLH).

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Clear and bright
Physical Form:	Liquid
Odor:	Petroleum
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	<1
Vapor Density (air=1):	>1
Boiling Point/Range:	No data
Melting/Freezing Point:	<-13°F / <-25°C
Pour Point:	<-13°F / <-25°C
Solubility in Water:	Insoluble
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity:	0.86 @ 60°F (15.6°C)
Bulk Density:	7.2 lbs/gal
Viscosity:	6.7 cSt @ 100°C; 46 cSt @ 40°C
Percent Volatile:	Negligible
Evaporation Rate (nBuAc=1):	No data
Flash Point:	320°F / 160°C
Test Method:	Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
LEL (vol % in air):	No data
UEL (vol % in air):	No data
Autoignition Temperature:	No data

10. STABILITY AND REACTIVITY

Stability: Stable under normal ambient and anticipated conditions of storage and handling.

Conditions to Avoid: Extended exposure to high temperatures can cause decomposition.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Combustion can yield oxides of carbon, nitrogen and sulfur.

Hazardous Polymerization: Not known to occur.

11 TOXICOLOGICAL INFORMATION

Chronic Data:

Lubricant Base Oil (Petroleum)

Carcinogenicity: The petroleum base oils contained in this product have been highly refined by a variety of processes including severe hydrocracking/hydroprocessing to reduce aromatics and improve performance characteristics. All of the oils meet the IP-346 criteria of less than 3 percent PAH's and are not considered carcinogens by NTP, IARC, or OSHA.

Acute Data:

Component	Oral ED50	Dermal ED50	Inhalation LC50
Lubricant Base Oil (Petroleum)	>5 g/kg	>2 g/kg	No data

12 ECOLOGICAL INFORMATION

Lubricant oil basestocks are complex mixtures of hydrocarbons (primarily branched chain alkanes and cycloalkanes) ranging in carbon number from C15 to C50. The aromatic hydrocarbon content of these mixtures varies with the severity of the refining process. White oils have negligible levels of aromatic hydrocarbons, whereas significant proportions are found in unrefined basestocks. Olefins are found only at very low concentrations. Volatilization is not significant after release of lubricating oil basestocks to the environment due to the very low vapor pressure of the hydrocarbon constituents. In water, lubricating oil basestocks will float and will spread at a rate that is viscosity dependent. Water solubilities are very low and dispersion occurs mainly from water movement with adsorption by sediment being the major fate process. In soil, lubricating oil basestocks show little mobility and adsorption is the predominant physical process.

Both acute and chronic ecotoxicity studies have been conducted on lubricant base oils. Results indicate that the acute aquatic toxicities to fish, Daphnia, Ceriodaphnia and algal species are above 1000 mg/l using either water accommodated fractions or oil in water dispersions. Since lubricant base oils mainly contain hydrocarbons having carbon numbers in the range C15 to C50, it is predicted that acute toxicity would not be observed with these substances due to low water solubility. Results from chronic toxicity tests show that the no observed effect level (NOEL) usually exceeds 1000 mg/l for lubricant base oils with the overall weight of experimental evidence leading to the conclusion that lubricant base oils do not cause chronic toxicity to fish and invertebrates.

Large volumes spills of lubricant base oils into water will produce a layer of undissolved oil on the water surface that will cause direct physical fouling of organisms and may interfere with surface air exchange resulting in lower levels of dissolved oxygen. Petroleum products have also been associated with causing taint in fish even when the latter are caught in lightly contaminated environments. Highly refined base oils sprayed onto the surface of eggs will result in a failure to hatch.

Extensive experience from laboratory and field trials in a wide range of crops has confirmed that little or no damage is produced as a result of either aerosol exposure or direct application of oil emulsion to the leaves of crop plants. Base oils incorporated into soil have resulted in little or no adverse effects on seed germination and plant growth at contamination rates up to 4%.

13 DISPOSAL CONSIDERATIONS

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste and is not believed to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

This material under most intended uses would become "Used Oil" due to contamination by physical or chemical impurities. Whenever possible, Recycle Used Oil in accordance with applicable federal and state or local regulations. Container contents should be completely used and containers should be emptied prior to discard.

14 TRANSPORTATION INFORMATION

U.S. Department of Transportation (DOT)

Shipping Description:

Not regulated

Note:

If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil)

14. TRANSPORTATION INFORMATION

International Maritime Dangerous Goods (IMDG)

Shipping Description: Not regulated
Note: Federal compliance requirements may apply. See 49 CFR 171.12.

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)

UN/ID #: Not regulated

	LTD. QTY	Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	---	---	---
Max. Net Qty. Per Package:	---	---	---

15. REGULATORY INFORMATION

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health: No
Chronic Health: No
Fire Hazard: No
Pressure Hazard: No
Reactive Hazard: No

CERCLA/SARA - Section 313 and 40 CFR 372:

This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

EPA (CERCLA) Reportable Quantity (in pounds):

This material does not contain any chemicals with CERCLA Reportable Quantities.

California Proposition 65:

This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

Canadian Regulations:

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 Regulations.

WHMIS Hazard Class
None

National Chemical Inventories:

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA.
All components are either on the DSL, or are exempt from DSL listing requirements.

U.S. Export Control Classification Number: EAR99

Other Regulatory Information

Diphenylamine, CASRN 122-39-4, which is present at trace amounts, is subject to the export notification requirements of TSCA Section 12(b).

16. OTHER INFORMATION

Issue Date: 03-Jan-2008
Status: Final
Previous Issue Date: 17-Aug-2006

16 OTHER INFORMATION

Revised Sections or Basis for Revision:

NFPA ratings (Section 2)
Regulatory information (Section 15)

MSDS Code:

775472

MSDS Legend:

ACGIH = American Conference of Governmental Industrial Hygienists; CAS = Chemical Abstracts Service Registry; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; IARC = International Agency for Research on Cancer; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

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Prepared according to 29CFR 1910.1200.

1	Chemical Product and Company Identification
---	--

Johnson Controls Inc
9104 Yellow Brick Road
Baltimore, MD 21237
Phone: (410) 574-0400

Product Trade Name	FRICK #12B
CAS Number	Not applicable for mixtures.
Synonyms	None.
Generic Chemical Name	Mixture.
Product Type	Multipurpose.
Preparation/Revision Date	25 March 2010

2	Hazards Identification
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Appearance	Clear to yellow liquid.
Odor	Mild
Principal Hazards	Caution. <ul style="list-style-type: none"> • May cause eye irritation.

See Section 11 for complete health hazard information.

3	Composition/Information on Ingredients
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Hazardous Ingredients	This material contains no ingredients requiring disclosure under regulatory hazard criteria for this jurisdiction. See Section 11 for additional details.
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4	First Aid Measures
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Eyes	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical attention.
Skin	Wash with soap and water. Get medical attention if irritation develops. Launder contaminated clothing before reuse.
Inhalation	Remove exposed person to fresh air if adverse effects are observed.
Oral	DO NOT INDUCE VOMITING. Get immediate medical attention.
Additional Information	Note to physician: Treat symptomatically.

5	Fire Fighting Measures
---	-------------------------------

Flash Point	260 °C, 500 °F COC (Typical)
Extinguishing Media	CO ₂ , dry chemical, or foam. Water can be used to cool and protect exposed material.
Firefighting Procedures	Wear full protective firegear including self-containing breathing apparatus operated in the positive pressure mode with full facepiece, coat, pants, gloves and boots. Water may be ineffective fighting fires.
Unusual Fire & Explosion Hazards	None known.

6	Accidental Release Measures
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FRICK #12B

Spill Procedures

Personal Protective Equipment must be worn, see Personal Protection Section for PPE recommendations. Ventilate area if spilled in confined space or other poorly ventilated areas. Prevent entry into sewers and waterways, dispose of in accordance with all federal, state and local environmental regulation. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material.

7	Handling and Storage
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Pumping Temperature	Not determined.
Maximum Handling Temperature	Not determined.
Handling Procedures	Keep containers closed when not in use. Do not discharge into drains or the environment, dispose to an authorized waste collection point. Use appropriate containment to avoid environmental contamination. Avoid breathing dust, fume, gas, mist, vapors or spray. Wash thoroughly after handling. Empty container contains product residue which may exhibit hazards of product.
Maximum Storage Temperature	Not determined.
Storage Procedures	No special storage precautions required.
Loading Temperature	Not determined.

8	Exposure Controls/Personal Protection
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Exposure Limits	None established
Other Exposure Limits	None known.
Engineering Controls	Use with adequate ventilation.
Gloves Procedures	Use nitrile or neoprene gloves.
Eye Protection	Safety Glasses.
Respiratory Protection	Use NIOSH/MSHA approved respirator with a combination organic vapor and high efficiency filter cartridge if recommended exposure limit is exceeded. Use self-contained breathing apparatus for entry into confined space, for other poorly ventilated areas and for large spill clean-up sites.
Clothing Recommendation	Long sleeve shirt is recommended. Launder contaminated clothing before reuse.

9	Physical and Chemical Properties
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Flash Point	260 °C, 500 °F COC (Typical)
Upper Flammable Limit	Not determined.
Lower Flammable Limit	Not determined.
Autoignition Point	Not determined.
Explosion Data	Material does not have explosive properties.
Vapor Pressure	Not determined.
pH	Not determined.
Specific Gravity	0.99 (15.6 °C)
Bulk Density	8.27 Lb/gal, 0.99 Kg/L
Water Solubility	Soluble.
Percent Solid	Not determined.
Percent Volatile	Not determined.
Volatile Organic Compound	Not determined.
Vapor Density	Not determined.
Evaporation Rate	Not determined.
Odor	Mild
Appearance	Clear to yellow liquid.
Viscosity	92.3 Centistokes (40 °C) 18.6 Centistokes (100 °C)
Odor Threshold	Not determined.
Boiling Point	Not determined.
Pour Point Temperature	-40 °C, -40 °F
Melting / Freezing Point	Not determined.

The above data are typical values and do not constitute a specification. Vapor pressure data are calculated unless otherwise noted.

10	Stability and Reactivity
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Stability	Material is normally stable at moderately elevated temperatures and pressures.
Decomposition Temperature	Not determined.
Incompatibility	Strong oxidizing agents.
Polymerization	Will not occur.
Thermal Decomposition	Smoke, carbon monoxide, carbon dioxide, aldehydes and other products of incomplete combustion.

FRICK #12B
Conditions to Avoid

Not determined.

11	Toxicological Information
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– ACUTE EXPOSURE –

<p>Eye Irritation Skin Irritation Respiratory Irritation Dermal Toxicity Inhalation Toxicity Oral Toxicity Dermal Sensitization Inhalation Sensitization</p>	<p>May cause eye irritation. Does not meet Canadian D2B or EU R36 criteria. Based on data from similar materials. Not expected to be a primary skin irritant. Based on data from components or similar materials. Prolonged or repeated contact may cause dermatitis. Contact with heated material may cause thermal burns. No data available to indicate product or components may cause respiratory irritation under normal workplace conditions and good industrial hygiene practices. The LD50 in rabbits is > 2000 mg/Kg. Based on data from components or similar materials. No data available to indicate product or components may be a toxic inhalation hazard The LD50 in rats is > 10,000 mg/Kg. Based on data from components or similar materials. Swallowing material may cause irritation of the gastrointestinal lining, nausea, vomiting, diarrhea, and abdominal pain. No data available to indicate product or components may be a skin sensitizer. No data available to indicate product or components may be respiratory sensitizers.</p>
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– CHRONIC EXPOSURE –

<p>Chronic Toxicity Carcinogenicity Mutagenicity Reproductive Toxicity Teratogenicity</p>	<p>No data available to indicate product or components present at greater than 1% are chronic health hazards. No data available to indicate any components present at greater than 0.1% may present a carcinogenic hazard. No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic. No data available to indicate either product or components present at greater than 0.1% that may cause reproductive toxicity. No data available to indicate product or any components contained at greater than 0.1% may cause birth defects.</p>
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– ADDITIONAL INFORMATION –

Other	No other health hazards known.
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12	Ecological Information
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– ENVIRONMENTAL TOXICITY –

<p>Freshwater Fish Toxicity Freshwater Invertebrates Toxicity Algal Inhibition Saltwater Fish Toxicity Saltwater Invertebrates Toxicity Bacteria Toxicity Miscellaneous Toxicity</p>	<p>The acute LC50 is 10 - 100 mg/L based on component data. The acute EC50 is 10 - 100 mg/L based on component data. The acute EC50 is 10 - 100 mg/L based on component data. Not determined. Not determined. Not determined. Not determined.</p>
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– ENVIRONMENTAL FATE –

<p>Biodegradation Bioaccumulation Soil Mobility</p>	<p>Adequate data is not available to estimate the biodegradation potential of this material. Less than 1.0% of the components potentially bioconcentrate, based on octanol/water coefficients. Not determined.</p>
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13	Disposal Considerations
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Waste Disposal	This material, if discarded, is not a hazardous waste under RCRA Regulation 40 CFR 261. Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.
-----------------------	--

14	Transport Information
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<p>ICAO/IATA I ICAO/IATA II IMDG IMDG EMS Fire IMDG EMS Spill IMDG MFAG MARPOL Annex II USCG Compatibility U.S. DOT Bulk DOT NAERG U.S. DOT (Intermediate) U.S. DOT Intermediate NAERG</p>	<p>Not regulated. Not regulated. Not regulated. Not applicable. Not applicable. Not applicable. Not determined. Not determined. Not regulated. Not applicable. Not regulated. Not applicable.</p>
---	--

FRICK #12B

U.S. DOT Non-Bulk Not regulated.
 U.S. DOT Non-Bulk NAERG Not applicable.
 Canada Not regulated.
 Mexico Not regulated.
 Bulk Quantity 85000 KG, 187391 lbs.
 Intermediate Quantity 11000 KG, 24251 lbs.
 Non-Bulk Quantity 400 KG, 882 lbs.

Review classification requirements before shipping materials at elevated temperatures.

15	Regulatory Information
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-- Global Chemical Inventories --

USA All components of this material are on the US TSCA Inventory or are exempt.

Other TSCA Reg. None known.

EU All components are in compliance with the EC Seventh amendment Directive 92/32/EEC.

Japan All components are in compliance with the Chemical Substances Control Law of Japan.

Australia All components are in compliance with chemical notification requirements in Australia.

New Zealand May require notification before sale under New Zealand regulations.

Canada All components are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List.

Switzerland All components are in compliance with the Environmentally Hazardous Substances Ordinance in Switzerland.

Korea All components are in compliance in Korea.

Philippines May require notification before sale under Philippines Republic Act 6969.

China This product may require notification in China.

-- Other U.S. Federal Regulations --

SARA Ext. Haz. Subst. This product does not contain greater than 1.0% of any chemical substance on the SARA Extremely Hazardous Substances list.

SARA Section 313 This product does not contain greater than 1.0% (greater than 0.1% for carcinogenic substance) of any chemical substances listed under SARA Section 313.

SARA 311 Classifications

Acute Hazard	No
Chronic Hazard	No
Fire Hazard	No
Reactivity Hazard	No

CERCLA Hazardous Substances None known.

-- State Regulations --

Cal. Prop. 65 This product contains the following chemical(s) known to the state of California to cause cancer and/or birth defects based on maximum impurity levels of components: < 0.01 ppm 2-Naphthylamine, CAS no. 91-59-8 < 0.5 ppm 1-Naphthylamine, CAS no. 134-32-7 < 0.5 ppm Aniline, CAS no. 62-53-3 < 1 ppm 1, 4 Dioxane, CAS no. 123-91-1 < 1 ppm Ethylene oxide, CAS no. 75-21-8

-- Product Registrations --

U.S. Fuel Registration Not applicable.

Finnish Registration Number Not Registered

Swedish Registration Number Not Registered

Norwegian Registration Number Not Registered

Danish Registration Number Not Registered

Swiss Registration Number Not Registered

Italian Registration Number Not Registered

-- Other / International --

Miscellaneous Regulatory Information Not determined.

16	Other Information
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US NFPA Codes

Health	Fire	Reactivity	Special
1	1	0	N/E

(N/E) - None established

HMIS Codes

Health	Fire	Reactivity
0	1	0

FRICK #12B
Precautionary Labels

Caution.

- May cause eye irritation.

Revision Indicators

Section: 2 Target organs.	Changed: 16 March 2010
Section: 3 Hazardous ingredients.	Changed: 16 March 2010
Section: 5 Unusual fire& explosion hazards.	Changed: 25 March 2010
Section: 8 Hazardous ingredients.	Changed: 16 March 2010
Section: 10 Incompatibility.	Changed: 16 March 2010
Section: 11 Oral toxicity.	Changed: 16 March 2010
Section: 15 SARA section 311/312.	Changed: 16 March 2010
Section: 16 HMIS codes.	Changed: 16 March 2010



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MATERIAL SAFETY DATA SHEET

SECTION 1	PRODUCT AND COMPANY IDENTIFICATION
------------------	---

PRODUCT

Product Name: MOBIL DTE OIL BB
Product Description: Base Oil and Additives
Product Code: 600221-00, 970905
Intended Use: Circulating/gear oil

COMPANY IDENTIFICATION

Supplier: EXXON MOBIL CORPORATION
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
MSDS Requests	713-613-3661
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com , http://www.mobil.com

SECTION 2	COMPOSITION / INFORMATION ON INGREDIENTS
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No Reportable Hazardous Substance(s) or Complex Substance(s).

SECTION 3	HAZARDS IDENTIFICATION
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This material is not considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL HEALTH EFFECTS

Low order of toxicity. Excessive exposure may result in eye, skin, or respiratory irritation. High-pressure injection under skin may cause serious damage.

NFPA Hazard ID:	Health: 0	Flammability: 1	Reactivity: 0
HMIS Hazard ID:	Health: 0	Flammability: 1	Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4	FIRST AID MEASURES
------------------	---------------------------

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use

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mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5	FIRE FIGHTING MEASURES
------------------	-------------------------------

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Pressurized mists may form a flammable mixture.

Hazardous Combustion Products: Aldehydes, Oxides of carbon, Incomplete combustion products, Sulfur oxides, Smoke, Fume

FLAMMABILITY PROPERTIES

Flash Point [Method]: >234C (453F) [ASTM D-92]

Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0

Autoignition Temperature: N/D

SECTION 6	ACCIDENTAL RELEASE MEASURES
------------------	------------------------------------

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7	HANDLING AND STORAGE
------------------	-----------------------------

HANDLING

Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is a static accumulator.

STORAGE

Do not store in open or unlabelled containers.

SECTION 8	EXPOSURE CONTROLS / PERSONAL PROTECTION
------------------	--

Exposure limits/standards for materials that can be formed when handling this product: When mists / aerosols can occur, the following are recommended: 5 mg/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL, 5 mg/m³ - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

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Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Work conditions can greatly affect glove durability; inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9	PHYSICAL AND CHEMICAL PROPERTIES
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Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Liquid
Color: Brown
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.89
Flash Point [Method]: >234C (453F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 316C (600F)
Vapor Density (Air = 1): > 2 at 101 kPa
Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 C
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A

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Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: 220 cSt (220 mm²/sec) at 40 C
Oxidizing Properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -12°C (10°F)
DMSO Extract (mineral oil only), IP-346: < 3 %wt

SECTION 10	STABILITY AND REACTIVITY
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STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
-------------------	----------------------------------

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m ³	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

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Additional information is available by request.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

SECTION 12	ECOLOGICAL INFORMATION
-------------------	-------------------------------

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land.
Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13	DISPOSAL CONSIDERATIONS
-------------------	--------------------------------

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken



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for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14	TRANSPORT INFORMATION
-------------------	------------------------------

LAND (DOT) : Not Regulated for Land Transport

LAND (TDG) : Not Regulated for Land Transport

SEA (IMDG) : Not Regulated for Sea Transport according to IMDG-Code

AIR (IATA) : Not Regulated for Air Transport

SECTION 15	REGULATORY INFORMATION
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OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purposes, this material is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: TSCA, AICS, PICCS, ENCS, DSL, EINECS, IECSC, KECI

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY: This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The Following Ingredients are Cited on the Lists Below: None.

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16	OTHER INFORMATION
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N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
No revision information is available.



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MHC: 0, 0, 0, 0, 0, 0

PPEC: A

DGN: 2007132XUS (546634)

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ETHYL MERCAPTAN

1. PRODUCT AND COMPANY IDENTIFICATION

Company

Odor-Tech, LLC.
 7591 Esler Field Road
 Pineville, LA 71360

Thio and Fine Chemicals

Customer Service Telephone Number: (800) 628-4453
 (Monday through Friday, 8:00 AM to 5:00 PM EST)

Emergency Information

Transportation: CHEMTREC: (800) 424-9300
 (24 hrs., 7 days a week)

Medical: Rocky Mountain Poison Center: (866) 767-5089
 (24 hrs., 7 days a week)

Product Information

Product name: ETHYL MERCAPTAN
Synonyms: ESH
Molecular formula: C₂H₅SH
Chemical family: mercaptans
Molecular weight: 62.13 g/mol
Product use: Chemical intermediate

2. HAZARDS IDENTIFICATION

Emergency Overview

Color: Clear - colourless
Physical state: liquid
Odor: mercaptans

***Classification of the substance or mixture:**

Flammable liquid., Category 1, H224
 Oral: Acute toxicity, Category 4, H302
 Inhalation: Acute toxicity, Category 4, H332
 Acute aquatic toxicity, Category 1, H400
 Chronic aquatic toxicity, Category 1, H410

*For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS-Labeling

Hazard pictograms:



Signal word:

Danger

Hazard statements:

H224 : Extremely flammable liquid and vapour.
H302 + H332 : Harmful if swallowed or if inhaled
H410 : Very toxic to aquatic life with long lasting effects.

Supplemental Hazard Statements:

The gas deadens the sense of smell. Do not depend on odor to detect presence of gas. May displace oxygen and cause rapid suffocation.

ETHYL MERCAPTAN

Precautionary statements:**Prevention:**

P210 : Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 : Keep container tightly closed.
P240 : Ground/bond container and receiving equipment.
P241 : Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 : Use only non-sparking tools.
P243 : Take precautionary measures against static discharge.
P261 : Avoid breathing gas/mist/vapours/spray.
P264 : Wash skin thoroughly after handling.
P270 : Do not eat, drink or smoke when using this product.
P271 : Use only outdoors or in a well-ventilated area.
P273 : Avoid release to the environment.
P280 : Wear protective gloves/ eye protection/ face protection.

Response:

P301 + P312 : IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
P303 + P361 + P353 : IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312 : Call a POISON CENTER or doctor/ physician if you feel unwell.
P330 : Rinse mouth.
P370 + P378 : In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391 : Collect spillage.

Storage:

P403 + P235 : Store in a well-ventilated place. Keep cool.

Disposal:

P501 : Dispose of contents/ container to an approved waste disposal plant.

Supplemental information:**Potential Health Effects:**

Objectionable odor may cause nausea, headache or dizziness. The gas deadens the sense of smell. Do not depend on odor to detect presence of gas. Vapor is heavier than air and can cause suffocation by reducing oxygen available for breathing.

May also cause: central nervous system depression, respiratory arrest, chest discomfort, accumulation of fluid in the lungs which may be delayed for several hours, (severity of effects depends on extent of exposure).

3. COMPOSITION/INFORMATION ON INGREDIENTS

ETHYL MERCAPTAN

Chemical Name	CAS-No.	Wt/Wt	GHS Classification**
Ethanethiol	75-08-1	100 %	H224, H302, H332, H400, H410

**For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

Inhalation:

If inhaled, remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Skin:

In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eyes:

Immediately flush eye(s) with plenty of water.

Ingestion:

If swallowed, DO NOT induce vomiting unless directed to do so by medical personnel. Get medical attention. Never give anything by mouth to an unconscious person. Rinse mouth.

Notes to physician:

Exposure to material may cause delayed lung injury resulting in pulmonary edema and pneumonitis. Exposed individuals should be monitored for 72 hours after exposure for the onset of delayed respiratory symptoms.

5. FIREFIGHTING MEASURES

Extinguishing media (suitable):

water spray, carbon dioxide, foam, Dry chemical

Protective equipment:

Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand / NIOSH approved or equivalent).

Further firefighting advice:

Cool closed containers exposed to fire with water spray.
 Closed containers of this material may explode when subjected to heat from surrounding fire.
 After a fire, wait until the material has cooled to room temperature before initiating clean-up activities.
 Do not allow run-off from fire fighting to enter drains or water courses.
 Fire fighting equipment should be thoroughly decontaminated after use.

Fire and explosion hazards:

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When burned, the following hazardous products of combustion can occur:

- Carbon oxides
- sulfur oxides
- hydrogen sulfide
- Hazardous organic compounds

6. ACCIDENTAL RELEASE MEASURES

In case of spill or leak:

Prevent further leakage or spillage if you can do so without risk. Evacuate area of all unnecessary personnel. Ventilate the area. Eliminate all ignition sources. Avoid generation of vapors. Contain and collect spillage with non-combustible absorbent material such as sodium bicarbonate, sodium carbonate, calcium carbonate, clean sand or non-acidic clay and then wet down (dampen) the mixture with water. Sweep or scoop up using non-sparking tools and place into suitable properly labeled containers for prompt disposal. The sweepings should be wetted down further with water. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

7. HANDLING AND STORAGE

Handling

General information on handling:

- Do not taste or swallow.
- Avoid breathing vapor or mist.
- Keep away from heat, sparks and flames.
- No smoking.
- Keep container closed.
- Do not enter confined spaces unless adequately ventilated.
- Use only with adequate ventilation.
- Wash thoroughly after handling.
- Check that all equipment is properly grounded and installed to satisfy electrical classification requirements.
- Container hazardous when empty.
- Follow label warnings even after container is emptied.
- RESIDUAL VAPORS MAY EXPLODE ON IGNITION.
- DO NOT CUT, DRILL, GRIND, OR WELD ON OR NEAR THIS CONTAINER.
- Improper disposal or reuse of this container may be dangerous and/or illegal.
- Emptied container retains vapor and product residue.

Storage

General information on storage conditions:

Keep in a dry, cool place. Keep away from direct sunlight. Keep container closed when not in use. Store in closed containers, in a secure area to prevent container damage and subsequent spillage. Store in well ventilated area away from heat and sources of ignition such as flame, sparks and static electricity. Ensure that all storage and handling equipment is properly grounded and installed to satisfy electrical classification requirements. Static electricity may accumulate when transferring material. All metal and groundable storage containers, including but not limited to drums, cylinders, Returnable Intermodal Bulk Containers (RIBCs) and Class C Flexible Intermodal Bulk Containers (FIBCs) must be bonded and grounded during filling and emptying operations. Observe all federal, state and local regulations and National Fire Protection Association (NFPA) Codes which pertain to the specific local

ETHYL MERCAPTAN

conditions of storage and use, including OSHA 29 CFR 1910.106 and NFPA 30, 70, 77, and 497.

Storage incompatibility – General:

Store away from oxidizers and reactive materials.

Store separate from: hydrogen peroxide

hypochlorites

nitric acid

Avoid exposure to water in process equipment at temperatures below approx 20°C (68°F)/1 atm to avoid formation of solid hydrates.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne Exposure Guidelines:

Ethanethiol (75-08-1)

US. ACGIH Threshold Limit Values

Time weighted average	0.5 ppm
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US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Ceiling Limit Value	10 ppm (25 mg/m3)
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Only those components with exposure limits are printed in this section. Limits with skin contact designation above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required. Limits with a sensitizer designation above mean that exposure to this material may cause allergic reactions.

Engineering controls:

Investigate engineering techniques to reduce exposures below airborne exposure limits or to otherwise reduce exposures. Provide ventilation if necessary to minimize exposures or to control exposure levels to below airborne exposure limits (if applicable see above). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

Respiratory protection:

Avoid breathing vapor or mist. Where airborne exposure is likely or airborne exposure limits are exceeded (if applicable, see above), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. Consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure or where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply

ETHYL MERCAPTAN

with 29 CFR § 1910.134.

Skin protection:

Minimize skin contamination by following good industrial hygiene practice. Wearing protective gloves is recommended. Wash hands and contaminated skin thoroughly after handling.

Eye protection:

Use good industrial practice to avoid eye contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	Clear - colourless
Physical state:	liquid
Odor:	mercaptans
Odor threshold:	0.4 ppb
Flash point	-49 °F (-45 °C) (Method: Standard ASTM D 3278)
Auto-ignition temperature:	572 °F (300 °C)
Lower flammable limit (LFL):	2.8 %(V)
Upper flammable limit (UFL):	18 %(V)
pH:	not determined
Density:	0.839 g/cm3
Specific Gravity (Relative density):	0.839 (68 °F (20 °C))Water=1 (liquid)
Vapor pressure:	401 mmHg (68 °F (20 °C))calculated
Relative vapor density:	2.1
Vapor density:	2.1 kg/m3
Boiling point/boiling range:	95 °F (35 °C)
Freezing point:	-234 °F (-148 °C)
Melting point/range:	-234 °F (-148 °C)
Evaporation rate:	not determined
Solubility in water:	6.8 g/l 68 °F (20 °C)

ETHYL MERCAPTAN

Refractive index:	1.431 68 °F (20 °C)
Viscosity, dynamic:	0.29 mPa.s 68 °F (20 °C)
% Volatiles:	100 %
Molecular weight:	62.13 g/mol
Oil/water partition coefficient:	1.26
Thermal decomposition	No data available
Critical point:	Critical pressure: 40,653 mmHg Critical temperature: 437.9 °F (225.5 °C)
Henry's constant:	455.8E+00 Pa.m ³ /mol
Flammability:	See GHS Classification in Section 2

10. STABILITY AND REACTIVITY

Stability:
 This material is chemically stable under normal and anticipated storage, handling and processing conditions.

Materials to avoid:
 Risk of violent reaction.
 Strong oxidizing agents
 Hydrogen peroxide
 Nitric acid
 Reactive materials
 Hypochlorites

Conditions / hazards to avoid:
 Sparks, flames, ignition points and static electricity. Avoid exposure to water in process equipment at temperatures below approx 20°C (68°F)/1 atm to avoid formation of solid hydrates.

Hazardous decomposition products:
 Thermal decomposition giving flammable and toxic products
 Carbon oxides
 sulfur oxides
 hydrogen sulfide
 Hazardous organic compounds

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11. TOXICOLOGICAL INFORMATION

Data for ETHYL MERCAPTAN

Acute toxicity

Oral:

Harmful if swallowed. (rat) LD50 = 682 mg/kg.

Dermal:

No deaths occurred. (rabbit) LD50 > 2,000 mg/kg.

Inhalation:

Harmful if inhaled. (rat) 4 h LC50 = 11.2 mg/l = 4420 ppm. signs: Central nervous system effects (vapor)

Skin Irritation:

Causes mild skin irritation. (rabbit) (4 h)

Eye Irritation:

Causes mild eye irritation. (rabbit) (data for a similar material)

Repeated dose toxicity

Subchronic oral administration to rat / affected organ(s): blood, liver / signs: changes in blood cell counts, changes in organ structure or function / (data for a similar material)

Subchronic inhalation administration to rat / affected organ(s): blood, liver, kidney / signs: changes in blood cell counts, changes in organ structure or function / (data for a similar material)

Subchronic inhalation administration to rat / affected organ(s): lung, kidney / signs: inflammation, changes in organ structure or function, changes in organ weights / (data for a similar material)

Genotoxicity

Assessment in Vitro:

Both positive and equivocal responses have been reported in tests using: animal cells

No genetic changes were observed in laboratory tests using: bacteria

Assessment in Vivo:

No genetic changes were observed in laboratory tests using: mice, (data for similar material)

Developmental toxicity

Exposure during pregnancy. inhalation (mouse) / No birth defects were observed. at doses that produce effects in mothers

Human experience

Inhalation:

Central nervous system: headache, nausea, respiratory depression.

ETHYL MERCAPTAN

Nose: The gas deadens the sense of smell. Do not depend on odor to detect presence of gas.

12. ECOLOGICAL INFORMATION

Chemical Fate and Pathway

Data on this material and/or a similar material are summarized below.

Data for ETHYL MERCAPTAN

Biodegradation:

Not readily biodegradable. (28 d) biodegradation 27.10 %

Octanol Water Partition Coefficient:

log Pow = 1.5

Mobility and Distribution in the Environment:

Slight adsorption / Log Koc= 1.53

Ecotoxicology

Data on this material and/or a similar material are summarized below.

Data for ETHYL MERCAPTAN

Aquatic toxicity data:

Toxic. Oncorhynchus mykiss (rainbow trout) 96 h LC50 = 2.4 mg/l

Aquatic invertebrates:

Very toxic. Daphnia magna (Water flea) 48 h EC50 = 0.1 mg/l

Algae:

Toxic. Pseudokirchneriella subcapitata (green algae) 72 h EC50 = 3.0 mg/l

13. DISPOSAL CONSIDERATIONS

Waste disposal:

Disposal via incineration is recommended. Dispose of in accordance with federal, state and local regulations. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

Take appropriate measures to prevent release to the environment.

14. TRANSPORT INFORMATION

US Department of Transportation (DOT)

UN Number	:	2363
Proper shipping name	:	Ethyl mercaptan
Class	:	3
Packaging group	:	I

ETHYL MERCAPTAN

Marine pollutant : yes

International Maritime Dangerous Goods Code (IMDG)

UN Number : 2363
 Proper shipping name : ETHYL MERCAPTAN
 Class : 3
 Packaging group : I
 Marine pollutant : yes
 Flash point : -49 °F (-45 °C)

15. REGULATORY INFORMATION

Chemical Inventory Status

EU. EINECS	EINECS	Conforms to
United States TSCA Inventory	TSCA	The components of this product are all on the TSCA Inventory.
Canadian Domestic Substances List (DSL)	DSL	All components of this product are on the Canadian DSL.
China. Inventory of Existing Chemical Substances in China (IECSC)	IECSC (CN)	Conforms to
Japan. ENCS - Existing and New Chemical Substances Inventory	ENCS (JP)	Conforms to
Japan. ISHL - Inventory of Chemical Substances	ISHL (JP)	Conforms to
Korea. Korean Existing Chemicals Inventory (KECI)	KECI (KR)	Conforms to
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	PICCS (PH)	Conforms to
Australia Inventory of Chemical Substances (AICS)	AICS	Conforms to

United States – Federal Regulations

SARA Title III – Section 302 Extremely Hazardous Chemicals:

The components in this product are either not SARA Section 302 regulated or regulated but present in negligible concentrations.

SARA Title III - Section 311/312 Hazard Categories:

Acute Health Hazard, Fire Hazard

SARA Title III – Section 313 Toxic Chemicals:

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

ETHYL MERCAPTAN

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - Reportable Quantity (RQ):

The components in this product are either not CERCLA regulated, regulated but present in negligible concentrations, or regulated with no assigned reportable quantity.

United States – State Regulations

New Jersey Right to Know

<u>Chemical Name</u>	<u>CAS-No.</u>
Ethanethiol	75-08-1

New Jersey Right to Know – Special Health Hazard Substance(s)

<u>Chemical Name</u>	<u>CAS-No.</u>
Ethanethiol	75-08-1

Pennsylvania Right to Know

<u>Chemical Name</u>	<u>CAS-No.</u>
Ethanethiol	75-08-1

California Prop. 65

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

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

- H224 Extremely flammable liquid and vapour.
- H302 Harmful if swallowed.
- H332 Harmful if inhaled.
- H400 Very toxic to aquatic life.
- H410 Very toxic to aquatic life with long lasting effects.

Miscellaneous:

Other information: This MSDS covers the following grades: Odorant Grade

Latest Revision(s):

Reference number:	00000068369
Date of Revision:	05/15/2015
Date Printed:	05/15/2015

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ETHYL MERCAPTAN

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Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088
EU/CLP GHS

Synonyms: #2 Heating Oil; 2 Oil; Off-road Diesel Fuel

*** Section 1 - Product and Company Identification ***

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

*** Section 2 - Hazards Identification ***

GHS Classification:

Flammable Liquids - Category 3
Acute Toxicity, Inhalation - Category 4
Skin Corrosion/Irritation – Category 2
Eye Damage/Irritation – Category 2
Carcinogenicity - Category 2
Specific Target Organ Toxicity (Single Exposure) – Category 3 (respiratory irritation, narcosis)
Aspiration Hazard – Category 1
Hazardous to the Aquatic Environment, Acute Hazard – Category 3

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Hazard Statements

Flammable liquid and vapor.
Harmful if inhaled.
Causes skin irritation.
Causes eye irritation.
Suspected of causing cancer.
Suspected of causing genetic defects.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Avoid breathing fume/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid release to the environment.

Response

In case of fire: Use water spray, fog or foam.
If on skin (or hair): Wash with plenty of soap and water. Take off immediately all contaminated clothing and wash it before reuse. If skin irritation occurs, get medical advice/attention.
If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center or doctor if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
If exposed or concerned: Get medical advice/attention.
If swallowed: Immediately call a poison center or doctor/physician if you feel unwell. Do NOT induce vomiting.

Storage

Store in a well ventilated place.
Keep cool. Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
68476-30-2	Fuel oil No. 2	100
91-20-3	Naphthalene	<0.1

A complex combination of hydrocarbons with carbon numbers in the range C9 and higher produced from the distillation of petroleum crude oil.

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

*** Section 4 - First Aid Measures ***

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO₂, water spray, fire fighting foam, or gaseous extinguishing agent.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

*** Section 6 - Accidental Release Measures ***

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when this product is loaded into tanks previously containing low flash point products (such as gasoline) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep containers closed and clearly labeled. Use approved vented storage containers. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Keep away from strong oxidizers; Fluorel ®

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

*** Section 8 - Exposure Controls / Personal Protection ***

Component Exposure Limits

Fuel oil No. 2 (270-671-4)

- ACGIH: 100 mg/m³ TWA (inhalable fraction and vapor, as total hydrocarbons, listed under Diesel fuel)
Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Diesel fuel)
- Belgium: 100 mg/m³ TWA (as total hydrocarbon, aerosol and vapor)
Skin (listed under Gas oil)
- Portugal: 100 mg/m³ TWA [VLE-MP] (aerosol and vapor, as total Hydrocarbons, listed under Fuel diesel)

Naphthalene (202-049-5)

- ACGIH: 15 ppm STEL
10 ppm TWA
Skin - potential significant contribution to overall exposure by the cutaneous route
- Austria: 10 ppm TWA [TMW]; 50 mg/m³ TWA [TMW]
skin notation
- Belgium: 15 ppm STEL; 80 mg/m³ STEL
10 ppm TWA; 53 mg/m³ TWA
Skin
- Denmark: 10 ppm TWA; 50 mg/m³ TWA
- Finland: 2 ppm STEL; 10 mg/m³ STEL
1 ppm TWA; 5 mg/m³ TWA
- France: 10 ppm TWA [VME]; 50 mg/m³ TWA [VME]
- Germany: 0.1 ppm TWA AGW (The risk of damage to the embryo or fetus can be excluded when MAK and BAT values are observed, inhalable fraction, exposure factor 1); 0.5 mg/m³ TWA AGW (The risk of damage to the embryo or fetus can be excluded when MAK and BAT values are observed, inhalable fraction, exposure factor 1)
- Greece: 10 ppm TWA; 50 mg/m³ TWA
- Ireland: 15 ppm STEL; 75 mg/m³ STEL
10 ppm TWA; 50 mg/m³ TWA
- Netherlands: 80 mg/m³ STEL
50 mg/m³ TWA
- Portugal: 10 ppm TWA [VLE-MP]
- Spain: 15 ppm STEL [VLA-EC]; 80 mg/m³ STEL [VLA-EC]
10 ppm TWA [VLA-ED]; 53 mg/m³ TWA [VLA-ED]
skin - potential for cutaneous exposure
- Sweden: 10 ppm LLV; 50 mg/m³ LLV
15 ppm STV; 80 mg/m³ STV

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

*** Section 9 - Physical & Chemical Properties ***

Appearance:	Red or reddish/orange colored (dyed)	Odor:	Mild, petroleum distillate odor
Physical State:	Liquid	pH:	ND
Vapor Pressure:	0.009 psia @ 70 °F (21 °C)	Vapor Density:	>1.0
Boiling Point:	340 to 700 °F (171 to 371 °C)	Melting Point:	ND
Solubility (H2O):	Negligible	Specific Gravity:	AP 0.823-0871
Evaporation Rate:	Slow; varies with conditions	VOC:	ND
Octanol/H2O Coeff.:	ND	Flash Point:	100 °F (38 °C) minimum
Flash Point Method:	PMCC	Upper Flammability Limit (UFL):	7.5
Lower Flammability Limit (LFL):	0.6	Burning Rate:	ND
Auto Ignition:	494°F (257°C)		

*** Section 10 - Chemical Stability & Reactivity Information ***

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers; Fluorel®

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

*** Section 11 - Toxicological Information ***

Acute Toxicity

A: General Product Information

Harmful if swallowed.

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

B: Component Analysis - LD50/LC50

Fuel oil No. 2 (68476-30-2)

Oral LD50 Rat 12 g/kg; Dermal LD50 Rabbit 4720 µL/kg; Dermal LD50 Rabbit >2000 mg/kg; Inhalation LC50 Rat 4.6 mg/L 4 h

Naphthalene (91-20-3)

Inhalation LC50 Rat >340 mg/m³ 1 h; Oral LD50 Rat 490 mg/kg; Dermal LD50 Rat >2500 mg/kg; Dermal LD50 Rabbit >20 g/kg

Product Mixture

Oral LD50 Rat 14.5 ml/kg; Dermal LD50 Rabbit >5 mL/kg; Guinea Pig Sensitization: negative; Primary dermal irritation: moderately irritating (Draize mean irritation score - 3.98 rabbits); Draize eye irritation: mildly irritating (Draize score, 48 hours, unwashed - 2.0 rabbits)

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Contact with eyes may cause mild irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This product is not reported to have any mutagenic effects. Material of similar composition has been positive in a mutagenicity study.

Carcinogenicity

A: General Product Information

Suspected of causing cancer.

Dermal carcinogenicity: positive - mice

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

This product is similar to Diesel Fuel. IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A) and NIOSH regards it as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

B: Component Carcinogenicity

Fuel oil No. 2 (68476-30-2)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)

IARC: Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Very toxic to aquatic life with long lasting effects. Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Fuel oil No. 2 (68476-30-2)

Test & Species

96 Hr LC50 Pimephales promelas

35 mg/L [flow-through]

Conditions

Naphthalene (91-20-3)

Test & Species

96 Hr LC50 Pimephales promelas

5.74-6.44 mg/L [flow-through]

Conditions

96 Hr LC50 Oncorhynchus mykiss

1.6 mg/L [flow-through]

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

96 Hr LC50 Oncorhynchus mykiss	0.91-2.82 mg/L [static]
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]
96 Hr LC50 Lepomis macrochirus	31.0265 mg/L [static]
72 Hr EC50 Skeletonema costatum	0.4 mg/L
48 Hr LC50 Daphnia magna	2.16 mg/L
48 Hr EC50 Daphnia magna	1.96 mg/L [Flow through]
48 Hr EC50 Daphnia magna	1.09 - 3.4 mg/L [Static]

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

IATA Information

Shipping Name: Heating oil, light

UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

ICAO Information

Shipping Name: Heating oil, light

UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

IMDG Information

Shipping Name: Heating oil, light

UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088

*** Section 15 - Regulatory Information ***

Regulatory Information

Component Analysis – Inventory

Component/CAS	EC #	EEC	CAN	TSCA
Fuel oil No. 2 68476-30-2	270-671-4	EINECS	DSL	Yes
Naphthalene 91-20-3	202-049-5	EINECS	DSL	Yes

*** Section 16 - Other Information ***

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

ATTACHMENT I: EMISSIONS UNIT TABLE

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

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 Unit ID ¹	Emission Point ID ²	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type ³ and Date of Change	Control Device ⁴
S052	P052	Hot Oil Heater (61.6 MMBtu/hr)	2019	61.6 MMBtu/hr	New	N/A
S053	P053	Hot Oil Heater (61.6 MMBtu/hr)	2019	61.6 MMBtu/hr	New	N/A
S054	P054	Ethane Amine Regenerator	2019	129 MMscfd	New	C011
S055	P055	Pressurized NGL/Condensate Unloading	2012	N/A	New	N/A
S056	P056	Stabilizer Heater	2019	10.09 MMBtu/hr	New	N/A
S057	P057	Emergency Generator Engine(s)	2019	16,000 hp	New	N/A
TK-2906	TK-2906	Slop Tank TK-2906	2019	500 bbl	New	N/A
TK-2907	TK-2907	Produced Water Tank TK-2907	2019	1,500 bbl	New	N/A
TK-3802	P001	Natural Gasoline Storage Tank TK-3802	2019	17,000 bbl	New	C001, C006
TK-4802	P001	Natural Gasoline Storage Tank TK-4802	2019	30,000 bbl	New	C001, C006
TK-5802	P001	Natural Gasoline Storage Tank TK-5802	2019	17,000 bbl	New	C001, C006
TK-6802	P001	Natural Gasoline Storage Tank TK-6802	2019	30,000 bbl	New	C001, C006
TK-7802	TK-7802	Refrigerated Propane Storage Tank TK-7802	2019	100,000 bbl	New	C012
S024	P024	Regen Gas Heater (9.7 MMBtu/hr)	2018	9.7 MMBtu/hr	New	None
S026	P026	Cryo HMO Heater (26.3 MMBtu/hr)	2018	26.3 MMBtu/hr	New	None

S029	P029	Glycol Reboiler (3.0 MMBtu/hr)	2018	3.0 MMBtu/hr	New	None
FUG AREA 3	FUG AREA 3	Fugitive Area 3 (Cryo 3)	2018	N/A	New	None
S032	V003	Glycol Dehydrator Still Vent	2018	230 MMscfd	New	C009
V003	V003	Vapor Combustor	2018	N/A	New	C009
S036	P036	Regen Gas Heater (9.7 MMBtu/hr)	2019	9.7 MMBtu/hr	New	None
S037	P037	Cryo HMO Heater (26.3 MMBtu/hr)	2019	26.3 MMBtu/hr	New	None
FUG AREA 4	FUG AREA 4	Fugitive Area 4 (Cryo 4)	2019	N/A	New	None
S040	P040	Regen Gas Heater (19.28 MMBtu/hr)	2019	19.28 MMBtu/hr	New	None
S041	P041	Cryo HMO Heater (54.67 MMBtu/hr)	2019	54.67 MMBtu/hr	New	None
FUG AREA 5	FUG AREA 5	Fugitive Area 5 (Cryo 5)	2019	N/A	New	None
S044	P044	Regen Gas Heater (9.7 MMBtu/hr)	2019	9.7 MMBtu/hr	New	None
S045	P045	Cryo HMO Heater (26.3 MMBtu/hr)	2019	26.3 MMBtu/hr	New	None
FUG AREA 6	FUG AREA 6	Fugitive Area 6 (Cryo 6)	2019	N/A	New	None
S048	P048	Regen Gas Heater (9.7 MMBtu/hr)	2019	9.7 MMBtu/hr	New	None
S049	P049	Cryo HMO Heater (26.3 MMBtu/hr)	2019	26.3 MMBtu/hr	New	None
FUG AREA 7	FUG AREA 7	Fugitive Area 7 (Cryo 7)	2019	N/A	New	None
S001	P001	Hot Oil Heater (216.7 MMBtu/hr)	2014	216.7 MMBtu/hr	Modification – 2018	None
S016	P016	Hot Oil Heater (61.6 MMBtu/hr)	2014	61.6 MMBtu/hr	Existing	None

S017	P017	Hot Oil Heater (61.6 MMBtu/hr)	2014	61.6 MMBtu/hr	Existing	None
S018	P018	Hot Oil Heater (61.6 MMBtu/hr)	2014	61.6 MMBtu/hr	Existing	None
S019	P019	Hot Oil Heater (61.6 MMBtu/hr)	2014	61.6 MMBtu/hr	Existing	None
S012	P012	Regen Gas Heater (9.7 MMBtu/hr)	2013	9.7 MMBtu/hr	Existing	None
S013	P013	Cryo HMO Heater (26.3 MMBtu/hr)	2013	26.3 MMBtu/hr	Existing	None
S006	P001	Glycol Dehydration Still Vent	2011	460 MMscfd	Modification - 2018	C001
S004A	P004A	Ground Flare	2015	N/A	Modification-2018	C004A
S034	P034	Flare (Pigging)	2017	N/A	Modification-2018	Flare (C034)
S035	P035	Pigging Vent	2017	N/A	Modification-2018	None
TK-906	TK-906	Slop Tank TK-906	2011	500 BBL	Modification – 2018	None
S011	P005	Ethane Amine Regenerator	2011	129 MMscfd	Modification - 2018	None
TK-802	P001	Natural Gasoline Storage Tank TK-802	2011	17,000 BBL	Existing	C001 and C006
TK-2802	P001	Natural Gasoline Storage Tank TK-2802	2014	30,000 BBL	Existing	C001 and C006
S008	P008	Product Loading – Closed Loop	2011	35,000 gpm (Truck, Rail and Propane Barge)	Existing	Vapor Return to Tank
ROADS (S010)	ROADS	Unpaved Roads	2011	N/A	Existing	None
FUG AREA 1	FUG AREA 1	Fugitive Area 1 (Cryo 1, Cryo 2, and Frac 1).	2011	N/A	Modification – 2018	None
FUG AREA 2	FUG AREA 2	Fugitives Area 2 (Frac 2)	2014	N/A	Modification - 2018	None
S033	P033	Barge Loading Vent	2017	N/A	New	None

S002	P002	Fire Pump #1	2011	700 HP	Modification – 2018	None
S003	P003	Fire Pump #2	2011	700 HP	Modification - 2018	None
TK-907	TK-907	Produced Water Tank TK-907	2011	1,500 bbl	Modification - 2018	None
S015	P015	Slop Water Truck Loading	2011	N/A	Modification - 2018	None
TK-L-1	TK-L-1	Gasoline Dispensing Tank	2017	1,000 gal	New	None
L-1	L-1	Gasoline Dispenser Loading	2017	N/A	New	None
N/A	Flare (Emergency only)	Four (4) Pressurized Horizontal Bullet Tanks (V-1905, V-1915, V-1925, V-1935)	2014	90,000 gal each	Existing	Pressure Tank
N/A	Flare (Emergency only)	Four (4) Pressurized Horizontal Bullet Tanks (V-2905, V-2915, V-2925, V-2935)	2019	90,000 gal each	New	Pressure Tank
NA	Flare (Emergency only)	Spherical Storage Tank (US-800)	2011	51,000 BBL	Existing	Pressure Tank
NA	Flare (Emergency only)	Spherical Storage Tank (US-801)	2011	20,600 BBL	Existing	Pressure Tank
NA	Flare (Emergency only)	Spherical Storage Tank (US-804)	2011	20,600 BBL	Existing	Pressure Tank
NA	Flare (Emergency only)	Spherical Natural Gas Liquid Storage Tank (US-805)	2011	20,600 BBL	Existing	Pressure Tank
NA	Flare (Emergency only)	Spherical Storage Tank (US-2800)	2019	51,000 BBL	New	Pressure Tank
NA	Flare (Emergency only)	Spherical Storage Tank (US-2801)	2019	20,600 BBL	New	Pressure Tank
NA	Flare (Emergency only)	Spherical Storage Tank (US-2804)	2019	20,600 BBL	New	Pressure Tank
NA	Flare (Emergency only)	Spherical Natural Gas Liquid Storage Tank (US-2805)	2019	20,600 BBL	New	Pressure Tank
NA	Flare (Emergency only)	Miscellaneous Storage Tanks	2011	Varies	Existing	None

S028	P028	Glycol Reboiler (3.0 MMBtu/hr)	N/A	3.0 MMBtu/hr	Removal	None
S031	V002	Dehydrator Still Vent	N/A	230 MMscfd	Removal	C008
V001	V001	Vapor Combustor	N/A	N/A	Removal	C007
V002	V002	Vapor Combustor	N/A	N/A	Removal	C008
S014	P006	Ethane Amine Regenerator	N/A	100 MMscfd	Removal	None
S020	P020	Glycol Reboiler (3.0 MMBtu/hr)	N/A	3.0 MMBtu/hr	Removal	None
S022	P022	Regen Gas Heater (9.7 MMBtu/hr)	N/A	9.7 MMBtu/hr	Removal	None

¹ For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S,... or other appropriate designation.

² For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.

³ New, modification, removal

⁴ For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

ATTACHMENT J: EMISSION POINTS DATA SUMMARY SHEET

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPs)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
P052, P053	Vertical Stack	S052, S053	Hot Oil Heater(s)	N/A	N/A	C	N/A	NO _x	1.48	6.47	1.48	6.47	Gas	EE	N/A
									3.63	15.91	3.63	15.91	Gas		
									0.33	1.45	0.33	1.45	Gas		
									0.46	2.01	0.46	2.01	Gas		
									0.04	0.19	0.04	0.19	Gas		
									--	31,583	--	31,583	Gas		
P054	Vertical Stack	S054	Ethane Amine Regenerator	C011	N/A	C	N/A	VOC	1.98	0.43	1.98	0.43	Gas	EE	N/A
									2,790	611	2,790	611	Gas		
									0.02	0.005	0.02	0.005	Gas		
									2,791	611	2,791	611	Gas		
									(2)	(2)	(2)	(2)	Gas		
													Gas		
P055	Vertical Stack	S055	Pressurized NGL/Condensate Loading	N/A	N/A	C	N/A	VOC	9.05	19.83	9.05	19.83	Gas	EE	N/A
									--	0.23	--	0.23	Gas		
									--	0.23	--	0.23	Gas		
									--	6	--	6	Gas		
									(2)	(2)	(2)	(2)	Gas		
													Gas		
P056	Vertical Stack	S056	Stabilizer Heater	N/A	N/A	C	N/A	NO _x	0.99	4.33	0.99	4.33	Gas	EE	N/A
									0.83	3.64	0.83	3.64	Gas		
									0.05	0.24	0.05	0.24	Gas		
									0.08	0.33	0.08	0.33	Gas		
									0.01	0.03	0.01	0.03	Gas		
									--	5,175	--	5,175	Gas		
				Gas											

P057	Vertical Stack(s)	S057	Emergency Generator Engine(s)	N/A	N/A	C	N/A	N/A	NOx CO VOC PM SO ₂ CO _{2e} (1) HAPs	70.55 141.10 35.27 1.28 0.08 -- (2)	3.53 7.05 1.76 0.06 0.004 749 (2)	70.55 141.10 35.27 1.28 0.08 -- (2)	3.53 7.05 1.76 0.06 0.004 749 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
TK-2906	Vertical Stack	TK-2906	Slop Tank TK-2906	N/A	N/A	C	N/A	N/A	VOC	8.88	0.05	8.88	0.05	Gas	N/A	N/A
TK-2907	Vertical Stack	TK-2907	Produced Water Tank TK-2907	N/A	N/A	C	N/A	N/A	VOC	26.96	0.14	26.96	0.14	Gas	N/A	N/A
P001	Vertical Stack	TK-3802	Natural Gasoline Storage Tank TK-3802	C001 and C006	N/A	N/A	Natural Gas Blanket and VRU	N/A	--	--	--	--	--	Gas	N/A	N/A
P001	Vertical Stack	TK-4802	Natural Gasoline Storage Tank TK-4802	C001 and C006	N/A	N/A	Natural Gas Blanket and VRU	N/A	--	--	--	--	--	Gas	N/A	N/A
P001	Vertical Stack	TK-5802	Natural Gasoline Storage Tank TK-5802	C001 and C006	N/A	N/A	Natural Gas Blanket and VRU	N/A	--	--	--	--	--	Gas	N/A	N/A
P001	Vertical Stack	TK-6802	Natural Gasoline Storage Tank TK-6802	C001 and C006	N/A	N/A	Natural Gas Blanket and VRU	N/A	--	--	--	--	--	Gas	N/A	N/A
TK-7802	Vertical Stack	TK-7802	Refrigerated Propane Storage Tank TK-7802	C012	N/A	N/A	VRU	N/A	--	--	--	--	--	Gas	N/A	N/A
P024	Vertical Stack	S024	Regen Gas Heater	N/A	N/A	C	N/A	N/A	NO _x CO VOC PM SO ₂ CO _{2e} (1) HAPs	0.95 0.80 0.05 0.07 0.01 -- (2)	4.17 3.50 0.23 0.32 0.03 4,975 (2)	0.95 0.80 0.05 0.07 0.01 -- (2)	4.17 3.50 0.23 0.32 0.03 4,975 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A

P026	Vertical Stack	S026	Cryo HMO Heater	N/A	N/A	C	N/A	N/A	2.58 2.17 0.14 0.20 0.02 -- (2)	11.29 9.49 0.62 0.86 0.08 13,489 (2)	2.58 2.17 0.14 0.20 0.02 -- (2)	11.29 9.49 0.62 0.86 0.08 13,489 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
P029	Vertical Stack	S029	Glycol Reboiler	N/A	N/A	C	N/A	N/A	0.29 0.25 0.02 0.02 0.002 -- (2)	1.29 1.08 0.07 0.10 0.01 1,539 (2)	0.29 0.25 0.02 0.02 0.002 -- (2)	1.29 1.08 0.07 0.10 0.01 1,539 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
FUG AREA 3	N/A	FUG AREA 3	Fugitive Area 3 (Cryo 3)	N/A	N/A	C	N/A	N/A	3.10 -- -- -- (2)	13.56 0.14 9.95 249 (2)	3.10 -- -- -- (2)	13.56 0.14 9.95 249 (2)	Gas Gas Gas Gas Gas	EE	N/A
V003	Vertical Stack	S032	Glycol Dehydrator Still Vent	C009	Vapor Combustor	C	N/A	N/A	2.17 -- -- -- (2)	9.50 0.39 6.96 174 (2)	2.17 -- -- -- (2)	9.50 0.39 6.96 174 (2)	Gas Gas Gas Gas Gas	EE	N/A
V003	Vertical Stack	V003	Vapor Combustor	N/A	N/A	C	N/A	N/A	0.77 1.54 0.0002 0.03 0.002 -- (2)	3.38 6.74 0.001 0.11 0.01 2,866 (2)	0.77 1.54 0.0002 0.03 0.002 -- (2)	3.38 6.74 0.001 0.11 0.01 2,866 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
P036	Vertical Stack	S036	Regen Gas Heater	N/A	N/A	C	N/A	N/A	0.95 0.80 0.05 0.07 0.01 -- (2)	4.17 3.50 0.23 0.32 0.03 4,975 (2)	0.95 0.80 0.05 0.07 0.01 -- (2)	4.17 3.50 0.23 0.32 0.03 4,975 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A

P037	Vertical Stack	S037	Cryo HMO Heater	N/A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} (1) HAPs	2.58 2.17 0.14 0.20 0.02 -- (2)	11.29 9.49 0.62 0.86 0.08 13,489 (2)	2.58 2.17 0.14 0.20 0.02 -- (2)	11.29 9.49 0.62 0.86 0.08 13,489 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
FUG AREA 4	N/A	FUG AREA 4	Fugitive Area 4 (Cryo 4)	N/A	N/A	C	N/A	VOC CO ₂ CH ₄ CO _{2e} (1) HAPs	3.91 -- -- -- (2)	17.12 0.22 15.74 394 (2)	3.91 -- -- -- (2)	17.12 0.22 15.74 394 (2)	Gas Gas Gas Gas Gas	EE	N/A
P040	Vertical Stack	S040	Regen Gas Heater	N/A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} (1) HAPs	1.89 1.59 0.10 0.14 0.01 -- (2)	8.28 6.95 0.46 0.63 0.06 9,888 (2)	1.89 1.59 0.10 0.14 0.01 -- (2)	8.28 6.95 0.46 0.63 0.06 9,888 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
P041	Vertical Stack	S041	Cryo HMO Heater	N/A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} (1) HAPs	5.36 4.50 0.29 0.41 0.04 -- (2)	23.48 19.72 1.29 1.78 0.17 28,039 (2)	5.36 4.50 0.29 0.41 0.04 -- (2)	23.48 19.72 1.29 1.78 0.17 28,039 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
FUG AREA 5	N/A	FUG AREA 5	Fugitive Area 5 (Cryo 5)	N/A	N/A	C	N/A	VOC CO ₂ CH ₄ CO _{2e} (1) HAPs	3.10 -- -- -- (2)	13.56 0.14 9.95 249 (2)	3.10 -- -- -- (2)	13.56 0.14 9.95 249 (2)	Gas Gas Gas Gas Gas	EE	N/A
P044	Vertical Stack	S044	Regen Gas Heater	N/A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} (1) HAPs	0.95 0.80 0.05 0.07 0.01 -- (2)	4.17 3.50 0.23 0.32 0.03 4,975 (2)	0.95 0.80 0.05 0.07 0.01 -- (2)	4.17 3.50 0.23 0.32 0.03 4,975 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A

P045	Vertical Stack	S045	Cryo HMO Heater	N/A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} (1) HAPs	2.58 2.17 0.14 0.20 0.02 -- (2)	11.29 9.49 0.62 0.86 0.08 13,489 (2)	2.58 2.17 0.14 0.20 0.02 -- (2)	11.29 9.49 0.62 0.86 0.08 13,489 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
FUG AREA 6	N/A	FUG AREA 6	Fugitive Area 6 (Cryo 6)	N/A	N/A	C	N/A	VOC CO ₂ CH ₄ CO _{2e} (1) HAPs	3.10 -- -- -- (2)	13.56 0.14 9.95 249 (2)	3.10 -- -- -- (2)	13.56 0.14 9.95 249 (2)	Gas Gas Gas Gas Gas	EE	N/A
P048	Vertical Stack	S048	Regen Gas Heater	N/A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} (1) HAPs	0.95 0.80 0.05 0.07 0.01 -- (2)	4.17 3.50 0.23 0.32 0.03 4,975 (2)	0.95 0.80 0.05 0.07 0.01 -- (2)	4.17 3.50 0.23 0.32 0.03 4,975 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
P049	Vertical Stack	S049	Cryo HMO Heater	N/A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} (1) HAPs	2.58 2.17 0.14 0.20 0.02 -- (2)	11.29 9.49 0.62 0.86 0.08 13,489 (2)	2.58 2.17 0.14 0.20 0.02 -- (2)	11.29 9.49 0.62 0.86 0.08 13,489 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
FUG AREA 7	N/A	FUG AREA 7	Fugitive Area 7 (Cryo 7)	N/A	N/A	C	N/A	VOC CO ₂ CH ₄ CO _{2e} (1) HAPs	3.10 -- -- -- (2)	13.56 0.14 9.95 249 (2)	3.10 -- -- -- (2)	13.56 0.14 9.95 249 (2)	Gas Gas Gas Gas Gas	EE	N/A
P001	Vertical Stack	S001	Hot Oil Heater	N/A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} (1) HAPs	9.75 3.25 0.37 1.61 0.15 -- (2)	42.71 14.24 1.61 7.07 0.67 111,142 (2)	9.75 3.25 0.37 1.61 0.15 -- (2)	42.71 14.24 1.61 7.07 0.67 111,142 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A

P016, P017, P018, P019,	Vertical Stack	S016, S017, S018, S019,	Hot Oil Heater(s)	N/A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} (1) HAPs	1.48 3.63 0.33 0.46 0.04 -- (2)	6.47 15.91 1.45 2.01 0.19 31,583 (2)	1.48 3.63 0.33 0.46 0.04 -- (2)	6.47 15.91 1.45 2.01 0.19 31,583 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
P012	Vertical Stack	S012	Regen Gas Heater	N/A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} HAPs	0.95 0.80 0.05 0.07 0.01 -- (2)	4.17 3.50 0.23 0.32 0.03 4,975 (2)	0.95 0.80 0.05 0.07 0.01 -- (2)	4.17 3.50 0.23 0.32 0.03 4,975 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
P013	Vertical Stack	S013	Cryo HMO Heater	N/A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} HAPs	2.58 2.17 0.14 0.20 0.02 -- (2)	11.29 9.49 0.62 0.86 0.08 13,489 (2)	2.58 2.17 0.14 0.20 0.02 -- (2)	11.29 9.49 0.62 0.86 0.08 13,489 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
P001	Vertical Stack	S006	Glycol Dehydrator Still Vent	C001	Heater	C	N/A	VOC CO ₂ CH ₄ CO _{2e} (1) HAPs	1.78 -- -- -- (2)	7.80 0.38 6.55 164 (2)	1.78 -- -- -- (2)	7.80 0.38 6.55 164 (2)	Gas Gas Gas Gas Gas	EE	N/A
P004A	Vertical Stack	S004A	Ground Flare	C004A	N/A	C	N/A	NO _x CO VOC PM SO ₂ CO _{2e} (1) HAPs	1,539.61 3,073.64 10,171.10 25.34 0.001 -- (2)	6.73 13.43 12.89 0.25 0.005 4,637 (2)	1,539.61 3,073.64 10,171.10 25.34 0.001 -- (2)	6.73 13.43 12.89 0.25 0.005 4,637 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A

P034	Vertical Stack	S034	Flare (Pigging)	C034	Flare	C	N/A	NOx CO VOC PM SO ₂ CO _{2e} (1) HAPs	24.25 13.99 227.77 1.31 1.87 -- (2)	0.15 0.08 1.37 0.01 0.01 142 (2)	24.25 13.99 227.77 1.31 1.87 -- (2)	0.15 0.08 1.37 0.01 0.01 142 (2)	Gas Gas Gas Gas Gas Gas Gas	EE	N/A
P035	N/A	S035	Pigging Vent	N/A	N/A	C	N/A	VOC CO ₂ CH ₄ CO _{2e} (1) HAPs	1,391.24 -- -- -- (2)	47.86 2.51 178.41 4,463 (2)	1,391.24 -- -- -- (2)	47.86 2.51 178.41 4,463 (2)	Gas Gas Gas Gas Gas	EE	N/A
TK-906	Vertical Stack	TK-906	Slop Tank TK-906	N/A	N/A	N/A	N/A	VOC	8.88	0.05	8.88	0.05	Gas	N/A	N/A
P005	Vertical Stack	S011	Ethane Amine Regenerator	N/A	N/A	C	N/A	VOC CO ₂ CH ₄ CO _{2e} (1) HAPs	1.98 2,790 0.02 2,791 (2)	8.67 12,220 0.10 12,222 (2)	1.98 2,790 0.02 2,791 (2)	8.67 12,220 0.10 12,222 (2)	Gas Gas Gas Gas Gas	EE	N/A
P001	Vertical Stack	TK-802	Natural Gas Storage Tank TK-802	C001 and C006	Natural Gas Blanket and VRU	N/A	N/A	--	--	--	--	--	Gas	N/A	N/A
P001	Vertical Stack	TK-2802	Natural Gas Storage Tank TK-2802	C001 and C006	Natural Gas Blanket and VRU	N/A	N/A	--	--	--	--	--	Gas	N/A	N/A
P008	N/A	S008	Propane, i-Butane, Butanes and Natural Gas Loading	Vapor Return to Tank	Vapor Return to Tank	N/A	N/A	VOC	4.36	2.18	4.36	2.18	Gas	N/A	N/A
ROADS	Fugitive	ROADS	Unpaved Roads	N/A	WT/WC	N/A	N/A	PM PM ₁₀ PM _{2.5}	-- -- --	43.86 11.69 1.17	-- -- --	43.86 11.69 1.17	Solid Solid Solid	AP-42	N/A

FUG AREA 1	N/A	FUG AREA 1	Fugitive Area 1 (Cryo 1, Cryo 2, and Frac 1)	N/A	N/A	C	N/A	VOC	16.03	70.21	16.03	70.21	Gas	EE	N/A
								CO ₂	--	0.67	--	0.67	Gas		
								CH ₄	--	46.97	--	46.97	Gas		
								CO _{2e} (1)	--	1,175	--	1,175	Gas		
								HAPs	(2)	(2)	(2)	(2)	Gas		
FUG AREA 2	N/A	FUG AREA 2	Fugitive Area 2 (Frac 2)	N/A	N/A	C	N/A	VOC	7.92	34.70	8.07	35.33	Gas	EE	N/A
								CO ₂	--	0.34	--	0.34	Gas		
								CH ₄	--	23.17	--	23.17	Gas		
								CO _{2e} (1)	--	580	--	580	Gas		
								HAPs	(2)	(2)	(2)	(2)	Gas		
P033	Vertical Stack	S033	Barge Loading Vent	N/A	N/A	C	N/A	VOC	97.22	82.69	97.22	82.69	Gas	EE	N/A
								HAPs	(2)	(2)	(2)	(2)	Gas		
P002	Vertical Stack	S002	Fire Pump #1	N/A	N/A	C	N/A	NO _x	4.63	0.23	4.63	0.23	Gas	EE	N/A
								CO	4.01	0.20	4.01	0.20	Gas		
								VOC	4.63	0.23	4.63	0.23	Gas		
								PM	0.23	0.01	0.23	0.01	Gas		
								SO ₂	0.01	0.0004	0.01	0.0004	Gas		
								CO _{2e}	--	41	--	41	Gas		
								HAPs	(2)	(2)	(2)	(2)	Gas		
P003	Vertical Stack	S003	Fire Pump #2	N/A	N/A	C	N/A	NO _x	4.63	0.23	4.63	0.23	Gas	EE	N/A
								CO	4.01	0.20	4.01	0.20	Gas		
								VOC	4.63	0.23	4.63	0.23	Gas		
								PM	0.23	0.01	0.23	0.01	Gas		
								SO ₂	0.01	0.0004	0.01	0.0004	Gas		
								CO _{2e}	--	41	--	41	Gas		
								HAPs	(2)	(2)	(2)	(2)	Gas		
TK-907	Vertical Stack	TK-907	Produced Water Tank TK-907	N/A	N/A	C	N/A	VOC	26.96	0.14	26.96	0.14	Gas	N/A	N/A
P015	Vertical Stack	S015	Slop Water Truck Loading	N/A	N/A	C	N/A	VOC	2.32	0.11	2.32	0.11	Gas	N/A	N/A
TK-L-1	Vertical Stack	TK-L-1	Gasoline Dispensing Tank	N/A	N/A	C	N/A	VOC	15.71	0.13	15.71	0.13	Gas	N/A	N/A
L-1	Vertical Stack	L-1	Gasoline Dispenser Loading	N/A	N/A	C	N/A	VOC	0.18	0.00005	0.18	0.00005	Gas	EE	N/A

Notes:
(1) Hourly emissions could not be quantified. CO_{2e} emissions include CO₂, CH₄, and N₂O, taking into account the Global Warming Potential of each.
(2) Individual HAPs are provided in Attachment N.

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit 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). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

- 1 Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.
- 2 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).
- 3 List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. **DO NOT LIST** H₂, H₂O, N₂, O₂, and Noble Gases.
- 4 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).
- 5 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).
- 6 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).
- 7 Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m³) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO₂, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data

Emission Point ID No. (Must match Emission Units Table)	Inner Diameter (ft.)	Exit Gas		Velocity (fps)	Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow ¹ (acfm) at operating conditions		Ground Level (Height above mean sea level)	Stack Height ² (Release height of emissions above ground level)	Northing	Easting
P052	4.0	670	22,609	102	655 ft	26 ft	4400.80000	512.10000
P053	4.0	670	22,609	102	655 ft	26 ft	4401.37893	511.84313
P054	1.0	120	131	3	655 ft	80 ft	4401.37893	511.84313
P055	~0.25	Ambient	N/A	N/A	655 ft	10 ft	4401.37893	511.84313
P056	2.5	550	8,500	30	655 ft	20 ft	4401.37893	511.84313
P057	1.0	900	12,000	255	655 ft	20 ft	4401.37893	511.84313
TK-2906	~0.25	Ambient	N/A	N/A	655 ft	16 ft	4401.37893	511.84313
TK-2907	~0.25	Ambient	N/A	N/A	655 ft	24 ft	4401.37893	511.84313
TK-7802	~0.25	Ambient	N/A	N/A	655 ft	40 ft	4401.37893	511.84313
P024	2.5	550	8,500	30	655 ft	15 ft	4401.37893	511.84313
P026	4.0	225	6,108	10	655 ft	20 ft	4401.37893	511.84313
P029	1.0	800	1,228	27	655 ft	20 ft	4401.37893	511.84313
FUG AREA 3	N/A	N/A	N/A	N/A	655 ft	N/A	4401.37893	511.84313
V003	N/A	N/A	N/A	N/A	655 ft	N/A	4401.37893	511.84313
P036	2.5	550	8,747	30	655 ft	15 ft	4401.37893	511.84313
P037	4.0	225	24,803	33	655 ft	20 ft	4401.37893	511.84313
FUG AREA 4	N/A	N/A	N/A	N/A	655 ft	N/A	4401.37893	511.84313
P040	2.5	800	8,500	30	655 ft	15 ft	4401.37893	511.84313
P041	4.0	800	6,108	10	655 ft	20 ft	4401.37893	511.84313

FUG AREA 5	N/A	N/A	N/A	N/A	N/A	655 ft	N/A	N/A	4401.37893	511.84313
P044	2.5	550	8,500	30	655 ft	15 ft	4401.37893	511.84313	4401.37893	511.84313
P045	4.0	225	6,108	10	655 ft	20 ft	4401.37893	511.84313	4401.37893	511.84313
FUG AREA 6	N/A	N/A	N/A	N/A	655 ft	N/A	4401.37893	511.84313	4401.37893	511.84313
P048	2.5	550	8,500	30	655 ft	15 ft	4401.37893	511.84313	4401.37893	511.84313
P049	4.0	225	6,108	10	655 ft	20 ft	4401.37893	511.84313	4401.37893	511.84313
FUG AREA 7	N/A	N/A	N/A	N/A	655 ft	N/A	4401.37893	511.84313	4401.37893	511.84313
P001	10.75	670	81,551	N/A	655 ft	60 ft	4400.9092	511.97901	4400.9092	511.97901
P016	4.0	670	22,609	102	655 ft	26 ft	4400.9433	512.01931	4400.9433	512.01931
P017	4.0	670	22,609	102	655 ft	26 ft	4400.9242	512.02482	4400.9242	512.02482
P018	4.0	670	22,609	102	655 ft	26 ft	4400.9414	512.01261	4400.9414	512.01261
P019	4.0	670	22,609	102	655 ft	26 ft	4400.9225	512.01773	4400.9225	512.01773
P012	2.5	550	8,500	30	655 ft	20 ft	4401.1979	511.97605	4401.1979	511.97605
P013	4.0	225	6,108	10	655 ft	20 ft	4401.1971	511.96864	4401.1971	511.96864
P004A	N/A	N/A	N/A	N/A	655 ft	N/A	4400.7010	511.92219	4400.7010	511.92219
P034	N/A	N/A	N/A	N/A	655 ft	N/A	4400.9919	512.27964	4400.9919	512.27964
P035	N/A	N/A	N/A	N/A	655 ft	N/A	4400.9919	512.27964	4400.9919	512.27964
TK-906	~0.25	Ambient	N/A	N/A	655 ft	16 ft	4401.1301	511.72637	4401.1301	511.72637
P005	1.0	120	131	3	655 ft	80 ft	4401.2232	511.89916	4401.2232	511.89916
P008	N/A	N/A	N/A	N/A	655 ft	N/A	4400.9286	511.71828	4400.9286	511.71828
ROADS	N/A	N/A	N/A	N/A	655 ft	N/A	4400.9919	511.86586	4400.9919	511.86586
FUG AREA 1	N/A	N/A	N/A	N/A	655 ft	N/A	4401.0262	511.77052	4401.0262	511.77052
FUG AREA 2	N/A	N/A	N/A	N/A	655 ft	N/A	4401.0674	511.91074	4401.0674	511.91074
P033	~0.25	Ambient	N/A	N/A	655 ft	8 ft	4400.7786	511.63289	4400.7786	511.63289
P002	~0.5	~950	~1,300	N/A	655 ft	15 ft	4401.0330	512.02594	4401.0330	512.02594
P003	~0.5	~950	~1,300	N/A	655 ft	15 ft	4401.0330	512.02594	4401.0330	512.02594
TK-907	~0.25	Ambient	N/A	N/A	655 ft	24 ft	4401.1301	511.72637	4401.1301	511.72637

P015	~0.25	Ambient	N/A	N/A	655 ft	10 ft	4401.1301	511.72637
TK-L-1	~0.1	Ambient	N/A	N/A	655 ft	6 ft	4400.9458	512.04916
L-1	N/A	Ambient	N/A	N/A	655 ft	6 ft	4400.9458	512.04916

¹ Give at operating conditions. Include inerts. ² Release height of emissions above ground level.

ATTACHMENT K: FUGITIVE EMISSIONS DATA SUMMARY SHEET

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? <input checked="" type="checkbox"/> Yes (insignificant source) <input type="checkbox"/> No <input checked="" type="checkbox"/> If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> 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.)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS ¹	Maximum Potential Uncontrolled Emissions ²		Maximum Potential Controlled Emissions ³		Est. Method Used ⁴
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	Not Applicable					
Unpaved Haul Roads	PM PM10 PM2.5	Does not apply	43.86 11.69 1.17	Does not apply	43.86 11.69 1.17	AP-42
Storage Pile Emissions	Not Applicable					
Loading/Unloading Operations	VOC	See Attachment N	S055: 19.83 S008: 2.18 S033: 82.69 S015: 0.11 L-1: 0.00005	See Attachment N	S055: 19.83 S008: 2.18 S033: 82.69 S015: 0.11 L-1: 0.00005	
Wastewater Treatment Evaporation & Operations	Not Applicable					
Equipment Leaks	VOC (Refer to Attachment N for emission specification)	See Attachment N	Area 1: 70.21 Area 2: 34.70 Area 3: 13.56 Area 4: 17.12 Area 5: 13.56 Area 6: 13.56 Area 7: 13.56	See Attachment N	Area 1: 70.21 Area 2: 34.70 Area 3: 13.56 Area 4: 17.12 Area 5: 13.56 Area 6: 13.56 Area 7: 13.56	EPA Factors
General Clean-up VOC Emissions	Not Applicable					
Other	Not Applicable					

¹ List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂O, N₂, O₂, and Noble Gases.

² 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).

³ 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 batch).

⁴ 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).

ATTACHMENT L: EMISSIONS UNIT DATA SHEETS

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

Attachment L EMISSIONS UNIT DATA SHEET CHEMICAL PROCESS

For chemical processes please fill out this sheet and all supplementary forms (see below) that apply. Please check all supplementary forms that have been completed.

- Emergency Vent Summary Sheet*
- Leak Sources Data Sheet*
- Toxicology Data Sheet*
- Reactor Data Sheet*
- Distillation Column Data Sheet*

1. Chemical process area name and equipment ID number (as shown in *Equipment List Form*)
FUG AREA 1, FUG AREA 2, FUG AREA 3, FUG AREA 4, FUG AREA 5, FUG AREA 6, FUG AREA 7

2. Standard Industrial Classification Codes (SICs) for process(es)

3. List raw materials and attach MSDSs

4. List Products and Maximum Production and attach MSDSs

Description and CAS Number	Maximum Hourly (lb/hr)	Maximum Annual (ton/year)

5. Complete the *Emergency Vent Summary Sheet* for all emergency relief devices.

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.

Refer to Attachment N fugitive calculations for control efficiency claimed for Leak Detection and Repair (LDAR) program. Fugitive Area 1 is subject to NSPS KKK, Area 2 is subject to NSPS OOOO, and Area 3, Area 4, Area 5, Area 6 and Area 7 are subject to NSPS OOOOa. All components will comply with the applicable requirements regarding monitoring, leak definitions, recordkeeping, and reporting.

7. Clearly describe below or attach to application Accident Procedures to be followed in the event of an accidental spill or release.

8A. Complete the *Toxicology Data Sheet* 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.

8B. 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.).

9. **Waste Products** - Waste products status: (If source is subject to RCRA or 45CSR25, please contact the Hazardous Waste Section of WVDEP, OAQ at (304) 926-3647.)

9A. Types and amounts of wastes to be disposed:

9B. Method of disposal and location of waste disposal facilities:
 Carrier: _____ Phone: _____

9C. Check here if approved USEPA/State Hazardous Waste Landfill will be used

10. Maximum and Projected Typical Operating Schedule for process or project as a whole (circle appropriate units).
 circle units: (hrs/day) (hr/batch) (days), (batches/day), (batches/week) (days/yr), (weeks/year)

10A. Maximum	24 hrs/day	7 days/week	365 days/year
--------------	------------	-------------	---------------

10B. Typical	24 hrs/day	7 days/week	365 days/year
--------------	------------	-------------	---------------

11. Complete a *Reactor Data Sheet* for each reactor in this chemical process.

12. Complete a *Distillation Column Data Sheet* for each distillation column in this chemical process.

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 See Attachment O	RECORDKEEPING See Attachment O
--------------------------------	-----------------------------------

REPORTING See Attachment O	TESTING See Attachment O
-------------------------------	-----------------------------

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.

RECORDKEEPING. Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING. Please describe the proposed frequency of reporting of the recordkeeping.

TESTING. Please describe any proposed emissions testing for this process equipment or air pollution control device.

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 provide 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.

1. 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 each process step. 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.
5. 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.
6. 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 batch 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 ¹	Equipment to Relief Vent (type, ID if available) ²	Relief Vents (type) & Set Pressure (psig)	Name of Chemical(s) or Pollutants Controlled	Worst Case Emission per Release Event (lbs)
P004A	Closed Vent System	Varies	Natural Gas, Natural Gas Liquids	See Attachment N
FUG AREA 1	Pressure Vessels	Varies	Natural Gas, Natural Gas Liquids	See Attachment N
FUG AREA 2	Pressure Vessels	Varies	Natural Gas, Natural Gas Liquids	See Attachment N
FUG AREA 3	Pressure Vessels	Varies	Natural Gas, Natural Gas Liquids	See Attachment N
FUG AREA 4	Pressure Vessels	Varies	Natural Gas, Natural Gas Liquids	See Attachment N
FUG AREA 5	Pressure Vessels	Varies	Natural Gas, Natural Gas Liquids	See Attachment N
FUG AREA 6	Pressure Vessels	Varies	Natural Gas, Natural Gas Liquids	See Attachment N
FUG AREA 7	Pressure Vessels	Varies	Natural Gas, Natural Gas Liquids	See Attachment N

All routine vents (non-emergency) should be listed on the *Emission Points Data Summary Sheet*.

¹ 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.

² List all emergency relief devices next to the piece of equipment from which they control releases.

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components ¹	Number of Components Monitored by Frequency ²	Average Time to Repair (days) ³	Estimated Annual Emission Rate (lb/yr) ⁴
Pumps ⁵	light liquid VOC ^{6,7}	See Attachment N for approximate component counts and service.	FUG AREA 1 – as required by NSPS subparts KKK and VV. FUG AREA 2 – as required by NSPS subpart OOOO. FUG AREA 3 – as required by NSPS subpart OOOOa. FUG AREA 4 – as required by NSPS subpart OOOOa. FUG AREA 5 – as required by NSPS subpart OOOOa. FUG AREA 6 – as required by NSPS subpart OOOOa. FUG AREA 7 – as required by NSPS subpart OOOOa.	FUG AREA 1 – as required by NSPS subparts KKK and VV. FUG AREA 2 – as required by NSPS subpart OOOO. FUG AREA 3 – as required by NSPS subpart OOOOa. FUG AREA 4 – as required by NSPS subpart OOOOa. FUG AREA 5 – as required by NSPS subpart OOOOa. FUG AREA 6 – as required by NSPS subpart OOOOa. FUG AREA 7 – as required by NSPS subpart OOOOa.	See Attachment N for estimated emissions.
	heavy liquid VOC ⁸				
	Non-VOC ⁹				
Valves ¹⁰	Gas VOC				
	Light Liquid VOC				
	Heavy Liquid VOC				
Safety Relief Valves ¹¹	Non-VOC				
	Gas VOC				
	Non VOC				
Open-ended Lines ¹²	VOC				
	Non-VOC				
Sampling Connections ¹³	VOC				
	Non-VOC				
Compressors	VOC				
	Non-VOC				
Flanges	VOC				
	Non-VOC				
Other	VOC				
	Non-VOC				

¹⁻¹³ See notes on the following page.

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.
2. 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 §51.100 (s).
7. 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, H₂S, mineral acids, NO, NO₂, SO₃, etc. DO NOT LIST CO₂, H₂, H₂O, N₂, O₂, 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.

TOXICOLOGY DATA SHEET¹

Descriptor Name/CAS Number	OSHA Limits ²		Acute ³ TC _{Lo} - Animal LC _{Lo} - Animal LC ₅₀ - Animal	Chronic ⁴	Irritation ⁵	References
	TWA	CL				

¹ Indicate by "ND" where no data exists, in company's knowledge.
² Time Weighted Average, Ceiling Limit, or other, with units.
³ If inhalation data is not available, provide other data as available.
⁴ Relying on animal or human studies, indicate if any data suggests: C = carcinogenicity, M = mutagenicity, T = teratogenicity, O = oncogenicity.
⁵ Indicate if there are dermal or eye irritation effects and whether they are considered to be low, moderate, or severe.

REACTOR DATA SHEET

Provide the following information for each piece of equipment that is a potential or actual source of emissions as shown on the *Equipment List Form* and other parts of application.

Identification Number (as shown on <i>Equipment List Form</i>):							
1. Name and type of equipment (e.g. CSTR, plug flow, batch, etc.)							
2. Type of operation <input type="checkbox"/> Batch <input type="checkbox"/> Continuous <input type="checkbox"/> Semi-batch							
3. Projected Actual Equipment Operating Schedule (complete appropriate lines):							
hrs/day		days/week			weeks/year		
hrs/batch		batches/day, weeks (Circle one)			day, weeks/yr (Circle one)		
4. Feed Data Flow In = gal/hr, or gal/batch							
Material Name & CAS No.	Phase ^a	Specific Gravity	Vapor Pressure ^b	Charge Rate			Fill Time (min/batch, run) ^c
				Normal	Max	Units	
<p>a. S = Solid, L = Liquid, G = gas or vapor</p> <p>b. At feed conditions</p> <p>c. Total time that equipment is filling per batch or run (start-up), for tank or vessel-type equipment.</p>							
5. Provide all chemical reactions that will be involved (if applicable), including the residence time and any side reactions that may occur as well as gases that may be generated during these reactions. Indicate if the reaction(s) are exothermic or endothermic.							

6. Maximum Temperature	7A. Maximum Pressure	
°C	mmHg	mmHg
°F	psig	psig
7B. Max. Set Pressure for venting		

8. Output Data		Flow Out =		gal/hr or gal/batch		
Material Name and CAS No.	Phase	Specific Gravity	Vapor Pressure	Hourly or Batch Output Rate		Units
				Normal	Maximum	

9. Complete the following emission data for equipment connected to a header exhaust system, giving emissions levels before entering header system (i.e. before control equipment).

Check here if not applicable

Emission Point ID (exhaust point of header system):

Material Name and CAS No.	Maximum Potential Emission Rate (lb/hr)	Method **

** MB - material balance; EE - Engineering Estimate; TM - Test Measurement (submit test data); O - other (Explain)

10. Provide the following information pertaining to each condenser that may be attached to this reactor. Attach additional pages as necessary if more than one condenser is used for this reactor. Complete the Condenser Air Pollution Control Device Sheet if necessary.

Check here if not applicable

- 10A. Cooling material
- 10B. Minimum and Maximum flowrate of cooling material (gal/hr)
- 10C. Inlet temperature of cooling material (°F)
- 10D. Outlet temperature of cooling material (°F)
- 10E. Pressure drop of gas to be condensed from inlet to outlet (psig)
- 10F. Inlet temperature of gas stream (°F)
- 10G. Outlet temperature of gas stream (°F)
- 10H. Number of passes
- 10I. Cooling surface area

11. Provide the following pertaining to auxiliary equipment that burns fuel (heaters, dryers, etc.):

Check here if not applicable

11A. Type of fuel and maximum fuel burn rate, per hour:

11B. Provide maximum percent sulfur (S), ash content of fuel, and the energy content using appropriate units:

%S	% Ash	BTU/lb, std. ft ³ /day, gal
		(circle one)

11C. Theoretical combustion air requirement in SCFD per unit of fuel (circle appropriate unit) @ 70°F and 14.7 PSIA:

SCFD/lb, SCFD, gal (circle one)

11D. Percent excess air: %

11E. Type, amount, and BTU rating of burners and all other firing equipment that are planned to be used:

11F. Total maximum design heat input: ×10⁶ BTU/hr.

12. 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

REPORTING

TESTING

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.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT OR AIR POLLUTION CONTROL DEVICE.

13. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NOTE: An *AIR POLLUTION CONTROL DEVICE SHEET* must be completed for any air pollution device(s) (except emergency relief devices) used to control emissions from this reactor.

DISTILLATION COLUMN DATA SHEET

Identification Number (as assigned on <i>Equipment List Form</i>):		
1. Name and type of equipment:		
#. Projected actual equipment operating schedule (complete appropriate lines):		
hrs/day	days/week	weeks/year
hrs/batch	batches/day, batches/week (circle one)	days/yr, weeks/yr (circle one)
2. Number of stages (plates), excluding condenser		
3. Number of feed plates and stage location		
4. Specify details of any reheating, recycling, or stage conditioning along with the stage locations		
5. Specify reflux ratio, R (where R is defined as the ratio of the reflux to the overhead product, given symbolically as $R=L/D$, where L = liquid down column, D = distillation product)		
6. Specify the fraction of feed which is vaporized, f (where f is the molal fraction of the feed that leaves the feed plate continuously as vapor).		
7A. Type of condenser used: <input type="checkbox"/> total <input type="checkbox"/> partial <input type="checkbox"/> multiple <input type="checkbox"/> other		
7B. For each condenser provide process operating details including all inlet and outlet temperatures, pressures, and compositions.		
8. Feed Characteristics		
A. Molar composition		
B. Individual vapor pressure of each component		
C. Total feed stage pressure		
D. Total feed stage temperature		
E. Total mass flow rate of each stream into the system		
9. Overhead Product		
A. Molar composition of components		
B. Vapor pressure of components		
C. Total mass flow rate of all streams leaving the system as overhead products		
10. Bottom Product		
A. Molar composition of all components		
B. Total mass flow rate of all streams leaving the system as bottom products		

11. General Information

- A. Distillation column diameter
- B. Distillation column height
- C. Type of plates
- D. Plate spacing
- E. Murphree plate efficiency
- F. Any other information necessary of describe the operation of this distillation column.

12. **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

REPORTING

TESTING

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.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT OR AIR POLLUTION CONTROL DEVICE.

13. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NOTE: An *AIR POLLUTION CONTROL DEVICE SHEET* must be completed for any air pollution device(s) (except emergency relief devices) used to control emissions from this distillation column.

Attachment L FUGITIVE EMISSIONS FROM UNPAVED HAULROADS

UNPAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)

		PM	PM-10
k =	Particle size multiplier	4.9	1.5
s =	Silt content of road surface material (%)	6.0	6.0
p =	Number of days per year with precipitation >0.01 in.	150	150

Item Number	Description	Number of Wheels	Mean Vehicle Weight (tons)	Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)
1	Average NGL Truck	18	15	5	0.4	8	60,225	N/A	N/A
2	Average Commercial Vehicle	4	2	5	0.4	3	7,300	N/A	N/A
3									
4									
5									
6									
7	Note: the equation below has been superceded by latest version of AP-42. Newest equation has been used for calculations. See attached spreadsheet.								
8									

Source: AP-42 Fifth Edition – 13.2.2 Unpaved Roads

$$E = k \times 5.9 \times (s \div 12) \times (S \div 30) \times (W \div 3)^{0.7} \times (w \div 4)^{0.5} \times ((365 - p) \div 365) = \text{lb/Vehicle Mile Traveled (VMT)}$$

Where:

		PM	PM-10
k =	Particle size multiplier	4.9	1.5
s =	Silt content of road surface material (%)	6.0	6.0
S =	Mean vehicle speed (mph)	5	5
W =	Mean vehicle weight (tons)	15	15
w =	Mean number of wheels per vehicle	18	18
p =	Number of days per year with precipitation >0.01 in.	150	150

For lb/hr: $[\text{lb} \div \text{VMT}] \times [\text{VMT} \div \text{trip}] \times [\text{Trips} \div \text{Hour}] = \text{lb/hr}$

For TPY: $[\text{lb} \div \text{VMT}] \times [\text{VMT} \div \text{trip}] \times [\text{Trips} \div \text{Hour}] \times [\text{Ton} \div 2000 \text{ lb}] = \text{Tons/year}$

SUMMARY OF UNPAVED HAULROAD EMISSIONS

Item No.	PM				PM-10			
	Uncontrolled		Controlled		Uncontrolled		Controlled	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
1	--	41.81	--	41.81	--	11.14	--	11.14
2	--	2.05	--	2.05	--	0.55	--	0.55
3								
4								
5								
6								
7								
8								
TOTALS		43.86		43.86		11.69		11.69

FUGITIVE EMISSIONS FROM PAVED HAULROADS

INDUSTRIAL PAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)

I =	Industrial augmentation factor (dimensionless)	
n =	Number of traffic lanes	
s =	Surface material silt content (%)	
L =	Surface dust loading (lb/mile)	

Item Number	Description	Mean Vehicle Weight (tons)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)
1							
2							
3							
4							
5							
6							
7							
8							

Source: AP-42 Fifth Edition – 11.2.6 Industrial Paved Roads

$$E = 0.077 \times I \times (4 \div n) \times (s \div 10) \times (L \div 1000) \times (W \div 3)^{0.7} = \text{lb/Vehicle Mile Traveled (VMT)}$$

Where:

I =	Industrial augmentation factor (dimensionless)	
n =	Number of traffic lanes	
s =	Surface material silt content (%)	
L =	Surface dust loading (lb/mile)	
W =	Average vehicle weight (tons)	

For lb/hr: $[\text{lb} \div \text{VMT}] \times [\text{VMT} \div \text{trip}] \times [\text{Trips} \div \text{Hour}] = \text{lb/hr}$

For TPY: $[\text{lb} \div \text{VMT}] \times [\text{VMT} \div \text{trip}] \times [\text{Trips} \div \text{Hour}] \times [\text{Ton} \div 2000 \text{ lb}] = \text{Tons/year}$

SUMMARY OF PAVED HAULROAD EMISSIONS

Item No.	Uncontrolled		Controlled	
	lb/hr	TPY	lb/hr	TPY
1				
2				
3				
4				
5				
6				
7				
8				
TOTALS				

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): N/A

Equipment Information

1. Manufacturer:	2. Model No. Serial No.
3. Number of units: 1 (EU#s S029)	4. Use Provide heat for dehydration unit.
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: TBD	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 3.0 ×10 ⁶ BTU/hr	10. Peak heat input per unit: 3.0 ×10 ⁶ BTU/hr
11. Steam produced at maximum design output: N/A LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: <input type="checkbox"/> Pulverized coal <input type="checkbox"/> Spreader stoker <input type="checkbox"/> Oil burners <input checked="" type="checkbox"/> Natural Gas Burner <input type="checkbox"/> Others, specify	14. Proposed type of burners and orientation: <input type="checkbox"/> Vertical <input type="checkbox"/> Front Wall <input type="checkbox"/> Opposed <input type="checkbox"/> Tangential <input type="checkbox"/> Others, specify
15. Type of draft: <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Induced	16. Percent of ash retained in furnace: N/A %
17. Will flyash be reinjected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	18. Percent of carbon in flyash: N/A %

Stack or Vent Data

19. Inside diameter or dimensions: 1.0 ft.	20. Gas exit temperature: 800 °F
21. Height: 20 ft.	22. Stack serves: <input checked="" type="checkbox"/> This equipment only <input type="checkbox"/> Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 1,361 ft ³ /min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	3,123 ft ³ /hr	ft ³ /hr	TPH	
	Annually	×10 ³ gal	27 ×10 ⁶ ft ³ /yr	×10 ⁶ ft ³ /hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	0.25 gr/100 ft ³	gr/100 ft ³	Maximum: wt. %	
	Ash (%)		N/A		Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	961 BTU/ft ³	BTU/ft ³	BTU/lb	
	Source		Plant Residue			
	Supplier		N/A			
	Halogens (Yes/No)		No			
	List and Identify Metals		N/A			

26. Gas burner mode of control: <input type="checkbox"/> Manual <input type="checkbox"/> Automatic hi-low <input type="checkbox"/> Automatic full modulation <input type="checkbox"/> Automatic on-off	27. Gas burner manufacture: TBD <hr/> 28. Oil burner manufacture: N/A
29. If fuel oil is used, how is it atomized? <input type="checkbox"/> Oil Pressure <input type="checkbox"/> Steam Pressure <input type="checkbox"/> Compressed Air <input type="checkbox"/> Rotary Cup <input type="checkbox"/> Other, specify	
30. Fuel oil preheated: <input type="checkbox"/> Yes <input type="checkbox"/> No	31. If yes, indicate temperature: °F
32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel: 573 scfm @ 70 °F, 14.7 PSIA, N/A % moisture	
33. Emission rate at rated capacity: See Attachment N lb/hr	
34. Percent excess air actually required for combustion of the fuel described: 15 %	
Coal Characteristics	
35. Seams:	
36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur: % of Moisture: % of Volatile Matter: % of Ash:	

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.25			
Hydrocarbons				
NO _x	0.29			
Pb				
PM ₁₀	0.02			
SO ₂	0.002			
VOCs	0.02			
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.25			
Hydrocarbons				
NO _x	0.29			
Pb				
PM ₁₀	0.02			
SO ₂	0.002			
VOCs	0.02			
Other (specify)				

39. How will waste material from the process and control equipment be disposed of?

N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. N/A

41. Have you included the **air pollution rates** on the Emissions Points Data Summary Sheet? Yes

42. 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 PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

See Attachment O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

See Attachment O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

See Attachment O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

See Attachment O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

TBD

Attachment L
Emission Unit Data Sheet
 (INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): N/A

Equipment Information

1. Manufacturer: Heatec or equivalent	2. Model No. TBD Serial No. TBD
3. Number of units: 5 (EU#s S012, S024, S036, S044, S048)	4. Use
5. Rated Boiler Horsepower: N/A hp	6. Boiler Serial No.: TBD
7. Date constructed: TBD	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 9.7 ×10 ⁶ BTU/hr	10. Peak heat input per unit: 9.7 ×10 ⁶ BTU/hr
11. Steam produced at maximum design output: N/A LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: <input type="checkbox"/> Pulverized coal <input type="checkbox"/> Spreader stoker <input type="checkbox"/> Oil burners <input checked="" type="checkbox"/> Natural Gas Burner <input type="checkbox"/> Others, specify	14. Proposed type of burners and orientation: <input type="checkbox"/> Vertical <input type="checkbox"/> Front Wall <input type="checkbox"/> Opposed <input type="checkbox"/> Tangential <input type="checkbox"/> Others, specify
15. Type of draft: <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Induced	16. Percent of ash retained in furnace: 0 %
17. Will flyash be reinjected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	18. Percent of carbon in flyash: N/A %

Stack or Vent Data

19. Inside diameter or dimensions: 2.5 ft.	20. Gas exit temperature: 550 °F
21. Height: 20 ft.	22. Stack serves: <input checked="" type="checkbox"/> This equipment only <input type="checkbox"/> Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 3,528 ft ³ /min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	10,097 ft ³ /hr (based on max hourly heat rate)	ft ³ /hr	TPH	
	Annually	×10 ³ gal	88 ×10 ⁶ ft ³ /yr	×10 ⁶ ft ³ /hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	negligible gr/100 ft ³	gr/100 ft ³	Maximum: wt. %	
	Ash (%)		N/A		Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	961 BTU/ft ³	BTU/ft ³	BTU/lb	
	Source		Plant Residue			
	Supplier		N/A			
	Halogens (Yes/No)		No			
	List and Identify Metals		N/A			

26. Gas burner mode of control: <input type="checkbox"/> Manual <input type="checkbox"/> Automatic hi-low <input type="checkbox"/> Automatic full modulation <input type="checkbox"/> Automatic on-off	27. Gas burner manufacture: <hr/> 28. Oil burner manufacture: N/A
29. If fuel oil is used, how is it atomized? <input type="checkbox"/> Oil Pressure <input type="checkbox"/> Steam Pressure <input type="checkbox"/> Compressed Air <input type="checkbox"/> Rotary Cup <input type="checkbox"/> Other, specify	
30. Fuel oil preheated: <input type="checkbox"/> Yes <input type="checkbox"/> No	31. If yes, indicate temperature: _____ °F
32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel: 1,851 scfm @ 70 °F, 14.7 PSIA, N/A % moisture	
33. Emission rate at rated capacity: See Attachment N lb/hr	
34. Percent excess air actually required for combustion of the fuel described: %	
Coal Characteristics	
35. Seams:	
36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur: % of Moisture: % of Volatile Matter: % of Ash:	

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.80			
Hydrocarbons				
NO _x	0.95			
Pb				
PM ₁₀	0.07			
SO ₂	0.01			
VOCs	0.05			
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.80			
Hydrocarbons				
NO _x	0.95			
Pb				
PM ₁₀	0.07			
SO ₂	0.01			
VOCs	0.05			
Other (specify)				

39. How will waste material from the process and control equipment be disposed of?

N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. N/A

41. Have you included the **air pollution rates** on the Emissions Points Data Summary Sheet? Yes

42. 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 PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
See Attachment O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
See Attachment O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
See Attachment O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
See Attachment O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
N/A

Attachment L
Emission Unit Data Sheet
 (INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): N/A

Equipment Information

1. Manufacturer: Heatec or equivalent	2. Model No. TBD Serial No. TBD
3. Number of units: 1 (EU#s S056)	4. Use
5. Rated Boiler Horsepower: N/A hp	6. Boiler Serial No.: TBD
7. Date constructed: TBD	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 10.09 ×10 ⁶ BTU/hr	10. Peak heat input per unit: 10.09 ×10 ⁶ BTU/hr
11. Steam produced at maximum design output: N/A LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: <input type="checkbox"/> Pulverized coal <input type="checkbox"/> Spreader stoker <input type="checkbox"/> Oil burners <input checked="" type="checkbox"/> Natural Gas Burner <input type="checkbox"/> Others, specify	14. Proposed type of burners and orientation: <input type="checkbox"/> Vertical <input type="checkbox"/> Front Wall <input type="checkbox"/> Opposed <input type="checkbox"/> Tangential <input type="checkbox"/> Others, specify
15. Type of draft: <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Induced	16. Percent of ash retained in furnace: 0 %
17. Will flyash be reinjected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	18. Percent of carbon in flyash: N/A %

Stack or Vent Data

19. Inside diameter or dimensions: 2.5 ft.	20. Gas exit temperature: 550 °F
21. Height: 20 ft.	22. Stack serves: <input checked="" type="checkbox"/> This equipment only <input type="checkbox"/> Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 3,669 ft ³ /min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	10,503 ft ³ /hr (based on max hourly heat rate)	ft ³ /hr	TPH	
	Annually	×10 ³ gal	92 ×10 ⁶ ft ³ /yr	×10 ⁶ ft ³ /hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	negligible gr/100 ft ³	gr/100 ft ³	Maximum: wt. %	
	Ash (%)		N/A		Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	961 BTU/ft ³	BTU/ft ³	BTU/lb	
	Source		Plant Residue			
	Supplier		N/A			
	Halogens (Yes/No)		No			
	List and Identify Metals		N/A			

26. Gas burner mode of control: <input type="checkbox"/> Manual <input type="checkbox"/> Automatic hi-low <input type="checkbox"/> Automatic full modulation <input type="checkbox"/> Automatic on-off	27. Gas burner manufacture: <hr/> 28. Oil burner manufacture: N/A
29. If fuel oil is used, how is it atomized? <input type="checkbox"/> Oil Pressure <input type="checkbox"/> Steam Pressure <input type="checkbox"/> Compressed Air <input type="checkbox"/> Rotary Cup <input type="checkbox"/> Other, specify	
30. Fuel oil preheated: <input type="checkbox"/> Yes <input type="checkbox"/> No	31. If yes, indicate temperature: _____ °F
32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel: 1,926 scfm @ 70 °F, 14.7 PSIA, N/A % moisture	
33. Emission rate at rated capacity: See Attachment N lb/hr	
34. Percent excess air actually required for combustion of the fuel described: %	
Coal Characteristics	
35. Seams:	
36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur: % of Moisture: % of Volatile Matter: % of Ash:	

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.83			
Hydrocarbons				
NO _x	0.99			
Pb				
PM ₁₀	0.08			
SO ₂	0.01			
VOCs	0.05			
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.83			
Hydrocarbons				
NO _x	0.99			
Pb				
PM ₁₀	0.08			
SO ₂	0.01			
VOCs	0.05			
Other (specify)				

39. How will waste material from the process and control equipment be disposed of?

N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. N/A

41. Have you included the **air pollution rates** on the Emissions Points Data Summary Sheet? Yes

42. 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 PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
See Attachment O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
See Attachment O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
See Attachment O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
See Attachment O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
N/A

Attachment L
Emission Unit Data Sheet
 (INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): N/A

Equipment Information

1. Manufacturer: Heatec or equivalent	2. Model No. TBD Serial No. TBD
3. Number of units: 1 (EU#s S040)	4. Use
5. Rated Boiler Horsepower: N/A hp	6. Boiler Serial No.: TBD
7. Date constructed: TBD	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 19.28 ×10 ⁶ BTU/hr	10. Peak heat input per unit: 19.28 ×10 ⁶ BTU/hr
11. Steam produced at maximum design output: N/A LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: <input type="checkbox"/> Pulverized coal <input type="checkbox"/> Spreader stoker <input type="checkbox"/> Oil burners <input checked="" type="checkbox"/> Natural Gas Burner <input type="checkbox"/> Others, specify	14. Proposed type of burners and orientation: <input type="checkbox"/> Vertical <input type="checkbox"/> Front Wall <input type="checkbox"/> Opposed <input type="checkbox"/> Tangential <input type="checkbox"/> Others, specify
15. Type of draft: <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Induced	16. Percent of ash retained in furnace: 0 %
17. Will flyash be reinjected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	18. Percent of carbon in flyash: N/A %

Stack or Vent Data

19. Inside diameter or dimensions: 2.5 ft.	20. Gas exit temperature: 800 °F
21. Height: 20 ft.	22. Stack serves: <input checked="" type="checkbox"/> This equipment only <input type="checkbox"/> Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 8,747 ft ³ /min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	20,069 ft ³ /hr (based on max hourly heat rate)	ft ³ /hr	TPH	
	Annually	×10 ³ gal	176 ×10 ⁶ ft ³ /yr	×10 ⁶ ft ³ /hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	negligible gr/100 ft ³	gr/100 ft ³	Maximum: wt. %	
	Ash (%)		N/A		Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	961 BTU/ft ³	BTU/ft ³	BTU/lb	
	Source		Plant Residue			
	Supplier		N/A			
	Halogens (Yes/No)		No			
	List and Identify Metals		N/A			

26. Gas burner mode of control: <input type="checkbox"/> Manual <input type="checkbox"/> Automatic hi-low <input type="checkbox"/> Automatic full modulation <input type="checkbox"/> Automatic on-off	27. Gas burner manufacture: 28. Oil burner manufacture: N/A
29. If fuel oil is used, how is it atomized? <input type="checkbox"/> Oil Pressure <input type="checkbox"/> Steam Pressure <input type="checkbox"/> Compressed Air <input type="checkbox"/> Rotary Cup <input type="checkbox"/> Other, specify	
30. Fuel oil preheated: <input type="checkbox"/> Yes <input type="checkbox"/> No	31. If yes, indicate temperature: _____ °F
32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel: 3,679 scfm @ 70 °F, 14.7 PSIA, N/A % moisture	
33. Emission rate at rated capacity: See Attachment N lb/hr	
34. Percent excess air actually required for combustion of the fuel described: %	
Coal Characteristics	
35. Seams:	
36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur: % of Moisture: % of Volatile Matter: % of Ash:	

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	1.59			
Hydrocarbons				
NO _x	1.89			
Pb				
PM ₁₀	0.14			
SO ₂	0.01			
VOCs	0.10			
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	1.59			
Hydrocarbons				
NO _x	1.89			
Pb				
PM ₁₀	0.14			
SO ₂	0.01			
VOCs	0.10			
Other (specify)				

39. How will waste material from the process and control equipment be disposed of?

N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. N/A

41. Have you included the **air pollution rates** on the Emissions Points Data Summary Sheet? Yes

42. 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 PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
See Attachment O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
See Attachment O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
See Attachment O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
See Attachment O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
N/A

Attachment L
Emission Unit Data Sheet
 (INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): N/A

Equipment Information

1. Manufacturer: Heatec or equivalent	2. Model No. TBD Serial No. TBD
3. Number of units: 5 (EU#s S013, S026, S037, S045, S049)	4. Use
5. Rated Boiler Horsepower: N/A hp	6. Boiler Serial No.: TBD
7. Date constructed: TBD	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 26.3 ×10 ⁶ BTU/hr	10. Peak heat input per unit: 26.3 ×10 ⁶ BTU/hr
11. Steam produced at maximum design output: N/A LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: <input type="checkbox"/> Pulverized coal <input type="checkbox"/> Spreader stoker <input type="checkbox"/> Oil burners <input checked="" type="checkbox"/> Natural Gas Burner <input type="checkbox"/> Others, specify	14. Proposed type of burners and orientation: <input type="checkbox"/> Vertical <input type="checkbox"/> Front Wall <input type="checkbox"/> Opposed <input type="checkbox"/> Tangential <input type="checkbox"/> Others, specify
15. Type of draft: <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Induced	16. Percent of ash retained in furnace: 0 %
17. Will flyash be reinjected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	18. Percent of carbon in flyash: N/A %

Stack or Vent Data

19. Inside diameter or dimensions: 4 ft.	20. Gas exit temperature: 255 °F
21. Height: 20 ft.	22. Stack serves: <input checked="" type="checkbox"/> This equipment only <input type="checkbox"/> Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 6,771 ft ³ /min	
24. Estimated percent of moisture: %	

Fuel Requirements

25. Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
Quantity (at Design Output)	gph@60°F	27,377 ft ³ /hr (based on max hourly heat rate)	ft ³ /hr	TPH	
Annually	×10 ³ gal	240 ×10 ⁶ ft ³ /yr	×10 ⁶ ft ³ /hr	tons	
Sulfur	Maximum: wt. % Average: wt. %	negligible gr/100 ft ³	gr/100 ft ³	Maximum: wt. %	
Ash (%)		N/A		Maximum	
BTU Content	BTU/Gal. Lbs/Gal.@60°F	961 BTU/ft ³	BTU/ft ³	BTU/lb	
Source		Plant Residue			
Supplier		N/A			
Halogens (Yes/No)		No			
List and Identify Metals		N/A			
26. Gas burner mode of control: <input type="checkbox"/> Manual <input type="checkbox"/> Automatic hi-low <input type="checkbox"/> Automatic full modulation <input type="checkbox"/> Automatic on-off			27. Gas burner manufacture:		
			28. Oil burner manufacture: N/A		
29. If fuel oil is used, how is it atomized? <input type="checkbox"/> Oil Pressure <input type="checkbox"/> Steam Pressure <input type="checkbox"/> Compressed Air <input type="checkbox"/> Rotary Cup <input type="checkbox"/> Other, specify					
30. Fuel oil preheated: <input type="checkbox"/> Yes <input type="checkbox"/> No			31. If yes, indicate temperature: _____ °F		
32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel: 5,019 scfm @ 70 °F, 14.7 PSIA, N/A % moisture					
33. Emission rate at rated capacity: See Attachment N lb/hr					
34. Percent excess air actually required for combustion of the fuel described: _____ %					
Coal Characteristics					
35. Seams:					
36. Proximate analysis (dry basis): % of Fixed Carbon: _____ % of Sulfur: _____ % of Moisture: _____ % of Volatile Matter: _____ % of Ash: _____					

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	2.17			
Hydrocarbons				
NO _x	2.58			
Pb				
PM ₁₀	0.20			
SO ₂	0.02			
VOCs	0.14			
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	2.17			
Hydrocarbons				
NO _x	2.58			
Pb				
PM ₁₀	0.20			
SO ₂	0.02			
VOCs	0.14			
Other (specify)				

39. How will waste material from the process and control equipment be disposed of?

N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. N/A

41. Have you included the **air pollution rates** on the Emissions Points Data Summary Sheet? Yes

42. 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 PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
See Attachment O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
See Attachment O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
See Attachment O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
See Attachment O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
N/A

Attachment L
Emission Unit Data Sheet
 (INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): N/A

Equipment Information

1. Manufacturer: Heatec or equivalent	2. Model No. TBD Serial No. TBD
3. Number of units: 1 (EU#s S041)	4. Use
5. Rated Boiler Horsepower: N/A hp	6. Boiler Serial No.: TBD
7. Date constructed: TBD	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 54.67 ×10 ⁶ BTU/hr	10. Peak heat input per unit: 54.67 ×10 ⁶ BTU/hr
11. Steam produced at maximum design output: N/A LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: <input type="checkbox"/> Pulverized coal <input type="checkbox"/> Spreader stoker <input type="checkbox"/> Oil burners <input checked="" type="checkbox"/> Natural Gas Burner <input type="checkbox"/> Others, specify	14. Proposed type of burners and orientation: <input type="checkbox"/> Vertical <input type="checkbox"/> Front Wall <input type="checkbox"/> Opposed <input type="checkbox"/> Tangential <input type="checkbox"/> Others, specify
15. Type of draft: <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Induced	16. Percent of ash retained in furnace: 0 %
17. Will flyash be reinjected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	18. Percent of carbon in flyash: N/A %

Stack or Vent Data

19. Inside diameter or dimensions: 4 ft.	20. Gas exit temperature: 800 °F
21. Height: 20 ft.	22. Stack serves: <input checked="" type="checkbox"/> This equipment only <input type="checkbox"/> Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 24,803 ft ³ /min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	56,908 ft ³ /hr (based on max hourly heat rate)	ft ³ /hr	TPH	
	Annually	×10 ³ gal	499 ×10 ⁶ ft ³ /yr	×10 ⁶ ft ³ /hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	negligible gr/100 ft ³	gr/100 ft ³	Maximum: wt. %	
	Ash (%)		N/A		Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	961 BTU/ft ³	BTU/ft ³	BTU/lb	
	Source		Plant Residue			
	Supplier		N/A			
	Halogens (Yes/No)		No			
	List and Identify Metals		N/A			

26. Gas burner mode of control: <input type="checkbox"/> Manual <input type="checkbox"/> Automatic hi-low <input type="checkbox"/> Automatic full modulation <input type="checkbox"/> Automatic on-off	27. Gas burner manufacture: <hr/> 28. Oil burner manufacture: N/A
29. If fuel oil is used, how is it atomized? <input type="checkbox"/> Oil Pressure <input type="checkbox"/> Steam Pressure <input type="checkbox"/> Compressed Air <input type="checkbox"/> Rotary Cup <input type="checkbox"/> Other, specify	
30. Fuel oil preheated: <input type="checkbox"/> Yes <input type="checkbox"/> No	31. If yes, indicate temperature: °F
32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel: 10,433 scfm @ 70 °F, 14.7 PSIA, N/A % moisture	
33. Emission rate at rated capacity: See Attachment N lb/hr	
34. Percent excess air actually required for combustion of the fuel described: %	
Coal Characteristics	
35. Seams:	
36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur: % of Moisture: % of Volatile Matter: % of Ash:	

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	4.50			
Hydrocarbons				
NO _x	5.36			
Pb				
PM ₁₀	0.41			
SO ₂	0.04			
VOCs	0.29			
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	4.50			
Hydrocarbons				
NO _x	5.36			
Pb				
PM ₁₀	0.41			
SO ₂	0.04			
VOCs	0.29			
Other (specify)				

39. How will waste material from the process and control equipment be disposed of?

N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. N/A

41. Have you included the **air pollution rates** on the Emissions Points Data Summary Sheet? Yes

42. 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 PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
See Attachment O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
See Attachment O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
See Attachment O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
See Attachment O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
N/A

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): N/A

Equipment Information

1. Manufacturer: Heatec, Inc	2. Model No. Serial No.
3. Number of units: 6 (EU#s S016, S017, S018, S019, S052 and S053)	4. Use Provide hot oil for natural gas processing.
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: 2014, S052 and S053 TBD	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 61.6 ×10 ⁶ BTU/hr	10. Peak heat input per unit: 61.6 ×10 ⁶ BTU/hr
11. Steam produced at maximum design output: N/A LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: <input type="checkbox"/> Pulverized coal <input type="checkbox"/> Spreader stoker <input type="checkbox"/> Oil burners <input checked="" type="checkbox"/> Natural Gas Burner <input type="checkbox"/> Others, specify	14. Proposed type of burners and orientation: <input type="checkbox"/> Vertical <input type="checkbox"/> Front Wall <input type="checkbox"/> Opposed <input type="checkbox"/> Tangential <input type="checkbox"/> Others, specify
15. Type of draft: <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Induced	16. Percent of ash retained in furnace: N/A %
17. Will flyash be reinjected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	18. Percent of carbon in flyash: N/A %

Stack or Vent Data

19. Inside diameter or dimensions: 4.0 ft.	20. Gas exit temperature: 670 °F
21. Height: 26 ft.	22. Stack serves: <input checked="" type="checkbox"/> This equipment only <input type="checkbox"/> Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 25,056 ft ³ /min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	64,101 ft ³ /hr	ft ³ /hr	TPH	
	Annually	×10 ³ gal	562 ×10 ⁶ ft ³ /yr	×10 ⁶ ft ³ /hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	0.25 gr/100 ft ³	gr/100 ft ³	Maximum: wt. %	
	Ash (%)		N/A		Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	961 BTU/ft ³	BTU/ft ³	BTU/lb	
	Source		Plant Residue			
	Supplier		N/A			
	Halogens (Yes/No)		No			
	List and Identify Metals		N/A			

26. Gas burner mode of control: <input type="checkbox"/> Manual <input type="checkbox"/> Automatic hi-low <input type="checkbox"/> Automatic full modulation <input type="checkbox"/> Automatic on-off	27. Gas burner manufacture: TBD <hr/> 28. Oil burner manufacture: N/A
--	--

29. If fuel oil is used, how is it atomized? <input type="checkbox"/> Oil Pressure <input type="checkbox"/> Steam Pressure <input type="checkbox"/> Compressed Air <input type="checkbox"/> Rotary Cup <input type="checkbox"/> Other, specify	
--	--

30. Fuel oil preheated: <input type="checkbox"/> Yes <input type="checkbox"/> No	31. If yes, indicate temperature: °F
--	---

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel: 11,752 scfm @ 70 °F, 14.7 PSIA, N/A % moisture
--

33. Emission rate at rated capacity: See Attachment N lb/hr
--

34. Percent excess air actually required for combustion of the fuel described: 15 %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur: % of Moisture: % of Volatile Matter: % of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	3.63			
Hydrocarbons				
NO _x	1.48			
Pb				
PM ₁₀	0.46			
SO ₂	0.04			
VOCs	0.33			
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	3.63			
Hydrocarbons				
NO _x	1.48			
Pb				
PM ₁₀	0.46			
SO ₂	0.04			
VOCs	0.33			
Other (specify)				

39. How will waste material from the process and control equipment be disposed of?

N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. N/A

41. Have you included the **air pollution rates** on the Emissions Points Data Summary Sheet? Yes

42. 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 PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

See Attachment O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

See Attachment O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

See Attachment O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

See Attachment O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

TBD

Attachment L
Emission Unit Data Sheet
 (INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): N/A

Equipment Information

1. Manufacturer: Optimized Process Furnances, Inc.	2. Model No. Serial No.
3. Number of units: 1 (EU# S001)	4. Use Provide hot oil for natural gas processing.
5. Rated Boiler Horsepower: N/A hp	6. Boiler Serial No.: N/A
7. Date constructed: 2011	8. Date of last modification and explain: N/A
9. Maximum design heat input per unit: 216.7 ×10 ⁶ BTU/hr	10. Peak heat input per unit: 216.7 ×10 ⁶ BTU/hr
11. Steam produced at maximum design output: N/A LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: <input type="checkbox"/> Pulverized coal <input type="checkbox"/> Spreader stoker <input type="checkbox"/> Oil burners <input checked="" type="checkbox"/> Natural Gas Burner <input type="checkbox"/> Others, specify	14. Proposed type of burners and orientation: <input type="checkbox"/> Vertical <input type="checkbox"/> Front Wall <input type="checkbox"/> Opposed <input type="checkbox"/> Tangential <input checked="" type="checkbox"/> Others, specify TBD
15. Type of draft: <input type="checkbox"/> Forced <input type="checkbox"/> Induced	16. Percent of ash retained in furnace: N/A %
17. Will flyash be reinjected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	18. Percent of carbon in flyash: N/A %

Stack or Vent Data

19. Inside diameter or dimensions: 10.75 ft.	20. Gas exit temperature: 670 °F
21. Height: 60 ft.	22. Stack serves: <input checked="" type="checkbox"/> This equipment only <input type="checkbox"/> Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: 88,171 ft ³ /min	
24. Estimated percent of moisture: N/A %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	225,571 ft ³ /hr	ft ³ /hr	TPH	
	Annually	×10 ³ gal	1,976 ×10 ⁶ ft ³ /yr	×10 ⁶ ft ³ /hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	0.25 gr/100 ft ³	gr/100 ft ³	Maximum: wt. %	
	Ash (%)		N/A		Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	961 BTU/ft ³	BTU/ft ³	BTU/lb	
	Source		Plant Residue			
	Supplier		N/A			
	Halogens (Yes/No)		No			
	List and Identify Metals		N/A			

26. Gas burner mode of control: <input type="checkbox"/> Manual <input type="checkbox"/> Automatic hi-low <input type="checkbox"/> Automatic full modulation <input type="checkbox"/> Automatic on-off	27. Gas burner manufacture: TBD <hr/> 28. Oil burner manufacture: N/A
--	--

29. If fuel oil is used, how is it atomized? <input type="checkbox"/> Oil Pressure <input type="checkbox"/> Steam Pressure <input type="checkbox"/> Compressed Air <input type="checkbox"/> Rotary Cup <input type="checkbox"/> Other, specify	
--	--

30. Fuel oil preheated: <input type="checkbox"/> Yes <input type="checkbox"/> No	31. If yes, indicate temperature: °F
--	---

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel: 41,355 scfm @ 70 °F, 14.7 PSIA, N/A % moisture
--

33. Emission rate at rated capacity: See Attachment N lb/hr
--

34. Percent excess air actually required for combustion of the fuel described: 15 %
--

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur: % of Moisture: % of Volatile Matter: % of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	3.25			
Hydrocarbons				
NO _x	9.75			
Pb				
PM ₁₀	1.61			
SO ₂	0.15			
VOCs	0.37			
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	3.25			
Hydrocarbons				
NO _x	9.75			
Pb				
PM ₁₀	1.61			
SO ₂	0.15			
VOCs	0.37			
Other (specify)				

39. How will waste material from the process and control equipment be disposed of?

N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. N/A

41. Have you included the **air pollution rates** on the Emissions Points Data Summary Sheet? Yes

42. 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 PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

See Attachment O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

See Attachment O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

See Attachment O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

See Attachment O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

TBD

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

See attached data following this EUDS for all information on the Natural Gas Liquids (NGL), propane, butane, and isobutane storage tanks.

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/>).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name
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>)
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change <input type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? <input type="checkbox"/> Yes <input type="checkbox"/> No (e.g. Is there more than one product stored in the tank?)	
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.	
9A. Tank Internal Diameter (ft)	9B. Tank Internal Height (or Length) (ft)
10A. Maximum Liquid Height (ft)	10B. Average Liquid Height (ft)

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.	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method <input type="checkbox"/> Submerged <input type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems <input type="checkbox"/> 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): <input type="checkbox"/> Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe) <input type="checkbox"/> External Floating Roof ___ pontoon roof ___ double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof ___ vertical column support ___ self-supporting <input type="checkbox"/> Variable Vapor Space ___ lifter roof ___ diaphragm <input type="checkbox"/> Pressurized ___ spherical ___ cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunitite lined <input type="checkbox"/> Epoxy-coated rivets <input type="checkbox"/> Other (describe)		
20A. Shell Color	20B. Roof Color	20C. Year Last Painted
21. Shell Condition (if metal and unlined): <input type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable		
22A. Is the tank heated? <input type="checkbox"/> YES <input type="checkbox"/> 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 Roof Tanks		<input type="checkbox"/> 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 Tanks		<input type="checkbox"/> Does Not Apply
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type: <input type="checkbox"/> Metallic (Mechanical) Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? <input type="checkbox"/> YES <input type="checkbox"/> NO		
25D. If YES, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? <input type="checkbox"/> YES <input type="checkbox"/> NO		

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	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 MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks <input type="checkbox"/> Does Not Apply	
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: <input type="checkbox"/> Continuous sheet construction 5 feet wide <input type="checkbox"/> Continuous sheet construction 6 feet wide <input type="checkbox"/> Continuous sheet construction 7 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 7.5 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 12 feet wide <input type="checkbox"/> Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft ²)
For column supported tanks:	26G. Diameter of each column:
26F. Number of columns:	

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data 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/(ft ² ·day))
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 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 (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): Does Not Apply

Carbon Adsorption¹

Condenser¹

Conservation Vent (psig)

Vacuum Setting Pressure Setting

Emergency Relief Valve (psig)

Inert Gas Blanket of

Insulation of Tank with

Liquid Absorption (scrubber)¹

Refrigeration of Tank

Rupture Disc (psig)

Vent to Incinerator¹

Other¹ (describe):

¹ Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss		Annual Loss (lb/yr)	Estimation Method ¹
		Amount	Units		

¹ EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

EMISSIONS UNIT DATA SHEET - STORAGE TANKS
 FOR NATURAL GAS LIQUID (NGL), PROPANE, BUTANE, ISOBUTANE AND GASOLINE
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

<i>I. General Information</i>							
Tank Name	Tank Equipment ID No.	Emission Point ID No.	Control Device ID No.	Date of Construction	Type of Change	Does the tank have more than one mode of operation?	Limitations
Spherical Storage Tank US-800 ¹	US-800	NA	C004A	2012	Existing	No	None
Spherical Storage Tank US-801 ¹	US-801	NA	C004A	2012	Existing	No	None
Spherical Storage Tank US-804 ¹	US-804	NA	C004A	2012	Existing	No	None
Spherical Storage Tank US-805 ¹	US-805	NA	C004A	2012	Existing	No	None
Spherical Storage Tank US-2800 ¹	US-2800	NA	C004A	2019	New	No	None
Spherical Storage Tank US-2801 ¹	US-2801	NA	C004A	2019	New	No	None
Spherical Storage Tank US-2804 ¹	US-2804	NA	C004A	2019	New	No	None
Spherical Storage Tank US-2805 ¹	US-2805	NA	C004A	2019	New	No	None
Pressurized Bullet Tanks ¹ (4)	V-1905, V-1915, V-1925, V-1935	NA	C004A	2014	Existing	No	None
Pressurized Bullet Tanks ¹ (4)	V-2905, V-2915, V-2925, V-2935	NA	C004A	2019	New	No	None
Gasoline Storage Tank	TK-802	P001	C001	2012	Existing	No	None
Gasoline Storage Tank	TK-2802	P001	C001	2014	Existing	No	None
Gasoline Storage Tank	TK-3802	P001	C001	2019	New	No	None
Gasoline Storage Tank	TK-4802	P001	C001	2019	New	No	None
Gasoline Storage Tank	TK-5802	P001	C001	2019	New	No	None
Gasoline Storage Tank	TK-6802	P001	C001	2019	New	No	None
Refrigerated Propane Storage Tank	TK-7802	TK-7802	C012	2019	New	No	None
Slop Oil Tank	TK-906	TK-906	NA	2012	Existing	No	None
Slop Oil Tank	TK-2906	TK-2906	NA	2019	New	No	None
Produced Water Tank	TK-907	TK-907	NA	2012	Existing	No	None
Produced Water Tank	TK-2907	TK-2907	NA	2019	New	No	None
Gasoline Dispensing Tank	TK-L-1	TK-L-1	NA	2016	Existing	No	None

Note: ¹ Pressurized vessel. Only venting of the tanks is during emergency situations or non-routine maintenance activities.

EMISSIONS UNIT DATA SHEET - STORAGE TANKS
 FOR NATURAL GAS LIQUID (NGL), PROPANE, BUTANE, ISOBUTANE AND GASOLINE
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

<i>II. Tank Information</i>									
Tank Name	Type of Tank	Fill Method	Capacity (gallons)	Tank Diameter (ft)	Tank Length (ft)	Truck Loading (gpm)	Rail Loading (gpm)	Barge Loading (gpm)	
US-800	Spherical, Pressurized	Bottom	2,142,000	81	--	3,600	4,000	4,000	
US-801	Spherical, Pressurized	Bottom	865,200	60.5	--	3,600	4,000		
US-804	Spherical, Pressurized	Bottom	865,200	60.5	--	3,600	4,000		
US-805	Spherical, Pressurized	Bottom	865,200	60.5	--	3,600			
US-2800	Spherical, Pressurized	Bottom	2,142,000	81	--	3,600	4,000	4,000	
US-2801	Spherical, Pressurized	Bottom	865,200	60.5	--	3,600	4,000		
US-2804	Spherical, Pressurized	Bottom	865,200	60.5	--	3,600	4,000		
US-2805	Spherical, Pressurized	Bottom	865,200	60.5	--	3,600			
V-1905, V-1915, V-1925, V-1935	Horizontal, Pressurized	Bottom	90,000 each	10	90	3,600			
V-2905, V-2915, V-2925, V-2935	Horizontal, Pressurized	Bottom	90,000 each	10	90	3,600			
TK-802	Atmospheric, Vertical, Dome Roof	Top/Bottom	714,000	59	39.75	600	2,000	4,000	
TK-2802	Atmospheric, Vertical, Dome Roof	Top/Bottom	1,260,000	77	39.75	N/A	N/A	N/A	
TK-3802	Atmospheric, Vertical, Dome Roof	Top/Bottom	714,000	59	39.75	600	2,000	4,000	
TK-4802	Atmospheric, Vertical, Dome Roof	Top/Bottom	1,260,000	77	39.75	N/A	N/A	N/A	
TK-5802	Atmospheric, Vertical, Dome Roof	Top/Bottom	714,000	59	39.75	600	2,000	4,000	
TK-6802	Atmospheric, Vertical, Dome Roof	Top/Bottom	1,260,000	77	39.75	N/A	N/A	N/A	
TK-7802	Atmospheric, Vertical, Dome Roof	Top/Bottom	4,200,000	134	40	3,600	4,000	4,000	
TK-906	Atmospheric, Vertical, Dome Roof	Top/Bottom	21,000	15.5	16	150	NA	NA	
TK-2906	Atmospheric, Vertical, Dome Roof	Top/Bottom	21,000	15.5	16	150	NA	NA	
TK-907	Atmospheric, Vertical, Dome Roof	Top/Bottom	63,000	21.5	24	150	NA	NA	
TK-2907	Atmospheric, Vertical, Dome Roof	Top/Bottom	63,000	21.5	24	150	NA	NA	
TK-L-1	Atmospheric, Horizontal	Top/Bottom	1,000	5.42	6	1	NA	NA	

EMISSIONS UNIT DATA SHEET - STORAGE TANKS
 FOR NATURAL GAS LIQUID (NGL), PROPANE, BUTANE, ISOBUTANE AND GASOLINE
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

III. Tank Construction and Operation

Tank Name	Tank Shell Construction	Shell/ Roof Color	Operating Pressure (psig)	Is Tank Heated?
US-800	Welded	White	180	No
US-801	Welded	White	78	No
US-804	Welded	White	46	No
US-805	Welded	White	181	No
US-2800	Welded	White	180	No
US-2801	Welded	White	78	No
US-2804	Welded	White	46	No
US-2805	Welded	White	181	No
V-1905, V-1915, V-1925, V-1935	Welded	White	181	No
V-2905, V-2915, V-2925, V-2935	Welded	White	181	No
TK-802	Welded	White	0	No
TK-2802	Welded	White	0	No
TK-3802	Welded	White	0	No
TK-4802	Welded	White	0	No
TK-5802	Welded	White	0	No
TK-6802	Welded	White	0	No
TK-7802	Welded	White	0	No
TK-906	Welded	Carbon Steel	0	No
TK-2906	Welded	Carbon Steel	0	No
TK-907	Welded	Carbon Steel	0	No
TK-2907	Welded	Carbon Steel	0	No
TK-L-1	Welded	White	0	No

LIQUID INFORMATION

Product Name	CAS #	Liquid Density (lb/gal)	Liquid Molecular Weight (lb/lb-mole)	Vapor Molecular Weight (lb/lb-mole)	True Vapor Pressure (psia)	Reid Vapor Pressure (psia)
Propane	74-98-6	4.24	44.096	44.096	126.15	190
Isobutane	75-28-5	4.58	58.12	58.12	45	71
Butane	106-97-8	4.84	58.12	58.12	33.5	52.4
NGL	64741-48-6	4.26	52.29	52.29	132.4	124.6
Gasoline	80006-61-9	6.17	62	60	13.5	12
Slop Oil			2% Gasoline, 98% Water			
Produced Water			2% Gasoline, 98% Water			
Gasoline			Assume same as gasoline			

EMISSIONS UNIT DATA SHEET - STORAGE TANKS
 FOR NATURAL GAS LIQUID (NGL), PROPANE, BUTANE, ISOBUTANE AND GASOLINE
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

EMISSIONS DATA

Tank Name	Type of Tank	Emissions	
US-800	Spherical, Pressurized	There are no emissions for these pressure vessels, except during emergency or upset conditions, or non-routine maintenance in which emissions will be vented through a pressure relief valve (PRV) to the Flare.	
US-801	Spherical, Pressurized		
US-804	Spherical, Pressurized		
US-805	Spherical, Pressurized		
US-2800	Spherical, Pressurized		
US-2801	Spherical, Pressurized	There are no emissions for these pressure vessels, except during emergency or upset conditions, or non-routine maintenance in which emissions will be vented through a pressure relief valve (PRV) to the Flare.	
US-2804	Spherical, Pressurized		
US-2805	Spherical, Pressurized		
V-1905, V-1915,	Horizontal, Pressurized		
V-1925, V-1935			
V-2905, V-2915,	Horizontal, Pressurized		
V-2925, V-2935			
TK-802	Atmospheric, Vertical, Dome Roof		The VOC emissions from this tank are vented to the flare.
TK-2802	Atmospheric, Vertical, Dome Roof		The VOC emissions from this tank are vented to the flare.
TK-3802	Atmospheric, Vertical, Dome Roof		The VOC emissions from this tank are vented to the flare.
TK-4802	Atmospheric, Vertical, Dome Roof	The VOC emissions from this tank are vented to the flare.	
TK-5802	Atmospheric, Vertical, Dome Roof	The VOC emissions from this tank are vented to the flare.	
TK-6802	Atmospheric, Vertical, Dome Roof	The VOC emissions from this tank are vented to the flare.	
TK-7802	Atmospheric, Vertical, Dome Roof	There are no emissions from this tank, except during emergency or upset conditions, or non-routine maintenance in which emissions will be vented to the Flare.	
TK-906	Atmospheric, Vertical, Dome Roof	The VOC emissions from this tank are vented to atmosphere.	
TK-2906	Atmospheric, Vertical, Dome Roof	The VOC emissions from this tank are vented to atmosphere.	
TK-907	Atmospheric, Vertical, Dome Roof	The VOC emissions from this tank are vented to atmosphere.	
TK-2907	Atmospheric, Vertical, Dome Roof	The VOC emissions from this tank are vented to atmosphere.	
TK-L-1	Atmospheric, Horizontal	The VOC emissions from this tank are vented to atmosphere.	

Note: ¹ Pressurized vessel. Only venting of the tanks is during emergency situations or non-routine maintenance activities.

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*): S011, S054

1. Name or type and model of proposed affected source:

Carbon dioxide will be removed from the ethane product in an amine unit contacting system. Each amine treater unit consists of contactors and regenerators. The total ethane product is contacted with a diglycolamine (DGA) solution in one of the two amine contactors, where the CO₂ in the ethane product is removed to less than 500 ppmw. The rich amine from the contactors is regenerated in the Amine Regenerator where heat input is used to drive the CO₂ and water overhead and vented to atmosphere. The lean amine from the bottom of the regenerator is then recycled back to the amine contactors. The main emissions from the amine system are CO₂ and water.

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:

5.40 MMscf/hr ethane product (~81,523 bbl/day) per treater unit

4. Name(s) and maximum amount of proposed material(s) produced per hour:

5.40 MMscf/hr ethane product (~81,523 bbl/day) per treater unit

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

N/A

* 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):			
(a) Type and amount in appropriate units of fuel(s) to be burned:			
N/A			
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur 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:			
(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:			
(g) Proposed maximum design heat input:			× 10 ⁶ BTU/hr.
7. Projected operating schedule:			
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:

@	°F and	psia
a. NO _x		lb/hr grains/ACF
b. SO ₂		lb/hr grains/ACF
c. CO		lb/hr grains/ACF
d. PM ₁₀		lb/hr grains/ACF
e. Hydrocarbons	2.00	lb/hr grains/ACF
f. VOCs	1.98	lb/hr grains/ACF
g. Pb		lb/hr grains/ACF
h. Specify other(s)		
Carbon Dioxide	2,791	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.

9. 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
 See Attachment O

RECORDKEEPING
 See Attachment O

REPORTING
 See Attachment O

TESTING
 See Attachment O

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/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
 N/A

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*): S006, S032

1. Name or type and model of proposed affected source:

A glycol dehydration system is used to dry the incoming gas. EU# S006 consists of two glycol contactors with a single regeneration system, where emissions from the flash tank and still vent are routed to the plant hot oil heater (EU# S001) as fuel. EU# S032 consists of a single contactor and associated regeneration system, where emissions from the BTEX condenser and flash tank can be routed to the plant hot oil heater (EU#: S001) for combustion as fuel or to a dedicated vapor combustor (EU#s V003). BRM is permitting the S032 dehydration unit emissions assuming that all waste gas is routed to the vapor combustor, but would like to keep the flexibility to route the waste gas to the hot oil heater as well.

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:

Natural Gas
S006: 19.17 MMscf/hr (460 MMscf/day)
S032: 9.58 MMscf/hr (230 MMscf/day)

4. Name(s) and maximum amount of proposed material(s) produced per hour:

Natural Gas
S006: 19.17 MMscf/hr (460 MMscf/day)
S032: 9.58 MMscf/hr (230 MMscf/day)

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

N/A

* 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):			
(a) Type and amount in appropriate units of fuel(s) to be burned:			
N/A			
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur 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:			
(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:			
(g) Proposed maximum design heat input:			× 10 ⁶ BTU/hr.
7. Projected operating schedule:			
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:

@	°F and	psia	
a. NO _x	N/A	lb/hr	grains/ACF
b. SO ₂	N/A	lb/hr	grains/ACF
c. CO	N/A	lb/hr	grains/ACF
d. PM ₁₀	N/A	lb/hr	grains/ACF
e. Hydrocarbons	N/A	lb/hr	grains/ACF
f. VOCs	2.17	lb/hr	grains/ACF
g. Pb	N/A	lb/hr	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.

9. 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
See Attachment O

RECORDKEEPING
See Attachment O

REPORTING
See Attachment O

TESTING
See Attachment O

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/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
N/A

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*): S002 and S003

<p>1. Name or type and model of proposed affected source:</p> <p>Emergency Fire Pump Engine - Model C18, 700 hp @ 1,750 rpm</p>
<p>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.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>Diesel Fuel Consumption ~ 35.9 gal/hr</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>Combustion of Diesel fuel, where combustion gases push piston through cylinder to produce power.</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>Combustion of Diesel fuel, where combustion gases push piston through cylinder to produce power.</p>

* 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):			
(a) Type and amount in appropriate units of fuel(s) to be burned:			
Diesel Fuel Consumption ~ 35.9 gal/hr			
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur 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:			
(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:			
(g) Proposed maximum design heat input:			× 10 ⁶ BTU/hr.
7. Projected operating schedule:			
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:

@	°F and	psia
a. NO _x	4.63 lb/hr	grains/ACF
b. SO ₂	0.01 lb/hr	grains/ACF
c. CO	4.01 lb/hr	grains/ACF
d. PM ₁₀	0.23 lb/hr	grains/ACF
e. Hydrocarbons	lb/hr	grains/ACF
f. VOCs	4.63 lb/hr	grains/ACF
g. Pb	lb/hr	grains/ACF
h. Specify other(s)		
Negligible HAP emissions, as shown in Attachment N	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.

9. 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
 See Attachment O

RECORDKEEPING
 See Attachment O

REPORTING
 See Attachment O

TESTING
 See Attachment O

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/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
 N/A

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*): S057

<p>1. Name or type and model of proposed affected source:</p> <p>Natural gas fired generator engine(s).</p>
<p>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.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>Natural Gas - 120,221 scf/hr</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>N/A</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>N/A</p>

* 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):			
(a) Type and amount in appropriate units of fuel(s) to be burned:			
Natural gas			
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur 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:			
128 MMBtu/hr			
(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:			
N/A			
(g) Proposed maximum design heat input:			× 10 ⁶ BTU/hr.
7. Projected operating schedule:			
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:

@	°F and	psia
a. NO _x	N/A	lb/hr grains/ACF
b. SO ₂	N/A	lb/hr grains/ACF
c. CO	N/A	lb/hr grains/ACF
d. PM ₁₀	N/A	lb/hr grains/ACF
e. Hydrocarbons	N/A	lb/hr grains/ACF
f. VOCs	N/A	lb/hr grains/ACF
g. Pb	N/A	lb/hr 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.

9. 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
 See Attachment O

RECORDKEEPING
 See Attachment O

REPORTING
 See Attachment O

TESTING
 See Attachment O

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/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
 N/A

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*): S004A

<p>1. Name or type and model of proposed affected source:</p> <p>The Ground Flare will control VOC emissions from maintenance activities and other miscellaneous equipment that are vented to the flare on an as-needed basis.</p>
<p>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.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>N/A</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>Combustion of waste gas from maintenance venting and process operation.</p>

* 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):			
(a) Type and amount in appropriate units of fuel(s) to be burned:			
18 pilots at 85 scf/hr each of natural gas, and 117 scf/hr purge gas.			
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:			
See Attachment M design summary.			
(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:			
18 pilots at 1.629 MMBtu/hr (1,530 scf/hr for all 18 pilots and 1,065 Btu/scf) and 117 scf/hr purge gas.			
(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:			
N/A			
(g) Proposed maximum design heat input:		22,500	× 10 ⁶ BTU/hr.
7. Projected operating schedule:			
Hours/Day	24 (flare pilot)	Days/Week	7 (flare pilot)
		Weeks/Year	52 (flare pilot)

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	°F and	psia
a. NO _x	lb/hr	grains/ACF
b. SO ₂	lb/hr	grains/ACF
c. CO	lb/hr	grains/ACF
d. PM ₁₀	lb/hr	grains/ACF
e. Hydrocarbons	lb/hr	grains/ACF
f. VOCs	456,809*	lb/hr
g. Pb	lb/hr	grains/ACF
h. Specify other(s)	lb/hr	grains/ACF
	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.

* Represents the worst case for an entire hour, which is for plant wide emergency, which is not expected.

9. 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
 See Attachment O

RECORDKEEPING
 See Attachment O

REPORTING
 See Attachment O

TESTING
 See Attachment O

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/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
 N/A

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*): S034

1. Name or type and model of proposed affected source:

The Flare will control VOC emissions from propane/butane line pigging operations.

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:

N/A

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:

Combustion of propane/butane gas due to pigging operations on propane/butane pipeline.

* 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):			
(a) Type and amount in appropriate units of fuel(s) to be burned:			
72,000 scf/hr propane/butane gas			
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:			
See Attachment M design summary.			
(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:			
Auto-ignition flare with no pilot gas.			
(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:			
N/A			
(g) Proposed maximum design heat input:		22,500	× 10 ⁶ BTU/hr.
7. Projected operating schedule:			
Hours/Day	24 (flare pilot)	Days/Week	7 (flare pilot)
		Weeks/Year	52 (flare pilot)

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	°F and	psia
a. NO _x	lb/hr	grains/ACF
b. SO ₂	lb/hr	grains/ACF
c. CO	lb/hr	grains/ACF
d. PM ₁₀	lb/hr	grains/ACF
e. Hydrocarbons	lb/hr	grains/ACF
f. VOCs	N/A*	grains/ACF
g. Pb	lb/hr	grains/ACF
h. Specify other(s)	lb/hr	grains/ACF
	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.

* Flare only operates when needed for propane line pigging operations.

9. 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
 See Attachment O

RECORDKEEPING
 See Attachment O

REPORTING
 See Attachment O

TESTING
 See Attachment O

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/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
 N/A

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*): V003

1. Name or type and model of proposed affected source:

The vapor combustor V003 will control the waste gas emissions from the dehy BTEX condenser and flash tank.

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:

N/A

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:

Combustion of waste gas from BTEX condenser and flash tank.

* 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):					
(a) Type and amount in appropriate units of fuel(s) to be burned:					
One pilot at 30 scf/hr.					
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:					
See Attachment M design summary.					
(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:					
One pilot at 30 scf/hr.					
(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:					
N/A					
(g) Proposed maximum design heat input:				5.56	× 10 ⁶ BTU/hr.
7. Projected operating schedule:					
Hours/Day	24 (pilot)	Days/Week	7 (pilot)	Weeks/Year	52 (pilot)

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	°F and	psia
a. NO _x	lb/hr	grains/ACF
b. SO ₂	lb/hr	grains/ACF
c. CO	lb/hr	grains/ACF
d. PM ₁₀	lb/hr	grains/ACF
e. Hydrocarbons	lb/hr	grains/ACF
f. VOCs	N/A	lb/hr
g. Pb	lb/hr	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.

9. 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

Refer to Attachment O.

RECORDKEEPING

Refer to Attachment O.

REPORTING

Refer to Attachment O.

TESTING

Refer to Attachment O.

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/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
N/A

Attachment L
EMISSIONS UNIT DATA SHEET
BULK LIQUID TRANSFER OPERATIONS

Furnish the following information for each new or modified bulk liquid transfer area or loading rack, as shown on the *Equipment List Form* and other parts of this application. This form is to be used for bulk liquid transfer operations such as to and from drums, marine vessels, rail tank cars, and tank trucks.

Identification Number (as assigned on <i>Equipment List Form</i>): S008, S015, S033, S055, L-1				
1. Loading Area Name: Product Loading				
2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):				
<input type="checkbox"/> G Drums <input checked="" type="checkbox"/> Marine Vessels <input checked="" type="checkbox"/> Rail Tank Cars <input checked="" type="checkbox"/> Tank Trucks				
3. Loading Rack or Transfer Point Data:				
Number of pumps	TBD			
Number of liquids loaded	5 – Propane, Isobutane, Butane & Natural Gas Liquids (NGL), Natural Gasoline, Produced Water/Slop			
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	TBD			
4. Does ballasting of marine vessels occur at this loading area?				
<input type="checkbox"/> G Yes <input type="checkbox"/> G No <input checked="" type="checkbox"/> Does not apply				
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point:				
6. Are cargo vessels pressure tested for leaks at this or any other location?				
<input type="checkbox"/> G Yes <input type="checkbox"/> G No				
If YES, describe:				
7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):				
Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	24	24	24	24
days/week	7	7	7	7

weeks/quarter	13	13	13	13
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8. Bulk Liquid Data <i>(add pages as necessary):</i>									
Pump ID No.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Liquid Name	Propane	Isobutane	Butane	NGL	Natural Gasoline	Natural Gasoline (Barge)	Gasoline Dispenser	Slop/Produced Water	
Max. daily throughput (1000 gal/day)									
Max. annual throughput (1000 gal/yr)									
Loading Method ¹	BF	BF	BF	BF	BF	BF	SP	BF	
Max. Fill Rate (gal/min)	10,600	7,600	7,600	3,600	5,600	4,000	1	150	
Average Fill Time (min/loading)	Varies	Varies	Varies	Varies	Varies	Varies	10	60	
Max. Bulk Liquid Temperature (°F)	125	200	200	120	100	100	100	100	
True Vapor Pressure ²	126.15	45	33.5	132.4	13.5	13.5	13.5	0.30	
Cargo Vessel Condition ³	C	C	C	C	C	C	U	U	
Control Equipment or Method ⁴	VB	VB	VB	VB	VB	N/A	N/A	N/A	
Minimum control efficiency (%)	100	100	100	100	100	0	0	0	
Maximum Emission Rate	Loading (lb/hr)	Negligible	Negligible	Negligible	Negligible	Negligible	97.22	0.18	2.32
	Annual (lb/yr)	Negligible	Negligible	Negligible	Negligible	Negligible	49,000	0.1 lb/yr	220 lb/yr
Estimation Method ⁵						O (Sampling)	EPA	EPA	
¹ BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill									
² At maximum bulk liquid temperature									
³ B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)									
⁴ List as many as apply (complete and submit appropriate <i>Air Pollution Control Device</i>)									

	<p><i>Sheets</i>): CA = Carbon Adsorption Condensation Refrigeration-Absorption CRC = Compression-Refrigeration-Condensation O = other (describe)</p> <p>LOA = Lean Oil Adsorption CO = SC = Scrubber (Absorption) CRA = Compressor- TO = Thermal Oxidation or Incineration VB = Dedicated Vapor Balance (closed system)</p>	
	<p>⁵ EPA = EPA Emission Factor as stated in AP-42 MB = Material Balance TM = Test Measurement based upon test data submittal O = other (describe)</p>	

9. 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.

<p>MONITORING</p> <p>See Attachment O</p>	<p>RECORDKEEPING</p> <p>See Attachment O</p>
<p>REPORTING</p> <p>See Attachment O</p>	<p>TESTING</p> <p>See Attachment O</p>

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/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
 N/A

ATTACHMENT M: AIR POLLUTION CONTROL DEVICE SHEETS

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

Attachment M
Air Pollution Control Device Sheet
 (FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): C034

Equipment Information

1. Manufacturer: TBD Model No.	2. Method: <input checked="" type="checkbox"/> Elevated flare <input type="checkbox"/> Ground flare <input type="checkbox"/> Other Describe
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. Method of system used: <input type="checkbox"/> Steam-assisted <input type="checkbox"/> Air-assisted <input type="checkbox"/> Pressure-assisted <input checked="" type="checkbox"/> Non-assisted	
5. Maximum capacity of flare: <div style="text-align: right;">scf/min</div> <div style="text-align: right;">72,000</div> <div style="text-align: right;">scf/hr</div>	6. Dimensions of stack: Diameter 0.25 ft. Height 10 ft.
7. Estimated combustion efficiency: (Waste gas destruction efficiency) Estimated: 98 % Minimum guaranteed: 98 %	8. Fuel used in burners: <input type="checkbox"/> Natural Gas <input type="checkbox"/> Fuel Oil, Number <input checked="" type="checkbox"/> Other, Specify: Propane
9. Number of burners: 1 Rating: 170,712,000 BTU/hr	11. Describe method of controlling flame: N/A
10. Will preheat be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
12. Flare height: 10 ft.	14. Natural gas flow rate to flare pilot flame per pilot light: <div style="text-align: right;">scf/min</div> <div style="text-align: right;">N/A</div> <div style="text-align: right;">scf/hr</div>
13. Flare tip inside diameter: 0.25 ft	
15. Number of pilot lights: N/A Total BTU/hr	16. Will automatic re-ignition be used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
17. If automatic re-ignition will be used, describe the method: The flare is used only for combustion of propane/butane gas due to pigging activities. Flare ignites only when waste gas flow is detected.	
18. Is pilot flame equipped with a monitor? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, what type? <input type="checkbox"/> Thermocouple <input type="checkbox"/> Infra-Red <input type="checkbox"/> Ultra Violet <input type="checkbox"/> Camera with monitoring control room <input type="checkbox"/> Other, Describe:	
19. Hours of unit operation per year: Flare as Needed	

Steam Injection

20. Will steam injection be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	21. Steam pressure PSIG Minimum Expected: Design Maximum:
22. Total Steam flow rate: LB/hr	23. Temperature: °F
24. Velocity ft/sec	25. Number of jet streams
26. Diameter of steam jets: in	27. Design basis for steam injected: LB steam/LB hydrocarbon
28. How will steam flow be controlled if steam injection is used?	

Characteristics of the Waste Gas Stream to be Burned

29. Name	Quantity Grains of H ₂ S/100 ft ³	Quantity (LB/hr, ft ³ /hr, etc)	Source of Material
See Attachment N			
30. Estimate total combustible to flare: see Attachment N LB/hr or ACF/hr (Maximum mass flow rate of waste gas) scfm			
31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.: See Attachment N LB/hr or ACF/hr			
32. Give composition of carrier gases: None			
33. Temperature of emission stream: See attached °F Heating value of emission stream: BTU/ft³ Mean molecular weight of emission stream: MW = lb/lb-mole		34. Identify and describe all auxiliary fuels to be burned. None BTU/scf BTU/scf BTU/scf BTU/scf	
35. Temperature of flare gas: see attached °F		36. Flare gas flow rate: scf/min	
37. Flare gas heat content: see attached BTU/ft³		38. Flare gas exit velocity: see attached scf/min	
39. Maximum rate during emergency for one major piece of equipment or process unit: N/A scf/min			
40. Maximum rate during emergency for one major piece of equipment or process unit: N/A BTU/min			
41. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):			
42. Describe the collection material disposal system:			
43. Have you included Flare Control Device in the Emissions Points Data Summary Sheet? Yes			

44. 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:

REPORTING:

TESTING:

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: Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING: 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.

45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

N/A

46. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

VOC control = 98%

47. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M
Air Pollution Control Device Sheet
 (FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): C004A

Equipment Information

1. Manufacturer: Callidus Model No. CAL-MP staged, multipoint flare system	2. Method: <input type="checkbox"/> Elevated flare <input checked="" type="checkbox"/> Ground flare <input type="checkbox"/> Other Describe
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. Method of system used: <input type="checkbox"/> Steam-assisted <input type="checkbox"/> Air-assisted <input type="checkbox"/> Pressure-assisted <input checked="" type="checkbox"/> Non-assisted	
5. Maximum capacity of flare: <div style="text-align: right;">scf/min</div> <div style="text-align: right;">19,800,000 scf/hr</div>	6. Dimensions of stack: Diameter 1.67 ft. Height 20 ft.
7. Estimated combustion efficiency: (Waste gas destruction efficiency) Estimated: 98 % Minimum guaranteed: 98 %	8. Fuel used in burners: <input checked="" type="checkbox"/> Natural Gas <input type="checkbox"/> Fuel Oil, Number <input type="checkbox"/> Other, Specify:
9. Number of burners: 229 Rating: 22,500,000,000 BTU/hr	11. Describe method of controlling flame: Pressure Staging
10. Will preheat be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
12. Flare height: 20 ft.	14. Natural gas flow rate to flare pilot flame per pilot light: <div style="text-align: right;">85 scf/hr</div>
13. Flare tip inside diameter: 0.25 (burner riser) ft	
15. Number of pilot lights: eighteen (18) Total 1,628,996 BTU/hr	16. Will automatic re-ignition be used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
17. If automatic re-ignition will be used, describe the method: An auto flame front ignition is used for re-ignition. A thermocouple controller is used to indicate a loss of flame and a signal is sent to open the air/gas mixture at the panel. The panel then begins a series of re-ignitions using the flame front ignition and the necessary pilots. Flare stages will not open unless at least one pilot is lit.	
18. Is pilot flame equipped with a monitor? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, what type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infra-Red <input type="checkbox"/> Ultra Violet <input type="checkbox"/> Camera with monitoring control room <input type="checkbox"/> Other, Describe:	
19. Hours of unit operation per year: Pilots: 8,760 hours Flare: As Needed	

Steam Injection

20. Will steam injection be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	21. Steam pressure PSIG Minimum Expected: Design Maximum:
22. Total Steam flow rate: LB/hr	23. Temperature: °F
24. Velocity ft/sec	25. Number of jet streams
26. Diameter of steam jets: in	27. Design basis for steam injected: LB steam/LB hydrocarbon
28. How will steam flow be controlled if steam injection is used?	

Characteristics of the Waste Gas Stream to be Burned

29. Name	Quantity Grains of H ₂ S/100 ft ³	Quantity (LB/hr, ft ³ /hr, etc)	Source of Material
See Attached			
30. Estimate total combustible to flare: see attached LB/hr or ACF/hr (Maximum mass flow rate of waste gas) scfm			
31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.: See attached LB/hr or ACF/hr			
32. Give composition of carrier gases: See attached			
33. Temperature of emission stream: See attached °F Heating value of emission stream: BTU/ft³ Mean molecular weight of emission stream: MW = lb/lb-mole	34. Identify and describe all auxiliary fuels to be burned. see attached BTU/scf BTU/scf BTU/scf BTU/scf		
35. Temperature of flare gas: see attached °F	36. Flare gas flow rate: scf/min		
37. Flare gas heat content: see attached BTU/ft³	38. Flare gas exit velocity: see attached scf/min		
39. Maximum rate during emergency for one major piece of equipment or process unit: see attached scf/min			
40. Maximum rate during emergency for one major piece of equipment or process unit: see attached BTU/min			
41. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):			
42. Describe the collection material disposal system:			
43. Have you included Flare Control Device in the Emissions Points Data Summary Sheet? Yes			

44. 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:

Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

RECORDKEEPING:

Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

REPORTING:

Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

TESTING:

Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

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:

Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING:

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.

45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

N/A

46. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

VOC control = 98%

47. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M
Air Pollution Control Device Sheet
 (FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): C009.

Equipment Information

1. Manufacturer: TCI USA Inc. Model 500 Enclosed Combustor		2. Method: <input type="checkbox"/> Elevated flare <input type="checkbox"/> Ground flare <input checked="" type="checkbox"/> Other Describe: Vapor Combustor (V003)	
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.			
4. Method of system used: <input type="checkbox"/> Steam-assisted <input type="checkbox"/> Air-assisted <input type="checkbox"/> Pressure-assisted <input checked="" type="checkbox"/> Non-assisted			
5. Maximum capacity of flare: scf/min 3,447 scf/hr		6. Dimensions of stack: Diameter ft. Height ft.	
7. Estimated combustion efficiency: (Waste gas destruction efficiency) Estimated: 98 % Minimum guaranteed: 98 %		8. Fuel used in burners: <input checked="" type="checkbox"/> Natural Gas <input type="checkbox"/> Fuel Oil, Number <input type="checkbox"/> Other, Specify:	
9. Number of burners: Rating: 5,560,000 BTU/hr		11. Describe method of controlling flame: Pressure Staging	
10. Will preheat be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
12. Flare height: ft.		14. Natural gas flow rate to flare pilot flame per pilot light: scf/min 30 scf/hr	
13. Flare tip inside diameter: (burner riser) ft			
15. Number of pilot lights: 1 Total 31,950 BTU/hr		16. Will automatic re-ignition be used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
17. If automatic re-ignition will be used, describe the method: An auto flame front ignition is used for re-ignition. A thermocouple controller is used to indicate a loss of flame and a signal is sent to open the air/gas mixture at the panel. The panel then begins a series of re-ignitions using the flame front ignition and the necessary pilots.			
18. Is pilot flame equipped with a monitor? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, what type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infra-Red <input type="checkbox"/> Ultra Violet <input type="checkbox"/> Camera with monitoring control room <input type="checkbox"/> Other, Describe:			
19. Hours of unit operation per year: Pilots: 8,760 hours Flare: As Needed			

Steam Injection

20. Will steam injection be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	21. Steam pressure PSIG Minimum Expected: Design Maximum:
22. Total Steam flow rate: LB/hr	23. Temperature: °F
24. Velocity ft/sec	25. Number of jet streams
26. Diameter of steam jets: in	27. Design basis for steam injected: LB steam/LB hydrocarbon
28. How will steam flow be controlled if steam injection is used?	

Characteristics of the Waste Gas Stream to be Burned

29. Name	Quantity Grains of H ₂ S/100 ft ³	Quantity (LB/hr, ft ³ /hr, etc)	Source of Material
See Attachment N			
30. Estimate total combustible to flare: see Attachment N LB/hr or ACF/hr (Maximum mass flow rate of waste gas) scfm			
31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.: See Attachment N LB/hr or ACF/hr			
32. Give composition of carrier gases: See Attachment N			
33. Temperature of emission stream: See attachment N °F Heating value of emission stream: BTU/ft³ Mean molecular weight of emission stream: MW = lb/lb-mole	34. Identify and describe all auxiliary fuels to be burned. None BTU/scf BTU/scf BTU/scf BTU/scf		
35. Temperature of flare gas: see attached °F	36. Flare gas flow rate: scf/min		
37. Flare gas heat content: see attached BTU/ft³	38. Flare gas exit velocity: see attached scf/min		
39. Maximum rate during emergency for one major piece of equipment or process unit: see attached scf/min			
40. Maximum rate during emergency for one major piece of equipment or process unit: see attached BTU/min			
41. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):			
42. Describe the collection material disposal system:			
43. Have you included Flare Control Device in the Emissions Points Data Summary Sheet? Yes			

44. 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:

Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

RECORDKEEPING:

Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

REPORTING:

Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

TESTING:

Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

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:

Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING:

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.

45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

N/A

46. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

VOC control = 98 %

47. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M
Air Pollution Control Device Sheet
(Other Collectors)

Control Device ID No. (must match Emission Units Table):

Equipment Information

1. Manufacturer: TBD Model No.	2. Control Device Name: Vapor Recovery Unit Type: Electric Compressor
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected:	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: _____ SCFM	10. Capacity:
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. N/A	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal. N/A	

Gas Stream Characteristics

14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are particulates present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are metals present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
15. Inlet Emission stream parameters:	Maximum	Typical	
Pressure (mmHg):			
Heat Content (BTU/scf):			
Oxygen Content (%):			
Moisture Content (%):			
Relative Humidity (%):			

16. Type of pollutant(s) controlled: <input type="checkbox"/> SO _x <input type="checkbox"/> Odor <input type="checkbox"/> Particulate (type): <input checked="" type="checkbox"/> Other VOC				
17. Inlet gas velocity: _____ ft/sec	18. Pollutant specific gravity:			
19. Gas flow into the collector: ACF @ _____ °F and _____ PSIA	20. Gas stream temperature: Inlet: _____ °F Outlet: _____ °F			
21. Gas flow rate: Design Maximum: _____ ACFM Average Expected: _____ ACFM	22. Particulate Grain Loading in grains/scf: Inlet: _____ Outlet: _____			
23. Emission rate of each pollutant (specify) into and out of collector:				
Pollutant	IN Pollutant	Emission Capture Efficiency %	OUT Pollutant	Control Efficiency %
	lb/hr	grains/acf	lb/hr	grains/acf
A				
B				
C				
D				
E				
24. Dimensions of stack: _____ Height _____ ft. _____ Diameter _____ ft.				
25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.				

Particulate Distribution

26. Complete the table:	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	Weight % for Size Range	Weight % for Size Range
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):
None

28. Describe the collection material disposal system:
Vapors from the gasoline tanks and flare header will be compressed and sent back to process.

29. Have you included **Other Collectores Control Device** in the Emissions Points Data Summary Sheet?

30. **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:
Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

RECORDKEEPING:
Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

REPORTING:
Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

TESTING:
Refer to Attachment O for a description of all monitoring, testing, recordkeeping, and reporting requirements.

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: Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING: 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.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

ATTACHMENT N: SUPPORTING EMISSIONS CALCULATIONS

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

TABLE N-1
SUMMARY OF SITE-WIDE AIR POLLUTANT EMISSION RATES
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID	Control Device ID	Point ID	Description	Potential to Emit																	
				NO _x (lb/yr)	CO (lb/yr)	VOC (lb/yr)	PM (lb/yr)	PM ₁₀ (lb/yr)	PM _{2.5} (lb/yr)	SO ₂ (lb/yr)	CO ₂ (lb/yr)	CH ₄ (lb/yr)	CO _{2e} (lb/yr)								
NEW SOURCES																					
S052	N/A	P052	Hot Oil Heater (61.6 MM/Bu/hr)	1.48	6.47	15.91	0.33	1.45	0.46	2.01	0.46	2.01	0.04	0.19	--	--	--	--	--	--	31,583
S053	N/A	P053	Hot Oil Heater (61.6 MM/Bu/hr)	1.48	6.47	15.91	0.33	1.45	0.46	2.01	0.46	2.01	0.04	0.19	--	--	--	--	--	--	31,583
S054	C011	P054	Ethane Amine Regenerator	--	--	--	1.98	0.43	--	--	--	--	--	2,790	6.11	0.02	0.005	2,791	6.11	6	
S055	N/A	P055	Pressurized NGL Condensate Unloading	--	--	--	9.05	19.83	--	--	--	--	--	--	--	--	--	0.23	--	--	--
S056	N/A	P056	Stabilizer Heater (10.09 MM/Bu/hr)	0.99	4.33	0.83	3.64	0.05	0.24	0.08	0.33	0.08	0.33	0.01	0.03	--	--	--	--	--	5,175
S057	N/A	P057	Emergency Generator Engine(s)	70.85	3.53	141.10	7.05	35.27	1.76	1.28	0.06	1.28	0.06	0.08	0.004	--	748.65	--	--	--	749
TK-2906	N/A	TK-2906	Strip Tank TK-2906	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-2907	N/A	TK-2907	Produced Water Tank TK-2907	--	--	--	8.88	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-3802	C001 and C006	P001	Natural Gasoline Storage Tank TK-3802, with Natural Gas Blanket and VRU to Hot Oil Heater (insignificant intermittent source)	--	--	--	26.96	0.14	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-4802	C001 and C006	P001	Natural Gasoline Storage Tank TK-4802, with Natural Gas Blanket and VRU to Hot Oil Heater (insignificant intermittent source)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-5802	C001 and C006	P001	Natural Gasoline Storage Tank TK-5802, with Natural Gas Blanket and VRU to Hot Oil Heater (insignificant intermittent source)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-6802	C001 and C006	P001	Natural Gasoline Storage Tank TK-6802, with Natural Gas Blanket and VRU to Hot Oil Heater (insignificant intermittent source)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-7802	C012	TK-7802	Refrigerated Propane Storage Tank TK-7802, with VRU to separate vapors and recondense back to storage (insignificant intermittent source)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PLANT 3 SOURCES																					
S024	N/A	P024	Regen Gas Heater (9.7 MM/Bu/hr)	0.95	4.17	0.80	3.50	0.05	0.23	0.07	0.32	0.07	0.32	0.01	0.03	--	--	--	--	--	4,975
S026	N/A	P026	Cryo IMO Heater (26.3 MM/Bu/hr)	2.58	11.29	2.17	9.49	0.14	0.62	0.20	0.86	0.20	0.86	0.02	0.08	--	--	--	--	--	13,489
S027	N/A	P027	Cryo IMO Heater (26.3 MM/Bu/hr)	0.29	1.29	0.25	1.08	0.02	0.10	0.02	0.10	0.02	0.10	0.002	0.01	--	0.14	--	--	--	9.95
FLG AREA 3	N/A	FLG AREA 3	Flare Area 3 (Cryo 3)	--	--	--	3.10	13.56	--	--	--	--	--	--	--	--	--	--	--	--	249
S032	C009	V003	Glycol Dehydrator Sulf Vent	--	--	--	2.17	9.50	--	--	--	--	--	--	--	0.39	--	--	--	--	1.74
V003	C009	V003	Vapor Combustor	0.77	3.38	1.54	6.74	0.0002	0.001	0.03	0.11	0.03	0.11	0.002	0.01	--	--	--	--	--	2,866
S036	N/A	P036	Regen Gas Heater (9.7 MM/Bu/hr)	0.95	4.17	0.80	3.50	0.05	0.23	0.07	0.32	0.07	0.32	0.01	0.03	--	--	--	--	--	4,975
S037	N/A	P037	Cryo IMO Heater (26.3 MM/Bu/hr)	2.58	11.29	2.17	9.49	0.14	0.62	0.20	0.86	0.20	0.86	0.02	0.08	--	--	--	--	--	13,489
FLG AREA 4	N/A	FLG AREA 4	Flare Area 4 (Cryo 4)	--	--	--	3.91	17.12	--	--	--	--	--	--	--	0.22	--	--	--	--	394
S040	N/A	P040	Regen Gas Heater (19.28 MM/Bu/hr)	1.89	8.28	1.59	6.95	0.10	0.46	0.14	0.63	0.14	0.63	0.01	0.06	--	--	--	--	--	9,888
S041	N/A	P041	Cryo IMO Heater (54.67 MM/Bu/hr)	5.36	23.48	4.50	19.72	0.29	1.29	0.41	1.78	0.41	1.78	0.04	0.17	--	0.14	--	--	--	28,639
FLG AREA 5	N/A	FLG AREA 5	Flare Area 5 (Cryo 5)	--	--	--	3.10	13.56	--	--	--	--	--	--	--	--	--	--	--	--	249
S044	N/A	P044	Regen Gas Heater (9.7 MM/Bu/hr)	0.95	4.17	0.80	3.50	0.05	0.23	0.07	0.32	0.07	0.32	0.01	0.03	--	--	--	--	--	4,975
S045	N/A	P045	Cryo IMO Heater (26.3 MM/Bu/hr)	2.58	11.29	2.17	9.49	0.14	0.62	0.20	0.86	0.20	0.86	0.02	0.08	--	0.14	--	--	--	13,489
FLG AREA 6	N/A	FLG AREA 6	Flare Area 6 (Cryo 6)	--	--	--	3.10	13.56	--	--	--	--	--	--	--	--	--	--	--	--	249
S048	N/A	P048	Regen Gas Heater (9.7 MM/Bu/hr)	0.95	4.17	0.80	3.50	0.05	0.23	0.07	0.32	0.07	0.32	0.01	0.03	--	--	--	--	--	4,975
S049	N/A	P049	Cryo IMO Heater (26.3 MM/Bu/hr)	2.58	11.29	2.17	9.49	0.14	0.62	0.20	0.86	0.20	0.86	0.02	0.08	--	--	--	--	--	13,489
FLG AREA 7	N/A	FLG AREA 7	Flare Area 7 (Cryo 7)	--	--	--	3.10	13.56	--	--	--	--	--	--	--	0.14	--	--	--	--	249
EXISTING SOURCES																					
S001	N/A	P001	Hot Oil Heater (216.7 MM/Bu/hr)	9.75	42.71	3.25	14.24	0.37	1.61	1.61	7.07	1.61	7.07	0.15	0.67	--	--	--	--	--	111,142
S016	N/A	P016	Hot Oil Heater (61.6 MM/Bu/hr)	1.48	6.47	3.63	15.91	0.33	1.45	0.46	2.01	0.46	2.01	0.04	0.19	--	--	--	--	--	31,583
S017	N/A	P017	Hot Oil Heater (61.6 MM/Bu/hr)	1.48	6.47	3.63	15.91	0.33	1.45	0.46	2.01	0.46	2.01	0.04	0.19	--	--	--	--	--	31,583
S018	N/A	P018	Hot Oil Heater (61.6 MM/Bu/hr)	1.48	6.47	3.63	15.91	0.33	1.45	0.46	2.01	0.46	2.01	0.04	0.19	--	--	--	--	--	31,583
S019	N/A	P019	Hot Oil Heater (61.6 MM/Bu/hr)	1.48	6.47	3.63	15.91	0.33	1.45	0.46	2.01	0.46	2.01	0.04	0.19	--	--	--	--	--	31,583
S020	N/A	P020	Regen Gas Heater (9.7 MM/Bu/hr)	0.95	4.17	0.80	3.50	0.05	0.23	0.07	0.32	0.07	0.32	0.01	0.03	--	--	--	--	--	4,975
S021	N/A	P021	Regen Gas Heater (9.7 MM/Bu/hr)	0.95	4.17	0.80	3.50	0.05	0.23	0.07	0.32	0.07	0.32	0.01	0.03	--	--	--	--	--	4,975
S022	N/A	P022	Cryo IMO Heater (26.3 MM/Bu/hr)	2.58	11.29	2.17	9.49	0.14	0.62	0.20	0.86	0.20	0.86	0.02	0.08	--	0.38	--	--	--	13,489
S023	N/A	P023	Glycol Dehydrator Sulf Vent	1.539	6.73	3.073	13.43	0.11	0.46	0.14	0.63	0.14	0.63	0.01	0.06	--	0.38	--	--	--	6.55
S024	C004	P004	Flare (Plugging)	24.25	0.15	13.99	0.08	227.77	1.37	1.31	0.01	1.31	0.01	1.87	0.01	0.005	--	141.97	--	0.02	142
S035	N/A	P035	Plugging Vent	--	--	--	1,391.24	47.86	--	--	--	--	--	--	--	2.51	--	--	--	--	4,463
TK-906	N/A	TK-906	Strip Tank TK-906	--	--	--	8.88	0.05	--	--	--	--	--	--	--	--	--	--	--	--	178.41
S011	N/A	P005	Ethane Amine Regenerator	--	--	--	1.98	8.67	--	--	--	--	--	2,790	12.220	0.02	0.10	2,791	12.222	--	
TK-802	C001 and C006	P001	Natural Gasoline Storage Tank TK-802, with Natural Gas Blanket and VRU to Hot Oil Heater (insignificant intermittent source)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE N-1
SUMMARY OF SITE-WIDE AIR POLLUTANT EMISSION RATES
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID	Control Device ID	Emission Point ID	Description	NO _x		CO		VOC		PM		PM _{2.5}		SO ₂		CO ₂		CH ₄		CO _{2e}			
				Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)
TK-2802	C001 and C006	P001	Natural Gasoline Storage Tank TK-2802, with Natural Gas Blanket and VRU to Hot Oil Heater (insignificant intermittent source)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
S008	Vapor Return to Tank	P008	Propane, Ethane, Butane, and Natural Gasoline Loading (Truck, Railcar, and Propane barges)	--	--	--	--	4.36	2.18	--	--	--	--	--	--	--	--	--	--	--	--		
ROADS	N/A	ROADS	Unpaved Roads	--	--	--	--	16.03	70.21	--	43.86	--	11.69	--	--	--	0.67	--	46.97	--	1.175		
FUG AREA 1	N/A	FUG AREA 1	Fugitive Area 1 (Cryo 1, Cryo 2 and Frac-1)	--	--	--	--	7.92	34.70	--	--	--	--	--	--	--	0.34	--	23.17	--	580		
FUG AREA 2	N/A	FUG AREA 2	Fugitive Area 2 (Frac 2)	--	--	--	--	97.22	82.69	--	--	--	--	--	--	--	--	--	--	--	--		
S033	N/A	P033	Barge Loading Vent	--	--	--	--	4.63	0.23	4.01	0.23	0.01	0.23	0.01	0.0004	--	--	--	--	--	--		
S002	N/A	P002	Fire Pump #1 (700 lpp)	--	--	--	--	4.63	0.23	0.23	0.23	0.01	0.23	0.01	0.0004	--	--	--	--	--	41		
S003	N/A	P003	Fire Pump #2 (700 lpp)	--	--	--	--	4.63	0.23	0.23	0.23	0.01	0.23	0.01	0.0004	--	--	--	--	--	41		
TK-907	N/A	TK-907	Produced Water Tank TK-907	--	--	--	--	2.32	0.11	--	--	--	--	--	--	--	--	--	--	--	--		
S015	N/A	P015	Stop Water Truck Loading	--	--	--	--	15.71	0.13	--	--	--	--	--	--	--	--	--	--	--	--		
TK-L1	N/A	TK-L1	Gasoline Dispensing Tank	--	--	--	--	0.18	0.00093	--	--	--	--	--	--	--	--	--	--	--	--		
L-1	N/A	L-1	Gasoline Dispenser Loading	--	--	--	--	0.18	0.00093	--	--	--	--	--	--	--	--	--	--	--	--		
Total (PTE excluding fugitive)²:				1,689.24	210.46	3,285.34	233.75	12,046.89	212.69	34.78	28.30	34.78	28.30	34.78	2.57	2.66	5,800	13,725	0.04	19,227	5,881	463,720	
Site Total:				1,689.24	210.46	3,285.34	233.75	12,087.14	388.98	34.78	72.16	34.78	39.99	34.78	29.47	2.57	2.66	5,800	13,727	0.04	317.95	5,581	466,864
Previously Authorized Emissions (Permit R13-2896E):				109.75	109.75	101.40	96.78	753.34	75.34	33.64	33.69	17.45	18.89	10.58	18.89	1.80	0.86	--	--	--	--	--	319,536
Project Change³:				73.06	73.06	101.40	96.78	313.64	313.64	38.47	38.47	17.45	17.45	10.58	10.58	0.86	0.86	--	--	--	--	--	147,338
Nested Source Previously Authorized Emissions (Permit R13-2896E):				165.83	165.83	180.51	149.7	867	867	25.54	25.54	16.82	16.82	16.82	16.82	1.63	1.63	--	--	--	--	--	264,239
Total Nested PSD Sources (Boilers):				91.19	91.19	96.86	86.7	86.7	86.7	16.83	16.83	100	100	100	100	1.59	1.59	--	--	--	--	--	401,301
Existing Nested PSD Sources (Boilers, Plant 1, Plant 2, and Plant 3)⁴:				100	100	100	100	100	100	16.83	16.83	100	100	100	100	100	100	--	--	--	--	--	264,453
PSD Major Source Nested Sources Threshold:				92.77	92.77	83.73	6.30	6.30	6.30	8.72	8.72	8.72	8.72	8.72	0.78	0.78	--	--	--	--	--	--	100,000
Nested Sources Project-related Increases:																							

² Fugitive emissions are excluded for the purpose of determining major source status under 40 CFR §52.21.
³ The project related changes are below the major source permitting threshold of 2.50 T/yr. Therefore, this modification does not trigger PSD permitting by itself. Project changes include fugitive emissions, but for purposes of determining major modification, the project change would not include fugitives. The project-related change in VOC emissions, excluding fugitives, is 171.7 T/yr.
⁴ Increase in emissions from existing nested sources is attributed to a revision in NO_x emission factor on Unit ID S001 and revision of calculation methodologies on Unit ID S013.

TABLE N-2
SUMMARY OF SITE-WIDE HAZARDOUS AIR POLLUTANT EMISSION RATES
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID	Control Device ID	Emission Point ID	Description	Potential to Emit																
				CH ₄ O		N-Hexane		Benzene		Toluene		Ethylbenzene		Xylene		Methanol		Other HAPs		Total HAPs
				Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	
S023	C001 and C006	P001	Natural Gasoline Storage Tank TK-2802 with Natural Gas Blanket and VRU to Hot Oil Heater (insignificant intermittent source)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S008	Vapor Return to Tank	P008	Propanes, i-Butane, Butanes, and Natural Gasoline Loading (Truck, Railroad, and Propane Barge)	--	--	6.68E-02	3.34E-02	1.35E-02	6.76E-03	1.38E-02	6.88E-03	7.79E-04	3.89E-04	4.00E-03	2.00E-03	--	--	9.88E-02	4.94E-02	
ROADS	N/A	ROADS	Unpaved Roads	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
FUG AREA	N/A	FUG AREA	Fugitive Area 1 (Cryo 1, Cryo 2, and Frac 1)	--	--	4.37E-02	1.92E-01	8.70E-04	3.81E-03	1.21E-03	5.32E-03	0.00E+00	0.00E+00	4.30E-04	1.89E-03	0.00E+00	0.00E+00	4.63E-02	2.03E-01	
FUG AREA	N/A	FUG AREA	Fugitives Area 2 (Frac 2)	--	--	2.21E-02	9.69E-02	4.40E-04	1.93E-03	6.14E-04	2.69E-03	0.00E+00	0.00E+00	2.18E-04	9.54E-04	0.00E+00	0.00E+00	2.34E-02	1.03E-01	
S033	N/A	P033	Barge Loading Vent	--	--	--	--	4.38E-01	3.72E-01	7.29E-01	6.20E-01	--	--	2.82E-01	2.40E-01	--	--	1.45E+00	1.23E+00	
S002	N/A	P002	Fire Pump #1 (700 hp)	3.88E-04	1.94E-05	--	--	3.82E-03	1.91E-04	1.38E-03	6.91E-05	--	--	9.49E-04	4.75E-05	--	--	7.74E-03	3.87E-04	
S003	N/A	P003	Fire Pump #2 (700 hp)	3.88E-04	1.94E-05	--	--	3.82E-03	1.91E-04	1.38E-03	6.91E-05	--	--	9.49E-04	4.75E-05	--	--	7.74E-03	3.87E-04	
TK-907	N/A	TK-907	Produced Water Tank TK-907	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S015	N/A	P015	Slop Water Truck Loading	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
TK-L-1	N/A	TK-L-1	Gasoline Dispensing Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
L-1	N/A	L-1	Gasoline Dispenser Loading	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Total:				6.81	0.57	20.69	3.40	0.88	0.68	1.39	1.42	0.006	0.0006	0.63	0.99	3.97	8.41	1.888	0.10	362.6
Major Source Thresholds:				10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	15.56
																				25

TABLE N-3
SUMMARY OF DE-MINIMIS SOURCES
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID	Control Device ID	Emission Point ID	Description	De-minimis Justification
New Sources				
US-2800	N/A	US-2800	Spherical Storage Tank US-2800	Pressurized. No emissions other than fugitive components.
US-2801	N/A	US-2801	Spherical Storage Tank US-2801	Pressurized. No emissions other than fugitive components.
US-2804	N/A	US-2804	Spherical Storage Tank US-2804	Pressurized. No emissions other than fugitive components.
US-2805	N/A	US-2805	Spherical Storage Tank US-2805	Pressurized. No emissions other than fugitive components.
V-2905	N/A	V-2905	Pressurized Bullet Tank V-2905	Pressurized. No emissions other than fugitive components.
V-2915	N/A	V-2915	Pressurized Bullet Tank V-2915	Pressurized. No emissions other than fugitive components.
V-2925	N/A	V-2925	Pressurized Bullet Tank V-2925	Pressurized. No emissions other than fugitive components.
V-2935	N/A	V-2935	Pressurized Bullet Tank V-2935	Pressurized. No emissions other than fugitive components.
UK-3520	N/A	UK-3520	Amine Sump	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-3524	N/A	TK-3524	Amine Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
UT-608	N/A	UT-608	Glycol Sump (Water)	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
Existing Sources				
N/A	N/A	N/A	Refrigeration Compressors (Electric)	No emissions other than fugitive components.
N/A	N/A	N/A	Residue Gas Compressors (Electric)	No emissions other than fugitive components.
N/A	N/A	N/A	Ethane Compressors (Electric)	No emissions other than fugitive components.
US-800	N/A	US-800	Spherical Storage Tank US-800	Pressurized. No emissions other than fugitive components.
US-801	N/A	US-801	Spherical Storage Tank US-801	Pressurized. No emissions other than fugitive components.
US-804	N/A	US-804	Spherical Storage Tank US-804	Pressurized. No emissions other than fugitive components.
US-805	N/A	US-805	Spherical Storage Tank US-805	Pressurized. No emissions other than fugitive components.
V-1905	N/A	V-1905	Pressurized Bullet Tank V-1905	Pressurized. No emissions other than fugitive components.
V-1915	N/A	V-1915	Pressurized Bullet Tank V-1915	Pressurized. No emissions other than fugitive components.
V-1925	N/A	V-1925	Pressurized Bullet Tank V-1925	Pressurized. No emissions other than fugitive components.
V-1935	N/A	V-1935	Pressurized Bullet Tank V-1935	Pressurized. No emissions other than fugitive components.
TK-950	N/A	TK-950	Firewater Tank	Tank does not store organic liquids.
TK-605	N/A	TK-605	TEG Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-2605	N/A	TK-2605	TEG Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-119A	N/A	TK-119A	Lube Oil Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-119B	N/A	TK-119B	Lube Oil Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-840	N/A	TK-840	Lube Oil Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-810	N/A	TK-810	Lube Oil Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-850	N/A	TK-850	Used Oil Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-2436	N/A	TK-2436	Lube Oil Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
UT-909	N/A	UT-909	Open Drain Sump (Oil/Water)	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-2119A	N/A	TK-2119A	Lube Oil Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-2119B	N/A	TK-2119B	Lube Oil Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
UK-2520	N/A	UK-2520	Amine Sump	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-2524	N/A	TK-2524	Amine Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-2522	N/A	TK-2522	Treated Water Storage Tank	Tank does not store organic liquids.
UT-607	N/A	UT-607	Glycol Sump (Water)	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
UT-2909	N/A	UT-2909	Open Drain Sump (Oil/Water)	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-952B	N/A	TK-952B	Diesel Fuel Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-952C	N/A	TK-952C	Diesel Fuel Storage Tank	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.
TK-452	N/A	TK-452	Spent Caustic Tank	No emissions, out of service.
TK-453	N/A	TK-453	Caustic Tank	No emissions, out of service.
N/A	N/A	N/A	Hot Pressure Washer	Onsite maintenance and upkeep activity.
N/A	N/A	N/A	Hot Air Blower	Onsite maintenance and upkeep activity.
N/A	N/A	N/A	On-site Sewage Treatment Plant	Onsite maintenance and upkeep activity.
N/A	N/A	N/A	Diesel Fuel Cell	Vapor pressure less than 1.5 psia and tank capacity less than 10,567 gal.

SITE DATA
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Stream Compositions:

Component	Stream 1		Stream 2		Stream 3		Stream 4		Stream 5		Stream 6		Stream 7		Stream 8		Stream 9	
	mole-%	wt-%	mole-%	wt-%	mole-%	wt-%	mole-%	wt-%	mole-%	wt-%	mole-%	wt-%	mole-%	wt-%	mole-%	wt-%	mole-%	wt-%
Water	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Carbon Dioxide	0.149%	0.326%	0.000%	0.000%	0.000%	0.000%	0.217%	0.291%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.001%	0.001%
Oxygen	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Hydrogen Sulfide	8.173%	65.914%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Methane	11.960%	18.091%	0.000%	0.000%	0.000%	0.000%	5.521%	3.305%	0.392%	0.158%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Ethane	0.017%	0.026%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Propane	0.017%	0.026%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Isobutane	0.017%	0.026%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
n-Butane	0.017%	0.026%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
n-Pentane	0.017%	0.026%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
n-Hexane	0.017%	0.026%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other Hexanes	0.015%	0.022%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Other Heptanes	0.021%	0.029%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Octane	0.001%	0.001%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Nonanes*	0.001%	0.001%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Benzenes	0.001%	0.001%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Toluene	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Ethylbenzene	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Xylenes	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
p-Xylene	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
m-Xylene	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
o-Xylene	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Totals	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
VOC max	5.81%	15.27%	0.18%	0.47%	100.00%	100.00%	44.19%	44.19%	44.19%	57.85%	57.85%	99.19%	99.19%	100.00%	100.00%	100.00%	100.00%	85.00%
VOC min	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Methane max	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Methane min	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Specific Gravity	0.6880	0.5970	0.6880	0.5970	0.6880	0.5970	0.6880	0.5970	0.6880	0.5970	0.6880	0.5970	0.6880	0.5970	0.6880	0.5970	0.6880	0.5970
	19.88	17.2	19.88	17.2	19.88	17.2	19.88	17.2	19.88	17.2	19.88	17.2	19.88	17.2	19.88	17.2	19.88	17.2

Gas Higher Heating Value
Gas Lower Heating Value

1.212 Btu/scf
1.191 Btu/scf

1.065 Btu/scf
901 Btu/scf

30.0

1.5470

2.0700

57.8

1.6300

46.2

GROUND FLARE POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID **S004A**

Pilot Emissions- Continual

Pilot fuel consumption	1,530.00	scf/hr
Pilot heat input rating	1.629	MMBtu/hr
Fuel gas HHV	1,065	Btu/ft ³
Annual operating hours	8,760	hr/yr

Waste Gas Streams

Source	Purge Gas ⁷	Pigging	Blowdowns	Closed Vent System	Irregular Process Vents	Ethane Treater S011 Flash Tank	Ethane Treater S054 Flash Tank	Total
Total hourly heat input to flare (MMBtu/hr)	0.12	82.77	11,068.83	0.62	0.78	0.93	0.93	11,154.97
Total annual heat input to flare (MMBtu/yr)	1,091.24	1,691.25	52,011.55	5,400.12	6,790.07	8,111.69	8,111.69	83,207.60
Total hourly gas volume to flare (scf/hr)	117.00	31,000.00	3,300,000.00	540.74	570.78	525.78	525.78	3,333,280.07
Total annual gas volume to flare (MMscf/yr)	1.02	0.88	31.49	4.74	5.00	4.61	4.61	52.34
Hourly VOC to flare (lb/hr)	--	3,281.92	504,341.26	6.34	7.44	0.48	0.48	507,637.92
Annual VOC to flare (T/yr)	--	20.08	550.71	27.78	32.57	2.11	2.11	635.36
Hourly HAP to flare (lb/hr)	--	186.63	39.54	0.08	0.36	0.002	0.002	226.63
Annual HAP to flare (T/yr)	--	1.12	1.00	0.36	1.60	0.01	0.01	4.09

Flare control efficiency 98.0%

Pollutant	CAS	REF	Emission Factor	Units	Potential Emissions	
					lb/hr	tons/yr
<i>Pilot</i>						
<i>Criteria Pollutants</i>						
NO _x	N/A	1	0.138	lb/MMBtu	0.22	0.98
CO	630-08-0	1	0.2755	lb/MMBtu	0.45	1.97
VOC	N/A	3	5.5	lb/MMscf	0.01	0.04
PM ₁₀	N/A	3	7.6	lb/MMscf	0.01	0.05
PM _{2.5}	N/A	3	7.6	lb/MMscf	0.01	0.05
SO ₂	7446-09-5	2	4.0	ppm	0.001	0.005
<i>Waste Gas</i>						
<i>Criteria Pollutants</i>						
NO _x	N/A	1	0.138	lb/MMBtu	1,539.39	5.74
CO	630-08-0	1	0.2755	lb/MMBtu	3,073.19	11.46
VOC - combustion	N/A	3	5.5	lb/MMscf	18.33	0.14
VOC - controlled process stream	N/A	---	507,638	lb/hr	10,152.76	12.71
PM ₁₀	N/A	3	7.6	lb/MMscf	25.33	0.20
PM _{2.5}	N/A	3	7.6	lb/MMscf	25.33	0.20
HAP - controlled process stream	N/A	---	227	lb/hr	4.53	0.08
<i>Greenhouse Gases (Pilot and Purge)</i>						
Carbon dioxide	124-38-9	4	53.06	kg/MMBtu	205.13	898.45
Methane	74-82-8	5	1.0E-03	kg/MMBtu	0.004	0.02
Nitrous oxide	10024-97-2	5	1.0E-04	kg/MMBtu	0.0004	0.002
CO ₂ e	N/A	6	---	---	205.34	899.38
TOTAL						
<i>Criteria Pollutants</i>						
NO _x	N/A	---	---	---	1,539.61	6.73
CO	630-08-0	---	---	---	3,073.64	13.43
VOC	N/A	---	---	---	10,171.10	12.89
PM ₁₀	N/A	---	---	---	25.34	0.25
PM _{2.5}	N/A	---	---	---	25.34	0.25
SO ₂	7446-09-5	---	---	---	0.001	0.005

Notes:

- CO and NO_x are based upon TNRCC Guidance Document for Flares (dated 10/00) for non-assisted high-BTU flares.
- SO₂ is estimated using a mass balance approach and the actual sulfur content of the gas.
- AP-42 Table 1.4-2
- 40 CFR 98 Table C-1
- 40 CFR 98 Table C-2
- 40 CFR 98 Table A-1
- During normal operations, purge gas is recovered by VRU and routed back to inlet. Purge gas combustion only occurs when waste gas is being combusted at the flare (purge gas is not continuous). Hourly rate is based on average use through the year. Purge gas volume is determined by the amount of waste gas routed to flare.
- Hourly emission rates based on flare flows due to quantifiable events. Hourly emissions may be exceeded due to unpredictable events requiring an emergency shutdown (ESD).

Waste gas GHG combustion emissions calculated in accordance with 40 CFR 98 Subpart W.

BLOWDOWN POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Case	MW (lb/lb-mol)	Heating Value ¹ (Btu/scf)	1 Inlet Comp. Blowdown	2 Residue Comp. Blowdown	3 Stab. Comp. Blowdown	4 Ethane Comp. Blowdown	5 Butane System Blowdown
Compound			mol%	mol%	mol%	mol%	mol%
water	18.00	0	0.0000	0.0000	0.0000	0.0000	0.0000
carbon dioxide	44.00	0	0.1490	0.1520	0.0010	0.0310	0.0000
nitrogen	28.00	0	0.3320	0.3430	0.0040	0.0010	0.0000
methane	16.04	1,012	81.7370	91.7190	0.0000	0.4630	0.0000
ethane	30.07	1,783	11.9690	7.6050	30.7740	99.4440	0.0000
propane	44.10	2,557	3.5880	0.1720	39.7240	0.0580	1.1839
isobutane	58.12	3,354	0.6170	0.0020	7.8150	0.0000	48.2631
n-butane	58.12	3,369	0.8980	0.0010	11.5310	0.0000	50.2350
isopentane	72.15	4,001	0.2660	0.0000	3.4790	0.0000	0.3135
n-pentane	72.15	4,009	0.2040	0.0000	2.3580	0.0000	0.0030
cyclopentane				0.0000			
n-hexane	86.17	4,756	0.0498	0.0030	2.5890	0.0000	0.0020
cyclohexane				0.0000			
other hexanes	86.17	4,756	0.1061	0.0000	0.0000	0.0000	0.0000
heptane	100.21	5,502	0.0555	0.0010	1.2940	0.0000	0.0000
benzene	78.11	3,741	0.0011	0.0000	0.0000	0.0000	0.0000
toluene	92.14	4,408	0.0013	0.0000	0.0000	0.0000	0.0000
ethylbenzene	106.17	5,222	0.0000	0.0000	0.0000	0.0000	0.0000
xylene	106.16	5,155	0.0004	0.0000	0.0000	0.0000	0.0000
octane (C8+)	114.23	6,239	0.0248	0.0000	0.4310	0.0000	0.0000
hydrogen sulfide	34.08	0	0.0000	0.0000	0.0000	0.0000	0.0000
Events/yr			252	324	36	60	2
Volume per Event (scf)			38,940	38,940	3,340	38,940	3,300,000
VOC Loading (lb/hr)			310	8	326	3	504,341
VOC Loading (tpy)			39.08	1.35	5.86	0.08	504.34
CO ₂ Loading (lb/hr)			6.73	6.86	0.004	1.40	0.00
CO ₂ Loading (tpy)			0.85	1.11	0.00007	0.04	0.00
CH ₄ Loading (lb/hr)			1,345.26	1,509.55	0.00	7.62	0.00
CH ₄ Loading (tpy)			169.50	244.55	0.00	0.23	0.00
Ethane Loading (lb/hr)			369.30	234.65	81.44	3,068.29	0.00
Ethane Loading (tpy)			46.53	38.01	1.47	92.05	0.00
n-Hexane Loading (lb/hr)			4.40	0.27	19.63	0.00	14.99
n-hexane Loading (tpy)			0.55	0.04	0.35	0.00	0.01
Benzene Loading (lb/hr)			0.09	0.00	0.00	0.00	0.00
Benzene Loading (tpy)			0.011	0.00	0.00	0.00	0.00
Toluene Loading (lb/hr)			0.12	0.00	0.00	0.00	0.00
Toluene Loading (tpy)			0.015	0.00	0.00	0.00	0.00
Ethylbenzene Loading (lb/hr)			0.00	0.00	0.00	0.00	0.00
Ethylbenzene Loading (tpy)			0.00	0.00	0.00	0.00	0.00
Xylene Loading (lb/hr)			0.04	0.00	0.00	0.00	0.00
Xylene Loading (tpy)			0.005	0.00	0.00	0.00	0.00
HAP Loading (lb/hr)			4.66	0.27	19.63	0.00	14.99
HAP Loading (tpy)			0.59	0.04	0.35	0.00	0.01
Capacity (MMscf/yr)			9,8129	12,6166	0,1202	2,3364	6,6000
Heat Content (Btu/scf)			1,214	1,068	2,670	1,779	3,354
Heat Input (MMBtu/hr)			47	42	9	69	11,069
Heat Input (MMBtu/yr)			11,915	13,481	321	4,157	22,138

Train	Unit ID	Service Type	Annual Events
1	C104A	Inlet	12
	C104B	Inlet	12
	C104C	Inlet	12
	C426A	Ethane	12
	C426B	Ethane	12
	C208A	Residue	12
	C208B	Residue	12
	C208C	Residue	12
	C436	Stabilizer	12
	C445	Butane	2
2	C-100	Inlet	12
	C-110	Inlet	12
	C-120	Inlet	12
	C426C	Ethane	12
	C426D	Ethane	12
	C426E	Ethane	12
	C-150	Residue	12
	C-160	Residue	12
	C-170	Residue	12
	C-180	Residue	12
	C2436	Stabilizer	12
3	C-3100	Inlet	12
	C-3110	Inlet	12
	C-3120	Inlet	12
	C-3150	Residue	12
	C-3160	Residue	12
	C-3170	Residue	12
	C-3180	Residue	12
	C3436	Stabilizer	12
4	C-4100	Inlet	12
	C-4110	Inlet	12
	C-4120	Inlet	12
	C-4150	Residue	12
	C-4160	Residue	12
	C-4170	Residue	12
	C-4180	Residue	12
5	C-5100	Inlet	12
	C-5110	Inlet	12
	C-5120	Inlet	12
	C-5150	Residue	12
	C-5160	Residue	12
	C-5170	Residue	12
	C-5180	Residue	12
6	C-6100	Inlet	12
	C-6110	Inlet	12
	C-6120	Inlet	12
	C-6150	Residue	12
	C-6160	Residue	12
	C-6170	Residue	12
	C-6180	Residue	12
7	C-7100	Inlet	12
	C-7110	Inlet	12
	C-7120	Inlet	12
	C-7150	Residue	12
	C-7160	Residue	12
	C-7170	Residue	12
	C-7180	Residue	12

1. Gross heating values obtained from <http://www.scribd.com/doc/118497630/Calculate-Gas-Heating-Value-From-Gas-Composition>. For C6+ compounds, the heating value of n-hexane was used.

IRREGULAR PROCESS VENT POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Case	MW (lb/lb-mol)	Heating Value ¹ (Btu/scf)	1 Inlet Stream	2 Residue Stream	3 Stabilizer Overheads	4 Ethane Stream
Compound			mol%	mol%	mol%	mol%
water	18.00	0	0.0000	0.0000	0.0000	0.0000
carbon dioxide	44.00	0	0.1490	0.1520	0.0010	0.0310
nitrogen	28.00	0	0.3320	0.3430	0.0040	0.0010
methane	16.04	1,012	81.7370	91.7190	0.0000	0.4630
ethane	30.07	1,783	11.9690	7.6050	30.7740	99.4440
propane	44.10	2,557	3.5880	0.1720	39.7240	0.0580
Isobutane	58.12	3,354	0.6170	0.0020	7.8150	0.0000
n-butane	58.12	3,369	0.8980	0.0010	11.5310	0.0000
Isopentane	72.15	4,001	0.2660	0.0000	3.4790	0.0000
n-pentane	72.15	4,009	0.2040	0.0000	2.3580	0.0000
cyclopentane			0.0000	0.0000	0.0000	0.0000
n-hexane	86.17	4,756	0.0498	0.0030	2.5890	0.0000
cyclohexane			0.0000	0.0000	0.0000	0.0000
other hexanes	86.17	4,756	0.1061	0.0000	0.0000	0.0000
heptane	100.21	5,502	0.0555	0.0010	1.2940	0.0000
benzene	78.11	3,741	0.0011	0.0000	0.0000	0.0000
toluene	92.14	4,408	0.0013	0.0000	0.0000	0.0000
ethylbenzene	106.17	5,222	0.0000	0.0000	0.0000	0.0000
xylene	106.16	5,155	0.0004	0.0000	0.0000	0.0000
octane (C8+)	114.23	6,239	0.0248	0.0000	0.4310	0.0000
hydrogen sulfide	34.08	0	0.0000	0.0000	0.0000	0.0000
Hourly Vent Volume (scf/hr) ²			228	228	57	57
Annual Vent Volume (MMscf/yr)			2	2	0.5	0.5
VOC Loading (lb/hr)			1.82	0.05	5.56	0.004
VOC Loading (tpy)			7.96	0.21	24.37	0.02
CO ₂ Loading (lb/hr)			0.04	0.04	0.0001	0.002
CO ₂ Loading (tpy)			0.17	0.18	0.0003	0.01
CH ₄ Loading (lb/hr)			7.89	8.85	0.00	0.01
CH ₄ Loading (tpy)			34.55	38.77	0.00	0.05
Ethane Loading (lb/hr)			2.17	1.38	1.39	4.50
Ethane Loading (tpy)			9.48	6.03	6.10	19.70
n-Hexane Loading (lb/hr)			0.03	0.00	0.34	0.00
n-hexane Loading (tpy)			0.11	0.01	1.47	0.00
Benzene Loading (lb/hr)			0.001	0.00	0.00	0.00
Benzene Loading (tpy)			0.002	0.00	0.00	0.00
Toluene Loading (lb/hr)			0.001	0.00	0.00	0.00
Toluene Loading (tpy)			0.003	0.00	0.00	0.00
Ethylbenzene Loading (lb/hr)			0.00	0.00	0.00	0.00
Ethylbenzene Loading (tpy)			0.00	0.00	0.00	0.00
Xylene Loading (lb/hr)			0.0003	0.00	0.00	0.00
Xylene Loading (tpy)			0.001	0.00	0.00	0.00
HAP Loading (lb/hr)			0.03	0.002	0.34	0.00
HAP Loading (tpy)			0.12	0.01	1.47	0.00
Heat Content (Btu/scf)			1,214	1,068	2,670	1,779
Heat Input (MMBtu/hr)			0.28	0.24	0.15	0.10
Heat Input (MMBtu/yr)			2,428	2,137	1,335	890

1. Gross heating values obtained from <http://www.scribd.com/doc/118497630/Calculate-Gas-Heating-Value-From-Gas-Composition>.

2. Release volume is if event lasted an entire hour. Emergency events are excluded from the emission calculations.

PIGGING OPERATIONS POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Location	Track Deck Site											
	New 24" Pig Receiver				New 24" Pig Receiver				North Side			
	30" Pig Launcher TL-613 Residue Launcher 24" Barrel Residue	24" Pig Receiver Inlet 30" Barrel	2018 Inlet 30" Barrel	2018 Inlet 30" Barrel	8" Pig Launcher ^d G150 Launcher 12" Barrel Propane/Butane ^d	24" Pig Receiver TL-404 Receiver 30" Barrel Inlet	20" Pig Launcher Residue Launcher 30" Barrel Residue	10" Pig Launcher G151 Launcher 16" Barrel Ethane	10" Pig Launcher BN Launcher 16" Barrel Inlet	8" Pig Receiver BN Receiver 12" Barrel Condensate/NGL		
Number of Events per Year	12	365	365	365	12	10	12	12	24	12		
Number of Events per Hour	18,000	7,000	7,000	7,000	72,000	7,000	18,000	18,000	2,000	31,000		
Volume per Event, scf	25,600	7,000	7,000	7,000	2,800	6,800	2,800	2,800	2,000	2,000		
Control Efficiency, %	28.96	28.96	28.96	28.96	28.96	28.96	28.96	28.96	28.96	28.96		
Air Flow, lbs/hr	28.96	28.96	28.96	28.96	28.96	28.96	28.96	28.96	28.96	28.96		
Gas Stream Density, lbs/scf ^a	0.046	0.053	0.053	0.053	0.158	0.053	0.080	0.080	0.125	0.125		
Control Type (Flare/Vent)	Vent	Vent	Vent	Vent	Flare	Vent	Flare	Flare	Flare	Flare		
Flare Control Efficiency, %	0%	0%	0%	0%	98%	0%	98%	98%	98%	98%		
Flare Unit ID	--	--	--	--	S034	--	S004A	S004A	S004A	S004A		
Waste Gas Heat Content (Btu/scf)	1,065	1,212	1,212	1,212	2,371	1,212	1,779	1,779	1,212	1,212		
Heat Input to Flare (MMBtu/hr)	N/A	N/A	N/A	N/A	170.71	N/A	32.03	32.03	2.42	82.77		
Heat Input to Flare (MMBtu/yr)	N/A	N/A	N/A	N/A	2,048.54	N/A	384.32	384.32	28.17	993.23		
Max VOC Percentage in Gas Stream, wt%	1.00%	20.00%	20.00%	20.00%	100.00%	20.00%	1.00%	1.00%	20.00%	20.00%		
Max H ₂ S Percentage in Gas Stream, wt%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
Max Methane Percentage in Gas Stream, wt%	95.00%	70.00%	70.00%	70.00%	0.00%	70.00%	95.00%	95.00%	70.00%	70.00%		
Max CO ₂ Percentage in Gas Stream, wt%	1.00%	1.00%	1.00%	1.00%	0.00%	1.00%	1.00%	1.00%	1.00%	1.00%		
Benzene Percentage in Gas Stream, wt%	0.0000%	0.0043%	0.0043%	0.0043%	0.0000%	0.0043%	0.0000%	0.0000%	0.0043%	0.0000%		
Toluene Percentage in Gas Stream, wt%	0.0000%	0.0066%	0.0066%	0.0066%	0.0000%	0.0066%	0.0000%	0.0000%	0.0066%	0.0000%		
Ethylbenzene Percentage in Gas Stream, wt%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%		
Xylene Percentage in Gas Stream, wt%	0.0000%	0.0021%	0.0021%	0.0021%	0.0000%	0.0021%	0.0000%	0.0000%	0.0021%	0.0000%		
n-Hexane Percentage in Gas Stream, wt%	0.0150%	0.2157%	0.2157%	0.2157%	0.0059%	0.2157%	0.0150%	0.0000%	0.2157%	0.0000%		
Hourly VOC Emission Rates (lb/hr) ^b	8.21	368.00	368.00	368.00	227.77	75.60	0.18	0.29	0.42	65.64		
Annual VOC Emission Rates (T/yr) ^c	0.05	13.43	13.43	13.43	1.37	20.50	0.001	0.002	0.01	0.39		
Annual Methane Emission Rates (T/yr) ^c	4.68	47.01	47.01	47.01	0.00	1.29	0.10	0.003	0.02	0.005		
Annual CO ₂ Emission Rates (T/yr) ^c	0.05	0.67	0.67	0.67	0.00	1.03	0.001	0.002	0.003	0.005		
Hourly Benzene Emission Rates (lb/hr) ^b	0.00	0.08	0.08	0.08	0.00	0.12	0.00	0.00	0.001	0.00		
Annual Benzene Emission Rates (T/yr) ^c	0.00	0.003	0.003	0.004	0.00	0.0001	0.00	0.00	0.000001	0.00		
Hourly Toluene Emission Rates (lb/hr) ^b	0.00	0.11	0.11	0.11	0.00	0.17	0.00	0.00	0.001	0.00		
Annual Toluene Emission Rates (T/yr) ^c	0.00	0.004	0.004	0.006	0.00	0.0001	0.00	0.00	0.000002	0.00		
Hourly Ethylbenzene Emission Rates (lb/hr) ^b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Annual Ethylbenzene Emission Rates (T/yr) ^c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Hourly Xylene Emission Rates (lb/hr) ^b	0.00	0.04	0.04	0.04	0.00	0.04	0.00	0.00	0.00004	0.00		
Annual Xylene Emission Rates (T/yr) ^c	0.00	0.001	0.001	0.002	0.00	0.00004	0.00	0.00	0.000001	0.00		
Hourly n-Hexane Emission Rates (lb/hr) ^b	0.12	3.97	3.97	3.97	0.01	6.06	0.003	0.00	0.005	3.73		
Annual n-Hexane Emission Rates (T/yr) ^c	0.001	0.14	0.14	0.22	0.0001	0.004	0.00002	0.00	0.001	0.02		

^a Gas stream density is calculated as follows:
(28.96 lb/mole) / (379 scf/mole) * (0.5970) = 0.046 lb/scf

^b Hourly VOC emission rates are calculated as follows:
(1 event/hr) * (18,000 scf/event) * (0.046 lb/scf) * (1.00% VOC) = 8.21 lb/hr

^c Annual VOC emission rates are calculated as follows:
(12 events/yr) * (18,000 scf/event) * (0.046 lb/scf) * (1.00% VOC) / (2,000 lbT) = 0.05 T/yr

^d Pig launcher in propane service has its own auto-ignition flare to control emissions during pigging operations. Emission calculations from this flare follow.

PIGGING FLARE POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID	Emission Point ID	Description	WG (Propane) Flow Rate ^a (scf/hr)	WG Higher Heating Value (Btu/scf)	Flare Feed Rate		Annual Operating Hours (hr/yr)	Pollutant	Emission Factors ^b	Potential to Emit		
					Hourly (MMBtu/hr)	Annual (MMBtu/yr)				Hourly ^b (lb/hr)	Annual ^c (T/yr)	
S034	P034	Flare (Pigging) ^e	72,000	2,371.00	170.71	2,048.54	12	CO	0.0820	lb/MMBtu	13.99	0.08
								NO _x	0.1421	lb/MMBtu	24.25	0.15
								PM ^d	0.0077	lb/MMBtu	1.31	0.01
								SO ₂	0.0109	lb/MMBtu	1.87	0.01
								VOC		Material Balance	227.77	1.37

^a The WG flow rate, heating value, and feed rates taken from calculation of pigging operations potential to emit work sheet.

^b Emission factors are from AP-42 Table 1.5-1 (dated 7/08) for propane combustion. Emission factors were normalized based on liquid propane heating value of 91,500,000 Btu/10³ gallons. An example calculation for hourly CO emissions for Emission Unit ID S034 follows:

$$\begin{aligned} \text{CO (lb/hr)} &= (\text{Flare Feed Rate, MMBtu/hr}) * (\text{Emission Factor, lb/MMBtu}) \\ \text{CO (lb/hr)} &= (170.71 \text{ MMBtu/hr}) * (0.0820 \text{ lb/MMBtu}) \\ &= \boxed{13.99} \text{ lb/hr CO} \end{aligned}$$

^c An example calculation for annual CO emissions for Emission Unit ID S034 follows:

$$\begin{aligned} \text{CO (T/yr)} &= (\text{Flare Feed Rate, MMBtu/yr}) * (\text{Emission Factor, lb/MMBtu}) / (2,000 \text{ lb/T}) \\ \text{CO (T/yr)} &= (2,048.54 \text{ MMBtu/yr}) * (0.0820 \text{ lb/MMBtu}) / (2,000 \text{ lb/T}) \\ &= \boxed{0.08} \text{ T/yr CO} \end{aligned}$$

^d The flare is smokeless per 40 CFR §60.18 requirements; therefore, PM emissions are negligible. However, PM emissions have been included to be conservative.

^e The flare has an auto-ignition system. Therefore, the flare does not require a continuous pilot to operate.

**HOT OIL AND PLANT HEATERS POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC**

Emission Unit ID	Description	Maximum Hourly Heat Input (MMBtu/hr)	Maximum Annual Heat Input (MMBtu/yr)	Fuel Lower Heating Value (Btu/scf)	Maximum Hourly Fuel Use (scf/hr)	Maximum Annual Fuel Use (MMscf/yr)	Annual Operating Hours (hr/yr)	VOC		NO _x		CO		PM ^d		SO ₂ ^e						
								Emission Factor ^a (lb/MMBtu)	PTE Annual ^b (T/yr)	Emission Factor ^a (lb/MMBtu)	PTE Annual ^b (T/yr)	Emission Factor ^a (lb/MMBtu)	PTE Annual ^b (T/yr)	Emission Factor ^a (lb/MMBtu)	PTE Annual ^b (T/yr)	Emission Factor (ppm S)	Hourly Annual ^c (lb/hr)					
New Equipment																						
S052	Hot Oil Heater	61.58	539,441	961	64,101	562	8,760	0.0054	0.33	1.45	0.024	1.48	6.47	0.059	3.63	15.91	0.00745	0.46	2.01	4.0	0.04	0.19
S053	Hot Oil Heater	61.58	539,441	961	64,101	562	8,760	0.0054	0.33	1.45	0.024	1.48	6.47	0.059	3.63	15.91	0.00745	0.46	2.01	4.0	0.04	0.19
S056	Stabilizer Heater	10.09	88,388	961	10,503	92	8,760	0.0054	0.05	0.24	0.098	0.99	4.33	0.082	0.83	3.64	0.00745	0.08	0.33	4.0	0.01	0.03
Plant 1 and 2 Equipment																						
S001	Hot Oil Heater	216.70	1,898,292	961	225,571	1,976	8,760	0.0017	0.37	1.61	0.045	9.75	42.71	0.015	3.25	14.24	0.00745	1.61	7.07	4.0	0.15	0.67
S012	Regen Gas Heater	9.7	84,972	961	10,097	88	8,760	0.0054	0.05	0.23	0.098	0.95	4.17	0.082	0.80	3.50	0.00745	0.07	0.32	4.0	0.01	0.03
S013	Cryo HMO Heater	26.3	230,388	961	27,377	240	8,760	0.0054	0.14	0.62	0.098	2.58	11.29	0.082	2.17	9.49	0.00745	0.20	0.86	4.0	0.02	0.08
S016	Hot Oil Heater	61.58	539,441	961	64,101	562	8,760	0.0054	0.33	1.45	0.024	1.48	6.47	0.059	3.63	15.91	0.00745	0.46	2.01	4.0	0.04	0.19
S017	Hot Oil Heater	61.58	539,441	961	64,101	562	8,760	0.0054	0.33	1.45	0.024	1.48	6.47	0.059	3.63	15.91	0.00745	0.46	2.01	4.0	0.04	0.19
S018	Hot Oil Heater	61.58	539,441	961	64,101	562	8,760	0.0054	0.33	1.45	0.024	1.48	6.47	0.059	3.63	15.91	0.00745	0.46	2.01	4.0	0.04	0.19
S019	Hot Oil Heater	61.58	539,441	961	64,101	562	8,760	0.0054	0.33	1.45	0.024	1.48	6.47	0.059	3.63	15.91	0.00745	0.46	2.01	4.0	0.04	0.19
Plant 3 Heaters																						
S024	Regen Gas Heater	9.7	84,972	961	10,097	88	8,760	0.0054	0.05	0.23	0.098	0.95	4.17	0.082	0.80	3.50	0.00745	0.07	0.32	4.0	0.01	0.03
S026	Cryo HMO Heater	26.3	230,388	961	27,377	240	8,760	0.0054	0.14	0.62	0.098	2.58	11.29	0.082	2.17	9.49	0.00745	0.20	0.86	4.0	0.02	0.08
S029	Glycol Reboiler	3.0	26,280	961	3,123	27	8,760	0.0054	0.02	0.07	0.098	0.29	1.29	0.082	0.25	1.08	0.00745	0.02	0.10	4.0	0.002	0.01
Plant 4 Heaters																						
S036	Regen Gas Heater	9.7	84,972	961	10,097	88	8,760	0.0054	0.05	0.23	0.098	0.95	4.17	0.082	0.80	3.50	0.00745	0.07	0.32	4.0	0.01	0.03
S037	Cryo HMO Heater	26.3	230,388	961	27,377	240	8,760	0.0054	0.14	0.62	0.098	2.58	11.29	0.082	2.17	9.49	0.00745	0.20	0.86	4.0	0.02	0.08
Plant 5 Heaters																						
S040	Regen Gas Heater	19.28	168,893	961	20,069	176	8,760	0.0054	0.10	0.46	0.098	1.89	8.28	0.082	1.59	6.95	0.00745	0.14	0.63	4.0	0.01	0.06
S041	Cryo HMO Heater	54.67	478,909	961	56,908	499	8,760	0.0054	0.29	1.29	0.098	5.36	23.48	0.082	4.50	19.72	0.00745	0.41	1.78	4.0	0.04	0.17
Plant 6 Heaters																						
S044	Regen Gas Heater	9.7	84,972	961	10,097	88	8,760	0.0054	0.05	0.23	0.098	0.95	4.17	0.082	0.80	3.50	0.00745	0.07	0.32	4.0	0.01	0.03
S045	Cryo HMO Heater	26.3	230,388	961	27,377	240	8,760	0.0054	0.14	0.62	0.098	2.58	11.29	0.082	2.17	9.49	0.00745	0.20	0.86	4.0	0.02	0.08

HOT OIL AND PLANT HEATERS POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID	Description	Maximum Hourly Heat Input (MMBtu/hr)	Maximum Annual Heat Input (MMBtu/yr)	Fuel Lower Heating Value (Btu/scf)	Maximum Hourly Fuel Use (scf/hr)	Maximum Annual Fuel Use (MMscf/yr)	Annual Operating Hours (hr/yr)	VOC		NO _x		CO		PM ^d		SO ₂ ^e							
								Emission Factor ^a (lb/MMBtu)	Hourly ^b Annual ^c (lb/hr) (T/yr)	Emission Factor ^a (lb/MMBtu)	Hourly ^b Annual ^c (lb/hr) (T/yr)	Emission Factor ^a (lb/MMBtu)	Hourly ^b Annual ^c (lb/hr) (T/yr)	Emission Factor ^a (lb/MMBtu)	Hourly ^b Annual ^c (lb/hr) (T/yr)	Emission Factor (ppm S)	Hourly (lb/hr)	Annual ^c (T/yr)	Emission Factor (lb/MMBtu)	Hourly ^b Annual ^c (lb/hr) (T/yr)	Emission Factor (ppm S)	Hourly (lb/hr)	Annual ^c (T/yr)
S048	Regen Gas Heater	9.7	84,972	961	10,097	88	8,760	0.0054	0.05	0.23	0.098	0.95	4.17	0.082	0.80	0.80	3.50	0.00745	0.07	0.32	4.0	0.01	0.03
S049	Cryo HMO Heater	26.3	230,388	961	27,377	240	8,760	0.0054	0.14	0.62	0.098	2.58	11.29	0.082	2.17	9.49	0.00745	0.20	0.86	4.0	0.02	0.08	

^a CO and VOC emission factors for Emission Unit ID S001 are based on vendor commitment, and NO_x emission factor is based on performance data. CO and NO_x emission factors for Emission Unit IDs S016 through S019, S052 and S053 are from vendor commitments. All other emission factors are from AP-42 Table 1.4-2 (dated 7/98), converted to lb/MMBtu by dividing by 1,020 Btu/scf.

^b An hourly VOC emission calculation example for Unit ID S001 follows:

$$\begin{aligned} \text{VOC (lb/hr)} &= (\text{Maximum Heat Input, MMBtu/hr}) \times (\text{Emission Factor, lb/MMBtu}) \\ \text{VOC (lb/hr)} &= (216.70 \text{ MMBtu/hr}) \times (0.0017 \text{ lb/MMBtu}) \\ \text{VOC (lb/hr)} &= \boxed{0.37 \text{ lb/hr VOC}} \end{aligned}$$

^c An annual VOC emission calculation example for Unit ID S001 follows:

$$\begin{aligned} \text{VOC (T/yr)} &= (\text{Hourly PTE, lb/hr}) \times (\text{Annual Operating Hours, hr/yr}) \times (2,000 \text{ lb/T}) \\ \text{VOC (T/yr)} &= (0.37 \text{ lb/hr}) \times (8,760 \text{ hr/yr}) \times (2,000 \text{ lb/T}) \\ \text{VOC (T/yr)} &= \boxed{1.61 \text{ T/yr VOC}} \end{aligned}$$

^d All PM is assumed to be less than 2.5 microns in diameter per footnote "e" of AP-42 Table 1.4-2.

^e A material balance approach was used to estimate the SO₂ emission rates using the maximum sulfur concentration in the natural gas.

An example calculation for hourly PTE SO₂ from Unit ID S001 follows:

$$\begin{aligned} \text{SO}_2 \text{ (lb/hr)} &= (\text{Maximum Heat Input, MMBtu/hr}) \times (\text{Fuel Heating Value, Btu/scf}) \times (1 \text{ lb-mol}/379 \text{ scf}) \times (64.06 \text{ lb SO}_2/\text{lb-mol S}) \\ \text{SO}_2 \text{ (lb/hr)} &= (216.70 \text{ MMBtu/hr}) \times (961 \text{ Btu/scf}) \times (4.0 \text{ lb-mol S/MMBtu-mol gas}) \times (1 \text{ lb-mol}/379 \text{ scf}) \times (64.06 \text{ lb SO}_2/\text{lb-mol S}) \\ &= \boxed{0.15 \text{ lb/hr SO}_2} \end{aligned}$$

**FUGITIVE AREA 1 POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC**

Component/Stream	Number of Components	Emission Factors ^a (kg/hr-component)	Operating Hours (hr/yr)	Maximum VOC		Maximum CH ₄		Uncontrolled PTE VOC		Reduction Credit ^a (%)	PTE VOC		PTE CO ₂		PTE Methane		PTE CO ₂ e Annual ^c (T/yr)	
				Content (%)	Content (%)	Content (%)	Content (%)	Hourly ^b (lb/hr)	Annual ^c (T/yr)		Hourly ^b (lb/hr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)		
<u>Valves</u>																		
Gas (Natural Gas)	3,000	0.0045	8,760	20%	1%	70%	5.9525	26.0718	1.7857	70%	7.8215	0.3911	7.8215	0.3911	27.3754	684.78		
Light Liquid	3,194	0.0025	8,760	100%	0%	0%	17.6039	77.1050	6.8655	61%	30.0710	0.0000	30.0710	0.0000	0.0000	0.00		
Heavy Liquid	65	0.0000084	8,760	100%	0%	0%	0.0012	0.0053	0.0012	0%	0.0053	0.0000	0.0053	0.0000	0.0000	0.00		
<u>Flanges</u>																		
Gas (Natural Gas)	458	0.00039	8,760	20%	1%	70%	0.0788	0.3450	0.0788	0%	0.3450	0.0172	0.3450	0.0172	1.2074	30.20		
Light Liquid	7	0.00011	8,760	100%	0%	0%	0.0017	0.0074	0.0017	0%	0.0074	0.0000	0.0074	0.0000	0.0000	0.00		
<u>Relief Valves</u>																		
Gas (Natural Gas)	62	0.0088	8,760	20%	1%	70%	0.2406	1.0537	0.2406	0%	1.0537	0.0527	1.0537	0.0527	3.6879	92.25		
Light Liquid	34	0.0075	8,760	100%	0%	0%	0.5622	2.4623	0.5622	0%	2.4623	0.0000	2.4623	0.0000	0.0000	0.00		
<u>Compressor Seals</u>																		
Gas (Natural Gas)	17	0.0088	8,760	20%	1%	70%	0.0660	0.2889	0.0660	0%	0.2889	0.0144	0.2889	0.0144	1.0112	25.29		
<u>Pump Seals^d</u>																		
Light Liquid	38	0.013	8,760	100%	0%	0%	1.0891	4.7702	0.5990	45%	2.6236	0.0000	2.6236	0.0000	0.0000	0.00		
Heavy Liquid	3	0.00051	8,760	100%	0%	0%	0.0034	0.0148	0.0034	0%	0.0148	0.0000	0.0148	0.0000	0.0000	0.00		
<u>Connectors^e</u>																		
Gas (Natural Gas)	10,124	0.0002	8,760	20%	1%	70%	0.8928	3.9104	0.8928	0%	3.9104	0.1955	3.9104	0.1955	13.6864	342.35		
Light Liquid	10,656	0.00021	8,760	100%	0%	0%	4.9334	21.6083	4.9334	0%	21.6083	0.0000	21.6083	0.0000	0.0000	0.00		
<u>Closed Vent System - Valves^f</u>																		
Gas (Natural Gas)	281	0.0045	8,760	20%	1%	70%	0.5575	2.4421	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.00		
Light Liquid	13	0.0025	8,760	100%	0%	0%	0.0717	0.3138	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.00		
<u>Closed Vent System - Flanges^f</u>																		
Gas (Natural Gas)	406	0.00039	8,760	20%	1%	70%	0.0698	0.3058	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.00		
Light Liquid	8	0.0001	8,760	100%	0%	0%	0.0018	0.0077	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.00		
<u>Closed Vent System - Connectors^f</u>																		
Gas (Natural Gas)	275	0.0002	8,760	20%	1%	70%	0.0243	0.1062	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.00		
Light Liquid	33	0.00021	8,760	100%	0%	0%	0.0153	0.0669	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.00		
<u>Closed Vent System - Relief Valves^f</u>																		
Gas (Natural Gas)	60	0.0088	8,760	20%	1%	70%	0.2328	1.0197	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.00		
Light Liquid	1	0.0075	8,760	100%	0%	0%	0.0165	0.0724	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.00		
TOTAL:									16.03		70.21		0.67		46.97	1174.88		

^a Fugitive Emission Factors are per EPA document EPA-453/R-95-017; dated November 1995; pp.2-15. The emission factors are for total hydrocarbon. Reduction Credits are per EPA Leak Detection and Repair - A Best Practices Guide, Table 4.1 for refineries with a leak definition of 10,000 ppm, quarterly monitoring.

^b Hourly VOC emissions are calculated as follows:
 $(3,000 \text{ components}) * (0.0045 \text{ kg/hr-component}) * (1 \text{ lb}/0.454 \text{ kg}) * (100\% \text{ VOC}) * (100\% - 70\% \text{ reduction credit}) = 1.7857 \text{ lb/hr}$

^c Annual VOC emission rates are calculated as follows:
 $(1.7857 \text{ lb/hr}) * (8,760 \text{ hr/yr}) / (2,000 \text{ lb/T}) = 7.8215 \text{ T/yr}$

^d Leakless pumps are not included in the pump count.

^e Sampling connections are included in this category, because all sampling utilizes inline analyzers (i.e., closed loop sampling), such that additional emissions per sample do not occur.

^f Closed vent system gas and light liquid components are vented to the Flare S004A. Therefore, any leaks are routed to flare, and not to atmosphere as fugitive emissions (i.e., 100% control is taken). The Flare PTE calculation includes these potential leaks.

FUGITIVE AREA 1 POTENTIAL TO EMIT (SPECIATED)
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

Stream	PTE		Methane		Ethane		Propane		N-Butane		Isobutane		N-Pentane		Isopentane		n-Hexane		Other Hexanes		Benzene		Heptane		Octane+		Toluene		Ethylbenzene		Xylene	
	Hourly	Annual	% in	Hourly	% in	Hourly	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a
	(lb/hr)	(T/yr)	Stream	(lb/hr)	Stream	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)
Gas (Natural Gas)	3.0638	13.4195	65.91%	2.0195	18.09%	0.5543	52.34%	1.6035	17.27%	0.5290	11.86%	0.3634	4.87%	0.1492	6.35%	0.1945	1.42%	0.0435	3.02%	0.0927	0.03%	0.0009	1.84%	0.0564	0.95%	0.0292	0.04%	0.0012	0.00%	0.0000	0.01%	0.0004
Light Liquid	12.9618	56.7727	0.02%	0.0027	0.79%	0.1028	99.15%	12.8511	0.18%	0.0231	0.67%	0.0865	0.00%	0.0000	0.01%	0.0009	0.00%	0.0003	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Water/Oil	0.0000	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Heavy Liquid	0.0046	0.0201	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	100.00%	0.0046	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Total (lb/hr):	16.03			2.0222		0.6571		14.4546		0.5521		0.4499		0.1492		0.1954		0.0437		0.0927		0.0009		0.0564		0.0338		0.0012		0.0000		0.0004
Total (T/yr):	70.21			8.8572		2.8781		63.3111		2.4182		1.9706		0.6534		0.8557		0.1916		0.4058		0.0038		0.2469		0.1480		0.0053		0.0000		0.0019

^a An example calculation for propane follows:

Propane (lb/hr) = (PTE Total VOC, lb/hr) * (% Propane in VOC)

Propane (lb/hr) = (3.0638 lb/hr Total VOC) * (52.34% Propane in VOC)

Propane (lb/hr) = 1.6035 lb/hr Propane

FUGITIVE AREA 1 CLOSED VENT SYSTEM EQUIPMENT LEAKS TO FLARE
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

Stream	Uncontrolled VOC to Flare			Methane		Ethane		Propane		N-Butane		Isobutane		N-Pentane		Isopentane		n-Hexane		Other Hexanes		Benzene		Heptane		Octane+		Ethylbenzene		Toluene		Xylene	
	% in Stream	Hourly (lb/hr)	Annual (T/yr)	% in Stream	Hourly ^a (lb/hr)	% in Stream	Hourly ^a (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)		
Gas (Natural Gas)	20%	0.8844	3.8738	65.91%	2.9148	18.09%	0.8000	52.34%	0.4629	17.27%	0.1527	11.86%	0.1049	4.87%	0.0431	6.35%	0.0561	1.42%	0.0126	3.02%	0.0267	0.03%	0.0003	1.84%	0.0163	0.95%	0.0084	0.00%	0.0000	0.04%	0.0004	0.01%	0.0001
Light Liquid	100%	0.1052	0.4609	0.02%	0.0000	0.79%	0.0008	99.15%	0.1043	0.18%	0.0002	0.67%	0.0007	0.00%	0.0000	0.01%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Water/Oil	100%	0.0000	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Heavy Liquid	100%	0.0000	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Total (lb/hr):		0.99			2.9148		0.8008		0.5672		0.1529		0.1056		0.0431		0.0562		0.0126		0.0267		0.0003		0.0163		0.0084		0.0000		0.0004		0.0001
Total (T/yr):		4.33			12.7669		3.5077		2.4844		0.6696		0.4626		0.1886		0.2460		0.0550		0.1172		0.0011		0.0713		0.0369		0.0000		0.0015		0.0005

^a An example calculation of the emission rate to flare for methane follows:

$$\text{Methane (lb/hr)} = (\text{Uncontrolled VOC to Flare, lb/hr}) / (\% \text{ VOC in Stream}) * (\% \text{ Methane in Stream})$$

$$\text{Methane (lb/hr)} = (0.8844 \text{ lb/hr VOC}) / (20\% \text{ VOC}) * (65.91\% \text{ Methane})$$

$$\text{Methane (lb/hr)} = \boxed{2.9148 \text{ lb/hr Methane}}$$

^b An example calculation of the emission rate to flare for VOC constituents follows:

$$\text{Propane (lb/hr)} = (\text{Uncontrolled VOC to Flare, lb/hr}) * (\% \text{ Propane in VOC})$$

$$\text{Propane (lb/hr)} = (0.8844 \text{ lb/hr VOC}) * (52.34\% \text{ Propane})$$

$$\text{Propane (lb/hr)} = \boxed{0.4629 \text{ lb/hr Propane}}$$

FUGITIVE AREA 2 POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Component/Stream	Number of Components	Emission Factors ^a (kg/hr-component)	Operating Hours (hr/yr)	Maximum VOC		Maximum CH ₄		Uncontrolled PTE VOC		Reduction Credit ^a (%)	PTE VOC		PTE CO ₂		PTE Methane		PTE CO ₂ e Annual ^c (T/yr)	
				Content (%)	Content (%)	Content (%)	Content (%)	Hourly ^b (lb/hr)	Annual ^c (T/yr)		Hourly ^b (lb/hr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)		
<u>Valves</u>																		
Gas (Natural Gas)	2,546	0.0045	8,760	20%	1%	70%	5.0517	22.1263	0.2021	96%	0.8851	0.0443	3.0977	0.0443	0.8851	3.0977	77.49	
Light Liquid	4,123	0.0025	8,760	100%	0%	0%	22.7214	99.5196	1.1361	95%	4.9760	0.0000	0.0000	0.0000	4.9760	0.0000	0.00	
<u>Flanges</u>																		
Gas (Natural Gas)	1653	0.00039	8,760	20%	1%	70%	0.2842	1.2446	0.2842	0%	1.2446	0.0622	4.3562	0.0622	1.2446	4.3562	108.97	
Light Liquid	2,117	0.00011	8,760	100%	0%	0%	0.5133	2.2481	0.5133	0%	2.2481	0.0000	0.0000	0.0000	2.2481	0.0000	0.00	
<u>Relief Valves</u>																		
Gas (Natural Gas)	90	0.0088	8,760	20%	1%	70%	0.3492	1.5295	0.3492	0%	1.5295	0.0765	5.3534	0.0765	1.5295	5.3534	135.91	
Light Liquid	43	0.0075	8,760	100%	0%	0%	0.7027	3.0779	0.7027	0%	3.0779	0.0000	0.0000	0.0000	3.0779	0.0000	0.00	
<u>Compressor Seals</u>																		
Gas (Natural Gas)	10	0.0088	8,760	20%	1%	0%	0.0388	0.1699	0.0388	0%	0.1699	0.0085	0.0000	0.0085	0.1699	0.0000	0.01	
<u>Pump Seals^d</u>																		
Light Liquid	54	0.013	8,760	100%	0%	0%	1.5476	6.7787	0.1857	88%	0.8134	0.0000	0.0000	0.0000	0.8134	0.0000	0.00	
<u>Connectors^e</u>																		
Gas (Natural Gas)	12,609	0.0002	8,760	20%	1%	70%	1.1119	4.8700	0.2113	81%	0.9253	0.0463	3.2386	0.0463	0.9253	3.2386	81.01	
Light Liquid	14,331	0.00021	8,760	100%	0%	0%	6.6348	29.0605	1.2606	81%	5.5215	0.0000	0.0000	0.0000	5.5215	0.0000	0.00	
<u>Open-Ended Lines</u>																		
Gas (Natural Gas)	527	0.002	8,760	20%	1%	70%	0.4647	2.0355	0.4647	0%	2.0355	0.1018	7.1244	0.1018	2.0355	7.1244	178.21	
Light Liquid	834	0.0014	8,760	100%	0%	0%	2.5741	11.2746	2.5741	0%	11.2746	0.0000	0.0000	0.0000	11.2746	0.0000	0.00	
<u>Closed Vent System - Valves^f</u>																		
Gas (Natural Gas)	74	0.0045	8,760	20%	1%	70%	0.1468	0.6431	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	
Light Liquid	34	0.0025	8,760	100%	0%	0%	0.1874	0.8208	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	
<u>Closed Vent System - Flanges^f</u>																		
Gas (Natural Gas)	191	0.00039	8,760	20%	1%	70%	0.0328	0.1439	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	
Light Liquid	70	0.0001	8,760	100%	0%	0%	0.0154	0.0676	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	
<u>Closed Vent System - Connectors^f</u>																		
Gas (Natural Gas)	107	0.0002	8,760	20%	1%	70%	0.0094	0.0413	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	
Light Liquid	29	0.00021	8,760	100%	0%	0%	0.0134	0.0588	0.0000	100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	
TOTAL:											7.92	0.34	23.17	34.70	579.60			

^a Fugitive Emission Factors are per EPA document EPA-453/R-95-017; dated November 1995; pp.2-15. The emission factors are for total hydrocarbon. Reduction Credits are per EPA Leak Detection and Repair - A Best Practices Guide, Table 4.1 for refineries with a leak definition of 500 ppm.

^b Hourly VOC emissions are calculated as follows:

$$(2,546 \text{ components}) * (0.0045 \text{ kg/hr-component}) * (1 \text{ lb}/0.454 \text{ kg}) * (100\% \text{ VOC}) * (100\% - 96\% \text{ reduction credit}) = 0.2021 \text{ lb/hr}$$

^c Annual VOC emission rates are calculated as follows:

$$(0.2021 \text{ lb/hr}) * (8,760 \text{ hr/yr}) / (2,000 \text{ lb/T}) = 0.8851 \text{ T/yr}$$

^d Leakless pumps are not included in the pump count.

^e Sampling connections are included in this category, because all sampling utilizes inline analyzers (i.e., closed loop sampling), such that additional emissions per sample do not occur.

^f Closed vent system gas and light liquid components are vented to the Flare S1004A. Therefore, any leaks are routed to flare, and not to atmosphere as fugitive emissions (i.e., 100% control is taken). The Flare PTE calculation includes these potential leaks.

FUGITIVE AREA 2 POTENTIAL TO EMIT (SPECIATED)
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

Stream	PTE		Methane		Ethane		Propane		N-Butane		Isobutane		N-Pentane		Isopentane		n-Hexane		Other Hexanes		Benzene		Heptane		Octane+		Toluene		Ethylbenzene		Xylene	
	Hourly (lb/hr)	Annual (T/yr)	% in Stream	Hourly (lb/hr)	% in Stream	Hourly (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)		
Gas (Natural Gas)	1.5502	6.7900	65.91%	1.0218	18.09%	0.2805	52.34%	0.8113	17.27%	0.2677	11.86%	0.1839	4.87%	0.0755	6.35%	0.0984	1.42%	0.0220	3.02%	0.0469	0.03%	0.0004	1.84%	0.0285	0.95%	0.0148	0.04%	0.0006	0.00%	0.0000	0.01%	0.0002
Light Liquid	6.3725	27.9116	0.02%	0.0013	0.79%	0.0506	99.15%	6.3181	0.18%	0.0114	0.67%	0.0425	0.00%	0.0000	0.01%	0.0004	0.00%	0.0001	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Water/Oil	0.0000	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Heavy Liquid	0.0000	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Total (lb/hr):	7.92			1.0231		0.3310		7.1294		0.2790		0.2264		0.0755		0.0988		0.0221		0.0469		0.0004		0.0285		0.0148		0.0006		0.0000		0.0002
Total (T/yr):	34.70			4.4814		1.4498		31.2269		1.2221		0.9917		0.3306		0.4329		0.0969		0.2054		0.0019		0.1249		0.0647		0.0027		0.0000		0.0010

^a An example calculation for propane follows:

Propane (lb/hr) = (PTE Total VOC, lb/hr) * (% Propane in VOC)

Propane (lb/hr) = (1.5502 lb/hr Total VOC) * (52.34% Propane in VOC)

Propane (lb/hr) = 0.8113 lb/hr Propane

FUGITIVE AREA 2 CLOSED VENT SYSTEM EQUIPMENT LEAKS TO FLARE
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

Stream	Uncontrolled VOC to Flare			Methane		Ethane		Propane		N-Butane		Isobutane		N-Pentane		Isopentane		n-Hexane		Other Hexanes		Benzene		Heptane		Octane+		Ethylbenzene		Toluene		Xylene	
	% in Stream	Hourly (lb/hr)	Annual (T/yr)	% in Stream	Hourly ^a (lb/hr)	% in Stream	Hourly ^a (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)	% in VOC	Hourly ^b (lb/hr)
Gas (Natural Gas)	20%	0.1891	0.8283	65.91%	0.6232	18.09%	0.1711	52.34%	0.0990	17.27%	0.0326	11.86%	0.0224	4.87%	0.0092	6.35%	0.0120	1.42%	0.0027	3.02%	0.0057	0.03%	0.0001	1.84%	0.0035	0.95%	0.0018	0.00%	0.0000	0.04%	0.0001	0.01%	0.0000
Light Liquid	100%	0.2163	0.9472	0.02%	0.0000	0.79%	0.0017	99.15%	0.2144	0.18%	0.0004	0.67%	0.0014	0.00%	0.0000	0.01%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Water/Oil	100%	0.0000	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Heavy Liquid	100%	0.0000	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Total (lb/hr):		0.41			0.6233		0.1728		0.3134		0.0330		0.0239		0.0092		0.0120		0.0027		0.0057		0.0001		0.0035		0.0018		0.0000		0.0001		0.0000
Total (T/yr):		1.78			2.7300		0.7568		1.3726		0.1447		0.1046		0.0403		0.0526		0.0118		0.0251		0.0002		0.0152		0.0079		0.0000		0.0003		0.0001

^a An example calculation of the emission rate to flare for methane follows:

$$\text{Methane (lb/hr)} = (\text{Uncontrolled VOC to Flare, lb/hr}) / (\% \text{ VOC in Stream}) * (\% \text{ Methane in Stream})$$

$$\text{Methane (lb/hr)} = (0.1891 \text{ lb/hr VOC}) / (20\% \text{ VOC}) * (65.91\% \text{ Methane})$$

$$\text{Methane (lb/hr)} = \boxed{0.6232 \text{ lb/hr Methane}}$$

^b An example calculation of the emission rate to flare for VOC constituents follows:

$$\text{Propane (lb/hr)} = (\text{Uncontrolled VOC to Flare, lb/hr}) * (\% \text{ Propane in VOC})$$

$$\text{Propane (lb/hr)} = (0.1891 \text{ lb/hr VOC}) * (52.34\% \text{ Propane})$$

$$\text{Propane (lb/hr)} = \boxed{0.0990 \text{ lb/hr Propane}}$$

CLOSED VENT SYSTEM FEED RATE TO FLARE
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Point ID	Flare	P004A				
Component	Component LHV (Btu/lb)	Uncontrolled Emissions From Area 2 Closed Vent System		Flare DRE (%)	Potential to Emit ^d	
		Leaks ^a			Hourly (lb/hr)	Annual (T/yr)
		Hourly (lb/hr)	Annual (T/yr)			
Methane	21,502	0.6233	2.7300	99%	0.0062	0.0273
Ethane	20,416	0.1728	0.7568	99%	0.0017	0.0076
Propane	19,929	0.3134	1.3726	98%	0.0063	0.0275
i-Butane	19,614	0.0239	0.1046	98%	0.0005	0.0021
n-Butane	19,665	0.0330	0.1447	98%	0.0007	0.0029
i-Pentane	19,451	0.0120	0.0526	98%	0.0002	0.0011
n-Pentane	19,499	0.0092	0.0403	98%	0.0002	0.0008
n-Hexane	19,391	0.0027	0.0118	98%	0.0001	0.0002
Other Hexanes	19,147	0.0057	0.0251	98%	0.0001	0.0005
Benzene	18,000	0.0001	0.0002	98%	0.0000	0.0000
Heptane	19,163	0.0035	0.0152	98%	0.0001	0.0003
Octane	19,104	0.0018	0.0079	98%	0.0000	0.0002
Toluene	18,501	0.0001	0.0003	98%	0.0000	0.0000
Ethylbenzene	17,780	0.0000	0.0000	98%	0.0000	0.0000
Xylene	18,410	0.0000	0.0001	98%	0.0000	0.0000
TOTAL:	20,785	1.20	5.26		0.02	0.07
TOTAL VOC:		0.41	1.78		0.01	0.04
TOTAL HAPs:		0.003	0.01		0.0001	0.0002

Component	Component LHV (Btu/lb)	Uncontrolled Emissions From Area 1 Closed Vent System		Uncontrolled Emissions from Cryo Plants Closed Vent		Flare DRE (%)	Potential to Emit ^d	
		Leaks ^b		Systems ^c			Hourly (lb/hr)	Annual (T/yr)
		Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)			
Methane	21,502	2.9148	12.7669	14.5741	63.8346	99%	0.1749	0.7660
Ethane	20,416	0.8008	3.5077	4.0042	17.5385	99%	0.0481	0.2105
Propane	19,929	0.5672	2.4844	2.8360	12.4218	98%	0.0681	0.2981
i-Butane	19,614	0.1056	0.4626	0.5281	2.3130	98%	0.0127	0.0555
n-Butane	19,665	0.1529	0.6696	0.7644	3.3482	98%	0.0183	0.0804
i-Pentane	19,451	0.0562	0.2460	0.2808	1.2298	98%	0.0067	0.0295
n-Pentane	19,499	0.0431	0.1886	0.2153	0.9430	98%	0.0052	0.0226
n-Hexane	19,391	0.0126	0.0550	0.0628	0.2750	98%	0.0015	0.0066
Other Hexanes	19,147	0.0267	0.1172	0.1337	0.5858	98%	0.0032	0.0141
Benzene	18,000	0.0003	0.0011	0.0013	0.0055	98%	0.0000	0.0001
Ethyl Mercaptan	20,416	0.0000	0.0000	0.0000	0.0000	98%	0.0000	0.0000
Heptane	19,163	0.0163	0.0713	0.0813	0.3563	98%	0.0020	0.0086
Octane	19,104	0.0084	0.0369	0.0421	0.1845	98%	0.0010	0.0044
Toluene	18,501	0.0004	0.0015	0.0018	0.0077	98%	0.0000	0.0002
Ethylbenzene	17,780	0.0000	0.0000	0.0000	0.0000	98%	0.0000	0.0000
Xylene	18,410	0.0001	0.0005	0.0006	0.0027	98%	0.0000	0.0001
TOTAL:	20,951	4.71	20.61	23.53	103.05		0.34	1.50
TOTAL VOC:		0.99	4.33	4.95	21.67		0.12	0.52
TOTAL HAPs:		0.01	0.06	0.07	0.29		0.002	0.01

^a Please refer to the calculation sheet "Fug Area 2 Closed Vent System Equipment Leaks to Flare."

^b Please refer to the calculation sheet "Fug Area 1 Closed Vent System Equipment Leaks to Flare."

^c To account for the Closed Vent System on fugitive area 3, and proposed fugitive areas 4, 5, 6, and 7, the uncontrolled emissions from Area 1 have been multiplied by 5 to account for the additional cryo plants.

^d An example calculation for Potential to Emit Ethane follows:

$$\text{Ethane PTE (lb/hr)} = (\text{Uncontrolled PRV Equipment Leaks, lb/hr}) * (1 - \text{Flare DRE, wt\%})$$

$$\text{Ethane PTE (lb/hr)} = (0.1728 \text{ lb/hr}) * (1 - 99\%)$$

$$\text{Ethane PTE (lb/hr)} = \boxed{0.0017}$$

FUGITIVE AREA 3 POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Component	Number of Components	Emission Factors ^a (kg/hr-component)	Operating Hours (hr/yr)	Maximum VOC (wt%)	Maximum CO ₂ (wt%)	Maximum CH ₄ (wt%)	Reduction Credit ^a (%)	PTE VOC		PTE CO ₂		PTE Methane		PTE CO ₂ e	
								Hourly ^b (lb/hr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)		
<u>Valves</u>															
Gas Streams	1,605	0.0045	8,760	20%	1%	70%	96%	0.1274	0.5579	2.79E-02	1.95E+00	48.8474			
Gas Stream (Propane)	34	0.0045	8,760	100%	0%	0%	96%	0.0135	0.0591	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	1,625	0.0025	8,760	100%	0%	0%	95%	0.4478	1.9614	0.00E+00	0.00E+00	0.0000			
<u>Relief Valves</u>															
Gas Streams	52	0.0088	8,760	20%	1%	70%	0%	0.2018	0.8837	4.42E-02	3.09E+00	77.3713			
Gas Stream (Propane)	9	0.0088	8,760	100%	0%	0%	0%	0.1746	0.7648	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	45	0.0075	8,760	100%	0%	0%	0%	0.7441	3.2590	0.00E+00	0.00E+00	0.0000			
<u>Compressor Seals</u>															
Gas Streams	5	0.0088	8,760	20%	1%	70%	0%	0.0194	0.0850	4.25E-03	2.97E-01	7.4395			
Gas Stream (Propane)	4	0.0088	8,760	100%	0%	0%	0%	0.0776	0.3399	0.00E+00	0.00E+00	0.0000			
<u>Pump Seals</u>															
Light Liquid Stream	15	0.013	8,760	100%	0%	0%	88%	0.0516	0.2260	0.00E+00	0.00E+00	0.0000			
<u>Flanges</u>															
Gas Streams	1,311	0.00039	8,760	20%	1%	70%	0%	0.2254	0.9874	4.94E-02	3.46E+00	86.4492			
Gas Stream (Propane)	110	0.00039	8,760	100%	0%	0%	0%	0.0946	0.4143	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	846	0.00011	8,760	100%	0%	0%	0%	0.2052	0.8986	0.00E+00	0.00E+00	0.0000			
<u>Connectors</u>															
Gas Streams	4,475	0.0002	8,760	20%	1%	70%	81%	0.0750	0.3284	1.64E-02	1.15E+00	28.7522			
Gas Stream (Propane)	304	0.0002	8,760	100%	0%	0%	81%	0.0255	0.1115	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	6,976	0.00021	8,760	100%	0%	0%	81%	0.6136	2.6877	0.00E+00	0.00E+00	0.0000			
Gas Streams:								0.6490	2.8425	0.1421	9.9487	248.8597			
Gas Stream (Propane):								0.3857	1.6896	0.0000	0.0000	0.0000			
Light Liquid Stream:								2.0623	9.0327	0.0000	0.0000	0.0000			
TOTALS:								3.10	13.56	0.14	9.95	248.86			

^a Fugitive Emission Factors are per EPA document EPA-453/R-95-017; dated November 1995; pp.2-15. The emission factors are for total hydrocarbon. Reduction Credits are per EPA Leak Detection and Repair - A Best Practices Guide, Table 4.1 for refineries with a leak definition of 500 ppm.

^b Hourly VOC emission rates are calculated as follows:
(1,605 components) * (0.0045 kg/hr-component) * (1 lb/0.454 kg) * (20% VOC) * (100% - 96% reduction credit) = 0.1274 lb/hr

^c Annual VOC emission rates are calculated as follows:
(1,605 components) * (0.0045 kg/hr-component) * (1 lb/0.454 kg) * (8,760 hr/yr) * (20% VOC) * (100% - 96% reduction credit) / (2,000 lb/T) = 0.5579 T/yr

FUGITIVE AREA 3 POTENTIAL TO EMIT (SPECIATED)
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

Stream	PTE		Methane		Ethane		Propane		N-Butane		Isobutane		N-Pentane		Isopentane		n-Hexane		Other Hexanes		Benzene		Heptane		Octane+		Toluene		Ethylbenzene		Xylene	
	Hourly (lb/hr)	Annual (T/yr)	% in Stream	Hourly (lb/hr)	% in Stream	Hourly (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)		
Gas (Natural Gas)	0.6490	2.8425	65.91%	0.4278	18.09%	0.1174	52.34%	0.3397	17.27%	0.1120	11.86%	0.0770	4.87%	0.0316	6.35%	0.0412	1.42%	0.0092	3.02%	0.0196	0.03%	0.0002	1.84%	0.0119	0.95%	0.0062	0.04%	0.0003	0.00%	0.0000	0.01%	0.0001
Gas (Propane)	0.3857	1.6896	0.02%	0.0001	0.79%	0.0031	99.15%	0.3825	0.18%	0.0007	0.67%	0.0026	0.00%	0.0000	0.01%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Light Liquid	2.0623	9.0327	0.02%	0.0004	0.79%	0.0164	99.15%	2.0446	0.18%	0.0037	0.67%	0.0138	0.00%	0.0000	0.01%	0.0001	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Total (lb/hr):	3.10			0.4283		0.1368		2.7667		0.1164		0.0933		0.0316		0.0414		0.0093		0.0196		0.0002		0.0119		0.0062		0.0003		0.0000		0.0001
Total (T/yr):	13.56			1.8758		0.5993		12.1184		0.5099		0.4087		0.1384		0.1812		0.0406		0.0860		0.0008		0.0523		0.0271		0.0011		0.0000		0.0004

^a An example calculation for propane follows:

Propane (lb/hr) = (PTE Total VOC, lb/hr) * (% Propane in VOC)

Propane (lb/hr) = (0.6490 lb/hr Total VOC) * (52.34% Propane in VOC)

Propane (lb/hr) = 0.3397 lb/hr Propane

FUGITIVE AREA 4 POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Component	Number of Components	Emission Factors ^a (kg/hr-component)	Operating Hours (hr/yr)	Maximum VOC (wt%)	Maximum CO ₂ (wt%)	Maximum CH ₄ (wt%)	Reduction Credit ^a (%)	PTE VOC		PTE CO ₂		PTE Methane		PTE CO ₂ e	
								Hourly ^b (lb/hr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)		
Valves															
Gas Streams	2,350	0.0045	8,760	20%	1%	70%	96%	0.1865	0.8169	4.08E-02	2.86E+00	71.5211			
Gas Stream (Propane)	134	0.0045	8,760	100%	0%	0%	96%	0.0532	0.2329	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	1,625	0.0025	8,760	100%	0%	0%	95%	0.4478	1.9614	0.00E+00	0.00E+00	0.0000			
Relief Valves															
Gas Streams	96	0.0088	8,760	20%	1%	70%	0%	0.3725	1.6315	8.16E-02	5.71E+00	142.8393			
Gas Stream (Propane)	9	0.0088	8,760	100%	0%	0%	0%	0.1746	0.7648	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	45	0.0075	8,760	100%	0%	0%	0%	0.7441	3.2590	0.00E+00	0.00E+00	0.0000			
Compressor Seals															
Gas Streams	5	0.0088	8,760	20%	1%	70%	0%	0.0194	0.0850	4.25E-03	2.97E-01	7.4395			
Gas Stream (Propane)	23	0.0088	8,760	100%	0%	0%	0%	0.4462	1.9544	0.00E+00	0.00E+00	0.0000			
Pump Seals															
Light Liquid Stream	17	0.013	8,760	100%	0%	0%	88%	0.0585	0.2561	0.00E+00	0.00E+00	0.0000			
Flanges															
Gas Streams	1,871	0.00039	8,760	20%	1%	70%	0%	0.3217	1.4092	7.05E-02	4.93E+00	123.3765			
Gas Stream (Propane)	110	0.00039	8,760	100%	0%	0%	0%	0.0946	0.4143	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	846	0.00011	8,760	100%	0%	0%	0%	0.2052	0.8986	0.00E+00	0.00E+00	0.0000			
Connectors															
Gas Streams	7,570	0.0002	8,760	20%	1%	70%	81%	0.1268	0.5555	2.78E-02	1.94E+00	48.6377			
Gas Stream (Propane)	525	0.0002	8,760	100%	0%	0%	81%	0.0440	0.1926	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	6,976	0.00021	8,760	100%	0%	0%	81%	0.6136	2.6877	0.00E+00	0.00E+00	0.0000			
Gas Streams:								1.0270	4.4982	0.2249	15.7436	393.8142			
Gas Stream (Propane):								0.8126	3.5590	0.0000	0.0000	0.0000			
Light Liquid Stream:								2.0691	9.0628	0.0000	0.0000	0.0000			
TOTALS:								3.91	17.12	0.22	15.74	393.81			

^a Fugitive Emission Factors are per EPA document EPA-453/R-95-017; dated November 1995; pp.2-15. The emission factors are for total hydrocarbon. Reduction Credits are per EPA Leak Detection and Repair - A Best Practices Guide, Table 4.1 for refineries with a leak definition of 500 ppm.

^b Hourly VOC emission rates are calculated as follows:

$$(2,350 \text{ components}) * (0.0045 \text{ kg/hr-component}) * (1 \text{ lb}/0.454 \text{ kg}) * (20\% \text{ VOC}) * (100\% - 96\% \text{ reduction credit}) = 0.1865 \text{ lb/hr}$$

^c Annual VOC emission rates are calculated as follows:

$$(2,350 \text{ components}) * (0.0045 \text{ kg/hr-component}) * (1 \text{ lb}/0.454 \text{ kg}) * (8,760 \text{ hr/yr}) * (20\% \text{ VOC}) * (100\% - 96\% \text{ reduction credit}) / (2,000 \text{ lb/T}) = 0.8169 \text{ T/yr}$$

FUGITIVE AREA 4 POTENTIAL TO EMIT (SPECIATED)
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

Stream	PTE		Methane		Ethane		Propane		N-Butane		Isobutane		N-Pentane		Isopentane		n-Hexane		Other Hexanes		Benzene		Heptane		Octane+		Toluene		Ethylbenzene		Xylene	
	Hourly	Annual	% in	Hourly	% in	Hourly	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a	% in	Hourly ^a
	(lb/hr)	(T/yr)	Stream	(lb/hr)	Stream	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)	VOC	(lb/hr)
Gas (Natural Gas)	1.0270	4.4982	65.91%	0.6769	18.09%	0.1858	52.34%	0.5375	17.27%	0.1773	11.86%	0.1218	4.87%	0.0500	6.35%	0.0652	1.42%	0.0146	3.02%	0.0311	0.03%	0.0003	1.84%	0.0189	0.95%	0.0098	0.04%	0.0004	0.00%	0.0000	0.01%	0.0001
Gas (Propane)	0.8126	3.5590	0.02%	0.0002	0.79%	0.0064	99.15%	0.8056	0.18%	0.0014	0.67%	0.0054	0.00%	0.0000	0.01%	0.0001	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Light Liquid	2.0691	9.0628	0.02%	0.0004	0.79%	0.0164	99.15%	2.0515	0.18%	0.0037	0.67%	0.0138	0.00%	0.0000	0.01%	0.0001	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Total (lb/hr):	3.91			0.6775		0.2087		3.3946		0.1825		0.1411		0.0500		0.0654		0.0146		0.0311		0.0003		0.0189		0.0098		0.0004		0.0000		0.0001
Total (T/yr):	17.12			2.9676		0.9139		14.8682		0.7991		0.6178		0.2190		0.2864		0.0641		0.1360		0.0013		0.0827		0.0429		0.0018		0.0000		0.0006

^a An example calculation for propane follows:

Propane (lb/hr) = (PTE Total VOC, lb/hr) * (% Propane in VOC)

Propane (lb/hr) = (1.0270 lb/hr Total VOC) * (52.34% Propane in VOC)

Propane (lb/hr) = 0.5375 lb/hr Propane

FUGITIVE AREA 5 POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Component	Number of Components	Emission Factors ^a (kg/hr-component)	Operating Hours (hr/yr)	Maximum VOC (wt%)	Maximum CO ₂ (wt%)	Maximum CH ₄ (wt%)	Reduction Credit ^a (%)	PTE VOC		PTE CO ₂		PTE Methane		PTE CO ₂ e	
								Hourly ^b (lb/hr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)		
Valves															
Gas Streams	1,605	0.0045	8,760	20%	1%	70%	96%	0.1274	0.5579	2.79E-02	1.95E+00	48.8474			
Gas Stream (Propane)	34	0.0045	8,760	100%	0%	0%	96%	0.0135	0.0591	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	1,625	0.0025	8,760	100%	0%	0%	95%	0.4478	1.9614	0.00E+00	0.00E+00	0.0000			
Relief Valves															
Gas Streams	52	0.0088	8,760	20%	1%	70%	0%	0.2018	0.8837	4.42E-02	3.09E+00	77.3713			
Gas Stream (Propane)	9	0.0088	8,760	100%	0%	0%	0%	0.1746	0.7648	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	45	0.0075	8,760	100%	0%	0%	0%	0.7441	3.2590	0.00E+00	0.00E+00	0.0000			
Compressor Seals															
Gas Streams	5	0.0088	8,760	20%	1%	70%	0%	0.0194	0.0850	4.25E-03	2.97E-01	7.4395			
Gas Stream (Propane)	4	0.0088	8,760	100%	0%	0%	0%	0.0776	0.3399	0.00E+00	0.00E+00	0.0000			
Pump Seals															
Light Liquid Stream	15	0.013	8,760	100%	0%	0%	88%	0.0516	0.2260	0.00E+00	0.00E+00	0.0000			
Flanges															
Gas Streams	1,311	0.00039	8,760	20%	1%	70%	0%	0.2254	0.9874	4.94E-02	3.46E+00	86.4492			
Gas Stream (Propane)	110	0.00039	8,760	100%	0%	0%	0%	0.0946	0.4143	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	846	0.00011	8,760	100%	0%	0%	0%	0.2052	0.8986	0.00E+00	0.00E+00	0.0000			
Connectors															
Gas Streams	4,475	0.0002	8,760	20%	1%	70%	81%	0.0750	0.3284	1.64E-02	1.15E+00	28.7522			
Gas Stream (Propane)	304	0.0002	8,760	100%	0%	0%	81%	0.0255	0.1115	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	6,976	0.00021	8,760	100%	0%	0%	81%	0.6136	2.6877	0.00E+00	0.00E+00	0.0000			
								Gas Streams:		0.6490		2.8425		9.9487	
								Gas Stream (Propane):		0.3857		1.6896		0.0000	
								Light Liquid Stream:		2.0623		9.0327		0.0000	
								TOTALS:		3.10		13.56		9.95	

^a Fugitive Emission Factors are per EPA document EPA-453/R-95-017; dated November 1995; pp.2-15. The emission factors are for total hydrocarbon. Reduction Credits are per EPA Leak Detection and Repair - A Best Practices Guide, Table 4.1 for refineries with a leak definition of 500 ppm.

^b Hourly VOC emission rates are calculated as follows:
(1,605 components) * (0.0045 kg/hr-component) * (1 lb/0.454 kg) * (20% VOC) * (100% - 96% reduction credit) = 0.1274 lb/hr

^c Annual VOC emission rates are calculated as follows:
(1,605 components) * (0.0045 kg/hr-component) * (1 lb/0.454 kg) * (8,760 hr/yr) * (20% VOC) * (100% - 96% reduction credit) / (2,000 lb/T) = 0.5579 T/yr

FUGITIVE AREA 5 POTENTIAL TO EMIT (SPECIATED)
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

Stream	PTE		Methane		Ethane		Propane		N-Butane		Isobutane		N-Pentane		Isopentane		n-Hexane		Other Hexanes		Benzene		Heptane		Octane+		Toluene		Ethylbenzene		Xylene	
	Hourly (lb/hr)	Annual (T/yr)	% in Stream	Hourly (lb/hr)	% in Stream	Hourly (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)		
Gas (Natural Gas)	0.6490	2.8425	65.91%	0.4278	18.09%	0.1174	52.34%	0.3397	17.27%	0.1120	11.86%	0.0770	4.87%	0.0316	6.35%	0.0412	1.42%	0.0092	3.02%	0.0196	0.03%	0.0002	1.84%	0.0119	0.95%	0.0062	0.04%	0.0003	0.00%	0.0000	0.01%	0.0001
Gas (Propane)	0.3857	1.6896	0.02%	0.0001	0.79%	0.0031	99.15%	0.3825	0.18%	0.0007	0.67%	0.0026	0.00%	0.0000	0.01%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Light Liquid	2.0623	9.0327	0.02%	0.0004	0.79%	0.0164	99.15%	2.0446	0.18%	0.0037	0.67%	0.0138	0.00%	0.0000	0.01%	0.0001	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Total (lb/hr):	3.10			0.4283		0.1368		2.7667		0.1164		0.0933		0.0316		0.0414		0.0093		0.0196		0.0002		0.0119		0.0062		0.0003		0.0000		0.0001
Total (T/yr):	13.56			1.8758		0.5993		12.1184		0.5099		0.4087		0.1384		0.1812		0.0406		0.0860		0.0008		0.0523		0.0271		0.0011		0.0000		0.0004

^a An example calculation for propane follows:

Propane (lb/hr) = (PTE Total VOC, lb/hr) * (% Propane in VOC)

Propane (lb/hr) = (0.6490 lb/hr Total VOC) * (52.34% Propane in VOC)

Propane (lb/hr) = 0.3397 lb/hr Propane

FUGITIVE AREA 6 POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Component	Number of Components	Emission Factors ^a (kg/hr-component)	Operating Hours (hr/yr)	Maximum VOC (wt%)	Maximum CO ₂ (wt%)	Maximum CH ₄ (wt%)	Reduction Credit ^a (%)	PTE VOC		PTE CO ₂		PTE Methane		PTE CO ₂ e	
								Hourly ^b (lb/hr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)		
<u>Valves</u>															
Gas Streams	1,605	0.0045	8,760	20%	1%	70%	96%	0.1274	0.5579	2.79E-02	1.95E+00	48.8474			
Gas Stream (Propane)	34	0.0045	8,760	100%	0%	0%	96%	0.0135	0.0591	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	1,625	0.0025	8,760	100%	0%	0%	95%	0.4478	1.9614	0.00E+00	0.00E+00	0.0000			
<u>Relief Valves</u>															
Gas Streams	52	0.0088	8,760	20%	1%	70%	0%	0.2018	0.8837	4.42E-02	3.09E+00	77.3713			
Gas Stream (Propane)	9	0.0088	8,760	100%	0%	0%	0%	0.1746	0.7648	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	45	0.0075	8,760	100%	0%	0%	0%	0.7441	3.2590	0.00E+00	0.00E+00	0.0000			
<u>Compressor Seals</u>															
Gas Streams	5	0.0088	8,760	20%	1%	70%	0%	0.0194	0.0850	4.25E-03	2.97E-01	7.4395			
Gas Stream (Propane)	4	0.0088	8,760	100%	0%	0%	0%	0.0776	0.3399	0.00E+00	0.00E+00	0.0000			
<u>Pump Seals</u>															
Light Liquid Stream	15	0.013	8,760	100%	0%	0%	88%	0.0516	0.2260	0.00E+00	0.00E+00	0.0000			
<u>Flanges</u>															
Gas Streams	1,311	0.00039	8,760	20%	1%	70%	0%	0.2254	0.9874	4.94E-02	3.46E+00	86.4492			
Gas Stream (Propane)	110	0.00039	8,760	100%	0%	0%	0%	0.0946	0.4143	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	846	0.00011	8,760	100%	0%	0%	0%	0.2052	0.8986	0.00E+00	0.00E+00	0.0000			
<u>Connectors</u>															
Gas Streams	4,475	0.0002	8,760	20%	1%	70%	81%	0.0750	0.3284	1.64E-02	1.15E+00	28.7522			
Gas Stream (Propane)	304	0.0002	8,760	100%	0%	0%	81%	0.0255	0.1115	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	6,976	0.00021	8,760	100%	0%	0%	81%	0.6136	2.6877	0.00E+00	0.00E+00	0.0000			
Gas Streams:								0.6490	2.8425	0.1421	9.9487	248.8597			
Gas Stream (Propane):								0.3857	1.6896	0.0000	0.0000	0.0000			
Light Liquid Stream:								2.0623	9.0327	0.0000	0.0000	0.0000			
TOTALS:								3.10	13.56	0.14	9.95	248.86			

^a Fugitive Emission Factors are per EPA document EPA-453/R-95-017; dated November 1995; pp.2-15. The emission factors are for total hydrocarbon. Reduction Credits are per EPA Leak Detection and Repair - A Best Practices Guide, Table 4.1 for refineries with a leak definition of 500 ppm.

^b Hourly VOC emission rates are calculated as follows:
(1,605 components) * (0.0045 kg/hr-component) * (1 lb/0.454 kg) * (20% VOC) * (100% - 96% reduction credit) = 0.1274 lb/hr

^c Annual VOC emission rates are calculated as follows:
(1,605 components) * (0.0045 kg/hr-component) * (1 lb/0.454 kg) * (8,760 hr/yr) * (20% VOC) * (100% - 96% reduction credit) / (2,000 lb/T) = 0.5579 T/yr

FUGITIVE AREA 6 POTENTIAL TO EMIT (SPECIATED)
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

Stream	PTE		Methane		Ethane		Propane		N-Butane		Isobutane		N-Pentane		Isopentane		n-Hexane		Other Hexanes		Benzene		Heptane		Octane+		Toluene		Ethylbenzene		Xylene	
	Hourly (lb/hr)	Annual (T/yr)	% in Stream	Hourly (lb/hr)	% in Stream	Hourly (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)		
Gas (Natural Gas)	0.6490	2.8425	65.91%	0.4278	18.09%	0.1174	52.34%	0.3397	17.27%	0.1120	11.86%	0.0770	4.87%	0.0316	6.35%	0.0412	1.42%	0.0092	3.02%	0.0196	0.03%	0.0002	1.84%	0.0119	0.95%	0.0062	0.04%	0.0003	0.00%	0.0000	0.01%	0.0001
Gas (Propane)	0.3857	1.6896	0.02%	0.0001	0.79%	0.0031	99.15%	0.3825	0.18%	0.0007	0.67%	0.0026	0.00%	0.0000	0.01%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Light Liquid	2.0623	9.0327	0.02%	0.0004	0.79%	0.0164	99.15%	2.0446	0.18%	0.0037	0.67%	0.0138	0.00%	0.0000	0.01%	0.0001	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Total (lb/hr):	3.10			0.4283		0.1368		2.7667		0.1164		0.0933		0.0316		0.0414		0.0093		0.0196		0.0002		0.0119		0.0062		0.0003		0.0000		0.0001
Total (T/yr):	13.56			1.8758		0.5993		12.1184		0.5099		0.4087		0.1384		0.1812		0.0406		0.0860		0.0008		0.0523		0.0271		0.0011		0.0000		0.0004

^a An example calculation for propane follows:

Propane (lb/hr) = (PTE Total VOC, lb/hr) * (% Propane in VOC)

Propane (lb/hr) = (0.6490 lb/hr Total VOC) * (52.34% Propane in VOC)

Propane (lb/hr) = 0.3397 lb/hr Propane

FUGITIVE AREA 7 POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Component	Number of Components	Emission Factors ^a (kg/hr-component)	Operating Hours (hr/yr)	Maximum VOC (wt%)	Maximum CO ₂ (wt%)	Maximum CH ₄ (wt%)	Reduction Credit ^a (%)	PTE VOC		PTE CO ₂		PTE Methane		PTE CO ₂ e	
								Hourly ^b (lb/hr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)	Annual ^c (T/yr)		
<u>Valves</u>															
Gas Streams	1,605	0.0045	8,760	20%	1%	70%	96%	0.1274	0.5579	2.79E-02	1.95E+00	48.8474			
Gas Stream (Propane)	34	0.0045	8,760	100%	0%	0%	96%	0.0135	0.0591	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	1,625	0.0025	8,760	100%	0%	0%	95%	0.4478	1.9614	0.00E+00	0.00E+00	0.0000			
<u>Relief Valves</u>															
Gas Streams	52	0.0088	8,760	20%	1%	70%	0%	0.2018	0.8837	4.42E-02	3.09E+00	77.3713			
Gas Stream (Propane)	9	0.0088	8,760	100%	0%	0%	0%	0.1746	0.7648	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	45	0.0075	8,760	100%	0%	0%	0%	0.7441	3.2590	0.00E+00	0.00E+00	0.0000			
<u>Compressor Seals</u>															
Gas Streams	5	0.0088	8,760	20%	1%	70%	0%	0.0194	0.0850	4.25E-03	2.97E-01	7.4395			
Gas Stream (Propane)	4	0.0088	8,760	100%	0%	0%	0%	0.0776	0.3399	0.00E+00	0.00E+00	0.0000			
<u>Pump Seals</u>															
Light Liquid Stream	15	0.013	8,760	100%	0%	0%	88%	0.0516	0.2260	0.00E+00	0.00E+00	0.0000			
<u>Flanges</u>															
Gas Streams	1,311	0.00039	8,760	20%	1%	70%	0%	0.2254	0.9874	4.94E-02	3.46E+00	86.4492			
Gas Stream (Propane)	110	0.00039	8,760	100%	0%	0%	0%	0.0946	0.4143	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	846	0.00011	8,760	100%	0%	0%	0%	0.2052	0.8986	0.00E+00	0.00E+00	0.0000			
<u>Connectors</u>															
Gas Streams	4,475	0.0002	8,760	20%	1%	70%	81%	0.0750	0.3284	1.64E-02	1.15E+00	28.7522			
Gas Stream (Propane)	304	0.0002	8,760	100%	0%	0%	81%	0.0255	0.1115	0.00E+00	0.00E+00	0.0000			
Light Liquid Stream	6,976	0.00021	8,760	100%	0%	0%	81%	0.6136	2.6877	0.00E+00	0.00E+00	0.0000			
								Gas Streams:		0.1421		9.9487		248.8597	
								Gas Stream (Propane):		0.0000		0.0000		0.0000	
								Light Liquid Stream:		0.0000		0.0000		0.0000	
								TOTALS:		3.10		13.56		9.95	

^a Fugitive Emission Factors are per EPA document EPA-453/R-95-017; dated November 1995; pp.2-15. The emission factors are for total hydrocarbon. Reduction Credits are per EPA Leak Detection and Repair - A Best Practices Guide, Table 4.1 for refineries with a leak definition of 500 ppm.

^b Hourly VOC emission rates are calculated as follows:
(1,605 components) * (0.0045 kg/hr-component) * (1 lb/0.454 kg) * (20% VOC) * (100% - 96% reduction credit) = 0.1274 lb/hr

^c Annual VOC emission rates are calculated as follows:
(1,605 components) * (0.0045 kg/hr-component) * (1 lb/0.454 kg) * (8,760 hr/yr) * (20% VOC) * (100% - 96% reduction credit) / (2,000 lb/T) = 0.5579 T/yr

FUGITIVE AREA 7 POTENTIAL TO EMIT (SPECIATED)
 AIR PERMIT APPLICATION
 NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
 BLUE RACER MIDSTREAM, LLC

Stream	PTE		Methane		Ethane		Propane		N-Butane		Isobutane		N-Pentane		Isopentane		n-Hexane		Other Hexanes		Benzene		Heptane		Octane+		Toluene		Ethylbenzene		Xylene	
	Hourly (lb/hr)	Annual (T/yr)	% in Stream	Hourly (lb/hr)	% in Stream	Hourly (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)	% in VOC	Hourly ^a (lb/hr)		
Gas (Natural Gas)	0.6490	2.8425	65.91%	0.4278	18.09%	0.1174	52.34%	0.3397	17.27%	0.1120	11.86%	0.0770	4.87%	0.0316	6.35%	0.0412	1.42%	0.0092	3.02%	0.0196	0.03%	0.0002	1.84%	0.0119	0.95%	0.0062	0.04%	0.0003	0.00%	0.0000	0.01%	0.0001
Gas (Propane)	0.3857	1.6896	0.02%	0.0001	0.79%	0.0031	99.15%	0.3825	0.18%	0.0007	0.67%	0.0026	0.00%	0.0000	0.01%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Light Liquid	2.0623	9.0327	0.02%	0.0004	0.79%	0.0164	99.15%	2.0446	0.18%	0.0037	0.67%	0.0138	0.00%	0.0000	0.01%	0.0001	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000	0.00%	0.0000
Total (lb/hr):	3.10			0.4283		0.1368		2.7667		0.1164		0.0933		0.0316		0.0414		0.0093		0.0196		0.0002		0.0119		0.0062		0.0003		0.0000		0.0001
Total (T/yr):	13.56			1.8758		0.5993		12.1184		0.5099		0.4087		0.1384		0.1812		0.0406		0.0860		0.0008		0.0523		0.0271		0.0011		0.0000		0.0004

^a An example calculation for propane follows:

Propane (lb/hr) = (PTE Total VOC, lb/hr) * (% Propane in VOC)

Propane (lb/hr) = (0.6490 lb/hr Total VOC) * (52.34% Propane in VOC)

Propane (lb/hr) = 0.3397 lb/hr Propane

GLYCOL DEHYDRATOR POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Control Device Efficiency	
Flash Tank	98%
Condenser Vent	98%

Component	Emission Unit ID S006					
	Regenerator Emissions		Flash Tank Emissions		Total Emissions	
	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)
Carbon Dioxide	0.0400	0.1754	0.0462	0.2024	0.0862	0.3777
Nitrogen	0.0007	0.0032	0.0117	0.0511	0.0124	0.0543
Hydrogen Sulfide	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Methane	0.0959	0.4199	1.3986	6.1261	1.4945	6.5459
Ethane	0.1865	0.8170	0.8608	3.7703	1.0473	4.5874
Propane	0.2307	1.0103	0.4223	1.8499	0.6530	2.8601
Isobutane	0.0776	0.3397	0.0974	0.4267	0.1750	0.7664
n-Butane	0.1645	0.7204	0.1573	0.6888	0.3217	1.4092
Isopentane	0.0550	0.2410	0.0474	0.2074	0.1024	0.4484
n-Pentane	0.0584	0.2557	0.0401	0.1757	0.0985	0.4314
Cyclopentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0279	0.1224	0.0111	0.0487	0.0391	0.1711
Cyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other Hexanes	0.0435	0.1907	0.0229	0.1002	0.0664	0.2909
Heptanes	0.0636	0.2786	0.0131	0.0575	0.0767	0.3361
Methylcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0300	0.1315	0.0004	0.0017	0.0304	0.1332
Toluene	0.0520	0.2280	0.0004	0.0020	0.0525	0.2299
Ethylbenzene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Xylenes	0.0288	0.1262	0.0001	0.0004	0.0289	0.1266
C8+ Heavies	0.1327	0.5813	0.0030	0.0131	0.1357	0.5944
2,2,4-trimethylpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total VOC	0.96	4.23	0.82	3.57	1.78	7.80

Component	Emission Unit ID S032					
	Regenerator Emissions		Flash Tank Emissions		Total Emissions	
	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)
Carbon Dioxide	0.0403	0.1763	0.0477	0.2091	0.0880	0.3854
Nitrogen	0.0012	0.0051	0.0182	0.0796	0.0193	0.0847
Hydrogen Sulfide	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Methane	0.1022	0.4478	1.4870	6.5131	1.5893	6.9610
Ethane	0.2324	1.0179	1.0158	4.4491	1.2482	5.4669
Propane	0.2606	1.1415	0.5000	2.1898	0.7606	3.3313
Isobutane	0.0812	0.3556	0.1041	0.4562	0.1853	0.8118
n-Butane	0.1801	0.7886	0.1758	0.7702	0.3559	1.5588
Isopentane	0.0584	0.2558	0.0493	0.2159	0.1077	0.4716
n-Pentane	0.0619	0.2713	0.0416	0.1824	0.1036	0.4537
Cyclopentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0302	0.1324	0.0114	0.0500	0.0416	0.1824
Cyclohexane	0.0163	0.0714	0.0016	0.0072	0.0180	0.0786
Other Hexanes	0.0472	0.2069	0.0236	0.1033	0.0708	0.3102
Heptanes	0.0703	0.3077	0.0132	0.0578	0.0834	0.3655
Methylcyclohexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Benzene	0.0303	0.1328	0.0004	0.0017	0.0307	0.1345
Toluene	0.1184	0.5187	0.0010	0.0044	0.1194	0.5231
Ethylbenzene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Xylenes	0.1379	0.6039	0.0005	0.0020	0.1383	0.6060
C8+ Heavies	0.1503	0.6582	0.0028	0.0121	0.1530	0.6703
2,2,4-trimethylpentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total VOC	1.24	5.44	0.93	4.05	2.17	9.50

Notes:

1. A 10% safety factor has been added to all emissions to account for variability in gas composition. Although the still vent will employ a BTEX condenser, no control from the condenser has been taken into account for this PTE.
2. Dehydration unit S006 emissions from the BTEX condenser and flash tank are routed to the hot oil heater (unit ID S001) for combustion as fuel.
3. Dehydration unit S032 emissions from the BTEX condenser and flash tank can be routed to the plant hot oil heater (Unit ID S001) for combustion as fuel. Given the size of the heater, the waste gas contribution to the total fuel gas consumed by the heater is minimal. As a result, when waste gas is routed to the hot oil heater as fuel, emissions from the dehydration unit are considered negligible.
4. Alternatively, the dehydration unit S032 emissions can be routed to a vapor combustor with a destruction efficiency of 98%. Blue Racer Midstream is permitting the dehydration unit emissions assuming that all waste gas is routed to a vapor combustor, but would like to keep the flexibility to route the waste gas to the hot oil heater as well.
5. Emission rates from dehydration unit S032 are based on the most conservative emission rates among the GlyCalc results using gas analyses from 2014 and 2017.

VAPOR COMBUSTOR POTENTIAL TO EMIT SUMMARY
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Unit ID	Description	Pollutant	Pilot Gas		Waste Gas		Total	
			Potential to Emit (PTE) ^a		Potential to Emit (PTE) ^b		PTE Emissions	
			Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)
V003	Vapor Combustor (Cryo 3)	CO	0.01	0.04	1.53	6.70	1.54	6.74
		NO _x	0.004	0.02	0.77	3.36	0.77	3.38
		PM	0.0002	0.001	0.03	0.11	0.03	0.11
		SO ₂	0.00002	0.0001	0.002	0.01	0.002	0.01
		VOC (combustion)	0.0002	0.001	--	--	0.0002	0.001
		CH ₂ O	0.000002	0.00001	0.0003	0.001	0.0003	0.001
		Benzene	0.0000001	0.0000003	0.00001	0.00003	0.00001	0.00003
		Toluene	0.0000001	0.0000004	0.00001	0.00005	0.00001	0.00005
		n-Hexane	0.0001	0.0002	0.01	0.03	0.01	0.03
		Other HAP	0.0000001	0.0000002	0.00001	0.00003	0.00001	0.00003

^a The Pilot Gas PTE emissions are from the Vapor Combustor Pilot Gas Combustion Potential to Emit worksheet.

^b The Waste Gas CO, NO_x, PM and SO₂ PTE emissions are from the Vapor Combustor Waste Gas Combustion Potential to Emit worksheet.

VAPOR COMBUSTOR PILOT GAS COMBUSTION POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Unit ID	Description	Pilot Flow Rate (scf/hr)	Fuel Higher Heating Value (Btu/scf)	Annual Operating Hours (hr/yr)	Pollutant	Emission Factors ^a	Units	Hourly ^a (lb/hr)	Potential to Emit (PTE) Annual ^b (T/yr)
V003	Vapor Combustor	30.00	1,065	8,760	CO	0.2755	lb/MMBtu	0.01	0.04
					NO _x	0.1380	lb/MMBtu	0.004	0.02
					PM	7.6	lb/MMscf	0.0002	0.001
					SO ₂	4	ppm	0.00002	0.0001
					VOC	5.5	lb/MMscf	0.0002	0.001
					CH ₂ O	0.075	lb/MMscf	0.000002	0.00001
					Benzene	0.0021	lb/MMscf	0.0000001	0.0000003
					Toluene	0.0034	lb/MMscf	0.0000001	0.0000004
					n-Hexane	1.8	lb/MMscf	0.0001	0.0002
					Other HAP	0.0019	lb/MMscf	0.0000001	0.0000002

^a Emission Factors for CO and NO_x are based upon the Draft TNRRCC Guidance Document for Flares and Vapor Oxidizers (dated 10/00) for non-assisted high-Btu flares. An example calculation for hourly CO emissions for Unit ID V003 follows:

$$\text{CO (lb/hr)} = (\text{Fuel Flow Rate, scf/hr}) * (\text{Fuel Heating Value, Btu/scf}) * (\text{MM}/10^6) * (\text{Emission Factor, lb/MMBtu})$$

$$\text{CO (lb/hr)} = (30.00 \text{ scf/hr}) * (1,065 \text{ Btu/scf}) * (\text{MM}/10^6) * (0.2755 \text{ lb/MMBtu})$$

$$= 0.01 \text{ lb/hr CO}$$

SO₂ emission rates are estimated using a mass balance approach and the maximum sulfur content of the gas. An example calculation for hourly SO₂ emissions for Unit ID V003 follows:

$$\text{SO}_2 \text{ (lb/hr)} = (\text{Fuel Flow Rate, scf/hr}) * (\text{MM}/10^6) * (\text{Sulfur Content, scf S/MMscf gas}) * (\text{lb-mol}/379 \text{ scf}) * (32.06 \text{ lb S/lb-mol}) * (64.06 \text{ lb SO}_2/32.06 \text{ lb S})$$

$$\text{SO}_2 \text{ (lb/hr)} = (30.00 \text{ scf/hr}) * (\text{MM}/10^6) * (4.0 \text{ scf S/MMscf gas}) * (1 \text{ lb-mol}/379 \text{ scf}) * (32.06 \text{ lb S/lb-mol}) * (64.06 \text{ lb SO}_2/32.06 \text{ lb S})$$

$$= 0.00002 \text{ lb/hr SO}_2$$

Emission Factors for PM, VOC, and HAPs based upon AP-42, Table 1.4-2 and Table 1.4-3 (dated 7/98). An example calculation for hourly VOC emissions for Unit ID V003 follows:

$$\text{VOC (lb/hr)} = (\text{Fuel Flow Rate, scf/hr}) * (\text{MM}/10^6) * (\text{Emission Factor, lb/MMscf})$$

$$\text{VOC (lb/hr)} = (30.00 \text{ scf/hr}) * (\text{MM}/10^6) * (5.5 \text{ lb/MMscf})$$

$$= 0.0002 \text{ lb/hr VOC}$$

^b An example calculation for annual CO emissions for Unit ID V003 follows:

$$\text{CO (T/yr)} = (\text{Hourly Emissions, lb/hr}) * (\text{Annual Operating Hours, hr/yr}) * (1/2,000 \text{ lb})$$

$$\text{CO (T/yr)} = (0.01 \text{ lb/hr}) * (8,760 \text{ hr/yr}) * (1/2,000 \text{ lb})$$

$$= 0.04 \text{ T/yr CO}$$

VAPOR COMBUSTOR WASTE GAS COMBUSTION POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Unit ID	Description	WG Flow Rate ^a (scf/hr)	WG Higher Heating Value (Btu/scf)	Annual Operating Hours (hr/yr)	Waste Gas Feed Rate ^a		Pollutant	Emission Factors ^b	Units	Potential to Emit (PTE)	
					Hourly (MMBtu/hr)	Annual (MMBtu/yr)				Hourly ^b (lb/hr)	Annual ^c (T/yr)
V003	Vapor Combustor	3,416.91	1,626.07	8,760	5.56	48,671.82	CO	0.2755	lb/MMBtu	1.53	6.70
							NO _x	0.1380	lb/MMBtu	0.77	3.36
							PM	7.6	lb/MMscf	0.03	0.11
							SO ₂	4	ppm	0.002	0.01
							CH ₂ O	0.075	lb/MMscf	0.0003	0.001
							Benzene	0.0021	lb/MMscf	0.00001	0.00003
							Toluene	0.0034	lb/MMscf	0.00001	0.00005
							n-Hexane	1.8	lb/MMscf	0.01	0.03
							Other HAP	0.0019	lb/MMscf	0.00001	0.00003

^a The waste gas flow rate and feed rates for the vapor combustor were taken from the Vapor Combustor Feed Rate from Dehydration Unit Emissions worksheet

^b Emission Factors for CO and NO_x are based upon the Draft TNRCC Guidance Document for Flares and Vapor Oxidizers (dated 10/00) for non-assisted high-Btu flares. An example calculation for hourly CO emissions for Unit ID V003 follows:

$$\text{CO (lb/hr)} = (\text{WG Feed Rate, MMBtu/hr}) * (\text{Emission Factor, lb/MMBtu})$$

$$= (5.56 \text{ MMBtu/hr}) * (0.2755 \text{ lb/MMBtu})$$

$$= 1.53 \text{ lb/hr CO}$$

SO₂ emission rates are estimated using a mass balance approach and the maximum sulfur content of the gas. An example calculation for hourly SO₂ emissions for Unit ID V003 follows:

$$\text{SO}_2 \text{ (lb/hr)} = (\text{Fuel Flow Rate, scf/hr}) * (\text{MM}/10^6) * (\text{Sulfur Content, scf S/MMscf gas}) * (1 \text{ lb-mol}/379 \text{ scf}) * (32.06 \text{ lb S/lb-mol}) * (64.06 \text{ lb SO}_2/32.06 \text{ lb S})$$

$$= (3,416.91 \text{ scf/hr}) * (\text{MM}/10^6) * (4.0 \text{ scf S/MMscf gas}) * (1 \text{ lb-mol}/379 \text{ scf}) * (32.06 \text{ lb S/lb-mol}) * (64.06 \text{ lb SO}_2/32.06 \text{ lb S})$$

$$= 0.002 \text{ lb/hr SO}_2$$

Emission Factors for PM and HAPs based upon AP-42 Table 1.4-2 and Table 1.4-3 (dated 7/98). An example calculation for hourly PM emissions for Unit ID V003 follows:

$$\text{PM (lb/hr)} = (\text{Fuel Flow Rate, scf/hr}) * (\text{MM}/10^6) * (\text{Emission Factor, lb/MMscf})$$

$$= (3,416.91 \text{ scf/hr}) * (\text{MM}/10^6) * (7.6 \text{ lb/MMscf})$$

$$= 0.03 \text{ lb/hr VOC}$$

^c An example calculation for annual CO emissions for Unit ID V003 follows:

$$\text{CO (T/yr)} = (\text{WG Feed Rate, MMBtu/yr}) * (\text{Emission Factor, lb/MMBtu}) * (1 \text{ T}/2,000 \text{ lb})$$

$$= (48,671.82 \text{ MMBtu/yr}) * (0.2755 \text{ lb/MMBtu}) * (1 \text{ T}/2,000 \text{ lb})$$

$$= 6.70 \text{ T/yr CO}$$

VAPOR COMBUSTOR FEED RATE FROM DEHYDRATION UNIT EMISSIONS
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

SIB2 Constituent	Heating Value ¹ (Btu/lb)	Molecular Weight (lb/lbmol)	Total Uncontrolled Regenerator Emissions		Total Uncontrolled Flash Tank Emissions		Total Uncontrolled Emissions ³		Vapor Combustor Feed Rate		Volumetric Feed Rate ⁴	
			Hourly ² (lb/hr)	Annual ² (T/yr)	Hourly ² (lb/hr)	Annual ² (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (MMBtu/hr)	Annual (MMBtu/yr)	Hourly (scf/hr)	Annual (scf/yr)
nitrogen	0	28.013	0.0530	0.2321	0.8260	3.6179	0.9669	4.2350	0.0000	0.0000	13.15	115,157.30
carbon dioxide	0	44.01	1.8300	8.0154	2.1700	9.5046	4.0000	19.2720	0.0000	0.0000	38.08	333,557.61
hydrogen sulfide	0	34.0809	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00
methane	23.861	16.043	4.6475	20.3562	67.5917	296.0518	79.4631	348.0488	1.8961	16,609.5848	1,886.45	16,525,324.41
ethane	22.304	30.07	10.5630	46.2661	46.1714	202.2306	62.4078	273.3464	1.3919	12,193.4349	790.44	6,924,291.13
propane	21.646	44.097	11.8457	51.8843	22.7254	99.5372	38.0282	166.5637	0.8232	7,210.8735	328.44	2,877,177.27
isobutane	21.293	3.6904	3.6904	16.1638	4.7339	20.7344	9.2667	40.5880	0.1968	1,724.3414	60.72	531,918.73
n-butane	21.025	58.123	8.1841	35.8463	7.9929	35.0090	17.7947	77.9408	0.3789	3,319.1882	116.60	1,021,439.01
n-pentane	21.072	72.15	2.6543	11.6260	2.2403	9.8126	5.3841	23.5825	0.1132	991.6424	28.42	248,970.68
n-hexane	20.928	72.15	2.8154	12.3314	1.8928	8.2907	5.1790	22.6843	0.1091	956.0076	27.34	239,488.51
cyclopentane	20.350	86.177	1.3736	6.0163	0.5190	2.2730	2.0819	9.1182	0.0436	381.6526	9.20	80,596.21
other hexanes	20.195	84.161	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00
heptanes	20.825	100.204	2.1476	9.4066	0.0745	3.3261	0.8976	3.9311	0.0741	158.7759	4.06	35,579.13
2,2,4 trimethyl benzene	18.172	78.114	1.3785	6.0377	0.0174	0.0763	1.5355	6.7254	0.0279	244.4279	7.49	65,582.00
toluene	18.422	92.141	5.3833	23.5788	0.0453	0.1983	5.9715	26.1548	0.1100	963.6478	24.68	216,219.11
ethylbenzene	18.658	106.168	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00
xylene	18.438	106.167	6.2676	27.4519	0.0209	0.0916	6.9174	30.2979	0.1275	1,117.2635	24.82	217,379.06
c8+ heavies	20.747	114.231	6.8302	29.9161	0.1257	0.5508	7.6515	33.5136	0.1587	1,390.6129	25.51	223,476.78
Total VOC:			56,5058	247,4946	42,0693	184,2198	108,4216	474,8858				
Total HAPs:			14,4030	63,0847	6,6026	2,6392	16,5062	72,2963				
Total Feed Rate:									5.5561	48,671.8201	3,416.91	29,932,177.70

¹ Heating values taken from Perry's Chemical Engineers' Handbook, Table 3-207 (pg. 3-155).
² Emissions from dehydration unit still vent and flash tank taken from GPCalc simulation report.
³ Total uncontrolled emissions include a 10% increase to account for potential fluctuations in gas composition.
⁴ Volumetric feed rate for each contaminant calculated using the Ideal Gas Law at standard conditions of 14.65 psia and 60 °F.
 An example volumetric feed rate calculation for Methane follows:
 $(79.4631 \text{ lb/hr}) / (16.043 \text{ lb/lbmol}) * (10.73 \text{ psia} / (14.65 \text{ psia})) * (520 \text{ deg. R}) / (14.65 \text{ psia}) = 1,886.4507 \text{ scf/hr}$



Gas Analysis Report No: 232862

232862-1 -41

Date: 4/19/2017

For: BLUE RACER MIDSTREAM

Attn: ACCOUNTS PAYABLE

5949 SHERRY LANE
 DALLAS, TX 75225

Sample Identification:

Company: BLUE RACER MIDSTREAM

Field: NP

Lease: NATRIUM

STA # : NP

Sample Data: Date: 04/18/2017

PSIG: NP

By: LEE WOODS

Temp: N/P DEG. F.

DP: 0.0 LBS H2O

Remarks:

CYL # 300

Sample Type: SPOT

From: 04/01/2017

To: 01/18/2038

Hydrocarbon Analysis - Method

GPA 2261-13

Lab Analyst: LD

Component Name		Mol Percent	GPM @ 14.730 PSIA
Oxygen	(O2)	0.001	
Hydrogen	(H2)	0.007	
Helium	(HE)	0.017	
Carbon Monoxide	(CO)	0.000	
Nitrogen	(N2)	0.308	
Methane	(C1)	81.737	
Carbon Dioxide	(CO2)	0.149	
Ethane	(C2)	11.969	3.210
Propane	(C3)	3.588	0.991
Iso-Butane	(IC4)	0.617	0.203
N-Butane	(NC4)	0.898	0.284
Iso-Pentane	(IC5)	0.266	0.098
N-Pentane	(NC5)	0.204	0.074
Hexanes Plus	(C6+)	0.239	0.103
Total		100.000	

Mol Weight: 19.88

Ethane + GPM: 4.963

BTU/LB: 23051.12

Propane + GPM: 1.753

Iso-Pentane + GPM: 0.275

Compressibility Factor: 0.9968

Specific Gravity @ 60 Deg. F. (Air = 1) : 0.688

BTU/Cuft. (Real) 60 Deg. F. - PSIA:	14.650	14.696	14.730	15.025
Dry:	1208.0	1211.8	1214.6	1239.0
Sat:	1187.4	1191.1	1193.9	1217.9
ACT	1208.0	1211.8	1214.6	1239.0

Janet Cox
 Janet Cox, Customer Service Supervisor

Testing performed by Element Materials Technology Scott :: 2129 W. Willow St., Scott, LA 70583 :: 337-232-3568
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Gas Analysis Report No: 232862

232862-1 -41

Date: 4/19/2017

For: BLUE RACER MIDSTREAM
Attn: ACCOUNTS PAYABLE
5949 SHERRY LANE
DALLAS, TX 75225

Sample Identification:
Company: BLUE RACER MIDSTREAM
Field:
Lease: NATRIUM
STA # :

232862-1

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENT AS % OF TOTAL SAMPLE

COMPONENT NAME	MOL %	WEIGHT %
METHANE	0.0000	0.0000
ETHANE	0.0000	0.0000
PROPANE	0.0000	0.0000
ISO-BUTANE	0.0000	0.0000
N-BUTANE	0.0000	0.0000
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0000	0.0000
ISOPENTANE	0.0000	0.0000
N-PENTANE	0.0000	0.0000
2,2-DIMETHYLBUTANE (NEOHEXANE)	0.0104	0.0455
2,3-DIMETHYLBUTANE CYCLOPENTANE	0.0123	0.0487
2-METHYLPENTANE	0.0538	0.2352
3-METHYLPENTANE	0.0308	0.1348
N-HEXANE	0.0498	0.2180
2,2-DIMETHYLPENTANE	0.0022	0.0112
METHYLCYCLOPENTANE	0.0072	0.0309
2,4-DIMETHYLPENTANE	0.0009	0.0046
2,2,3-TRIMETHYLBUTANE	0.0006	0.0030
BENZENE	0.0011	0.0044
3,3-DIMETHYLPENTANE	0.0011	0.0056
CYCLOHEXANE	0.0059	0.0253
2-METHYLHEXANE	0.0108	0.0552
2,3-DIMETHYLPENTANE	0.0027	0.0139
1,1-DIMETHYLCYCLOPENTANE 3-METHYLHEXANE	0.0108	0.0548
1,t3-DIMETHYLCYCLOPENTANE	0.0008	0.0041

CAPILLARY ANALYSIS - METHOD GPA 2286-95
 COMPONENT AS % OF TOTAL SAMPLE

COMPONENT NAME	MOL %	WEIGHT %
1,c3-DIMETHYLCYCLOPENTANE 3-ETHYLPENTANE	0.0014	0.0071
1,t2-DIMETHYLCYCLOPENTANE 2,2,4-TRIMETHYLPENTANE	0.0012	0.0058
N-HEPTANE	0.0100	0.0509
METHYLCYCLOHEXANE 1,1,3-TRIMETHYLCYCLOPENTANE 2,2-DIMETHYLHEXANE	0.0092	0.0465
1,C2-DIMETHYLCYCLOPENTANE	0.0008	0.0042
2,5-DIMETHYLHEXANE	0.0006	0.0037
2,4-DIMETHYLHEXANE 2,2,3-TRIMETHYLPENTANE ETHYLCYCLOPENTANE	0.0012	0.0062
1,t2,c4-TRIMETHYLCYCLOPENTANE 3,3-DIMETHYLHEXANE	0.0004	0.0024
1,t2,C3-TRIMETHYLCYCLOPENTANE	0.0001	0.0004
2,3,4-TRIMETHYLPENTANE	0.0000	0.0001
TOLUENE	0.0013	0.0061
2,3-DIMETHYLHEXANE	0.0004	0.0021
1,1,2-TRIMETHYLCYCLOPENTANE	0.0001	0.0003
2-METHYLHEPTANE	0.0018	0.0104
4-METHYLHEPTANE	0.0007	0.0039
3,4-DIMETHYLHEXANE	0.0002	0.0009
3-METHYLHEPTANE 3-ETHYLHEXANE	0.0019	0.0112
1,c3-DIMETHYLCYCLOHEXANE 1,c2,t3-TRIMETHYLCYCLOPENTANE 1,c2,t4-TRIMETHYLCYCLOPENTANE 1,t4-DIMETHYLCYCLOHEXANE	0.0012	0.0069
2,2,5-TRIMETHYLHEXANE	0.0002	0.0011
1,1-DIMETHYLCYCLOHEXANE 1,methyl-t3-ETHYLCYCLOPENTANE 1-methyl-C3-ETHYLCYCLOPENTANE	0.0000	0.0001
1-methyl-t2-ETHYLCYCLOPENTANE 2,2,4-TRIMETHYLHEXANE	0.0000	0.0001
1-methyl-1-ETHYLCYCLOPENTANE CYCLOHEPTANE N-OCTANE	0.0014	0.0081
1,T2-DIMETHYLCYCLOCHEXANE	0.0002	0.0012
UNKNOWN	0.0000	0.0000
1,t3-DIMETHYLCYCLOHEXANE 1,c4-DIMETHYLCYCLOHEXANE 1,c2,c3-TRIMETHYLCYCLOPENTANE 2,4,4-TRIMETHYLHEXANE	0.0002	0.0011
ISOPROPYLCYCLOPENTANE	0.0000	0.0001
UNKNOWN	0.0000	0.0002

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENT AS % OF TOTAL SAMPLE

COMPONENT NAME	MOL %	WEIGHT %
2,2-DIMETHYLHEPTANE	0.0001	0.0004
2,4-DIMETHYLHEPTANE	0.0001	0.0006
1-methyl-c2-ETHYLCYCLOPENTANE		
2,2,3-TRIMETHYLHEXANE	0.0000	0.0001
1,c2-DIMETHYLCYCLOHEXANE	0.0001	0.0006
2,6-DIMETHYLHEPTANE		
N-PROPYLCYCLOPENTANE	0.0000	0.0003
1,c3,c5-TRIMETHYLCYCLOHEXANE		
2,5-DIMETHYLHEPTANE	0.0004	0.0021
3,5-DIMETHYLHEPTANE		
ETHYLCYCLOHEXANE		
1,1,3-TRIMETHYLCYCLOHEXANE	0.0001	0.0004
2,3,3-TRIMETHYLHEXANE		
3,3-DIMETHYLHEPTANE		
1,1,4-TRIMETHYLCYCLOHEXANE	0.0000	0.0001
UNKNOWN	0.0000	0.0000
2,3,4-TRIMETHYLHEXANE	0.0000	0.0001
ETHYLBENZENE	0.0000	0.0001
1,t2,t4-TRIMETHYLCYCLOHEXANE	0.0001	0.0004
1,c3,t5-TRIMETHYLCYCLOHEXANE		
2,3-DIMETHYLHEPTANE		
M-XYLENE	0.0003	0.0017
P-XYLENE		
3,4-DIMETHYLHEPTANE		
2-METHYLOCTANE	0.0003	0.0021
4-METHYLOCTANE		
UNKNOWN	0.0000	0.0000
3-METHYLOCTANE	0.0002	0.0013
UNKNOWN	0.0000	0.0000
1,t2,c3-TRIMETHYLCYCLOHEXANE	0.0000	0.0001
1,t2,c4-TRIMETHYLCYCLOHEXANE		
O-XYLENE	0.0000	0.0002
1,1,2-TRIMETHYLCYCLOHEXANE	0.0000	0.0001
UNKNOWN	0.0000	0.0002
ISOBUTYLCYCLOPENTANE	0.0000	0.0001
N-NONANE	0.0002	0.0010
UNKNOWN	0.0000	0.0000
1,c2,c3-TRIMETHYLCYCLOHEXANE	0.0000	0.0000
1,c2,t3-TRIMETHYLCYCLOHEXANE		
UNKNOWN	0.0000	0.0000
ISOPROPYLBENZENE	0.0000	0.0001
2,2-DIMETHYLOCTANE	0.0000	0.0001
ISOPROPYLCYCLOHEXANE	0.0000	0.0002
CYCLOOCTANE		
UNKNOWN	0.0000	0.0000
N-BUTYLCYCLOPENTANE	0.0000	0.0000
N-PROPYLCYCLOHEXANE		

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENT AS % OF TOTAL SAMPLE

COMPONENT NAME	MOL %	WEIGHT %
3,3-DIMETHYLOCTANE	0.0000	0.0002
UNKNOWN	0.0000	0.0000
N-PROPYLBENZENE	0.0000	0.0002
UNKNOWN	0.0000	0.0000
M-ETHYLTOLUENE	0.0000	0.0000
P-ETHYLTOLUENE	0.0000	0.0000
2,3-DIMETHYLOCTANE		
4-METHYLNONANE	0.0000	0.0001
5-METHYLNONANE		
1,3,5-TRIMETHYLBENZENE		
2-METHYLNONANE	0.0000	0.0003
3-ETHYLOCTANE	0.0000	0.0000
O-ETHYLTOLUENE	0.0000	0.0001
3-METHYLNONANE		
UNKNOWN	0.0000	0.0000
1,2,4-TRIMETHYLBENZENE	0.0000	0.0001
t-BUTYLBENZENE		
METHYLCYCLOOCTANE		
tert-BUTYLCYCLOHEXANE	0.0000	0.0001
ISO-BUTYLCYCLOHEXANE	0.0000	0.0002
N-DECANE	0.0000	0.0003
ISOBUTYLBENZENE	0.0000	0.0001
sec-BUTYLBENZENE	0.0000	0.0001
UNKNOWN	0.0000	0.0001
1-METHYL-3-ISOPROPYLBENZENE	0.0000	0.0000
1,2,3-TRIMETHYLBENZENE	0.0000	0.0001
1-METHYL-4-ISOPROPYLBENZENE		
UNKNOWN	0.0000	0.0001
1-METHYL-2-ISOPROPYLBENZENE	0.0000	0.0001
UNKNOWN	0.0000	0.0000
N-BUTYLCYCLOHEXANE	0.0000	0.0002
UNKNOWN	0.0000	0.0001
1,3-DIETHYLBENZENE	0.0000	0.0003
1-METHYL-3-PROPYLBENZENE		
1,2-DIETHYLBENZENE	0.0000	0.0001
N-BUTYLBENZENE		
1-METHYL-4-PROPYLBENZENE		
1,4-DIETHYLBENZENE	0.0000	0.0000
1-METHYL-2-PROPYLBENZENE	0.0000	0.0001
1,4-DIMETHYL-2-ETHYLBENZENE	0.0000	0.0001
UNKNOWN	0.0000	0.0001
1,2-DIMETHYL-4-ETHYLBENZENE	0.0000	0.0001

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENT AS % OF TOTAL SAMPLE

COMPONENT NAME	MOL %	WEIGHT %
1,3-DIMETHYL-2-ETHYLBENZENE	0.0000	0.0001
UNKNOWN	0.0000	0.0001
1,2-DIMETHYL-3-ETHYLBENZENE	0.0000	0.0000
UNKNOWN	0.0000	0.0000
N-UNDECANE	0.0000	0.0001
UNKNOWN	0.0000	0.0001
1,2,4,5-TETRAMETHYLBENZENE	0.0000	0.0002
1,2,3,5-TETRAMETHYLBENZENE	0.0000	0.0000
UNKNOWN	0.0000	0.0001
1,2,3,4-TETRAMETHYLBENZENE	0.0000	0.0002
CYCLODECANE		
UNKNOWN	0.0000	0.0001
NAPHTHALENE	0.0000	0.0001
N-DODECANE	0.0001	0.0006
ISOTRIDECANES PLUS	0.0004	0.0041
Total:	0.2390	1.0989

TOTAL HEXANES	0.1570	0.6822
TOTAL HEPTANES	0.0568	0.2768
TOTAL OCTANES	0.0218	0.1165
TOTAL NONANES	0.0022	0.0136
TOTAL DECANES PLUS	0.0012	0.0097

BTEX COMPONENTS

N-HEXANE	0.0498	0.2180
BENZENE	0.0011	0.0044
TOLUENE	0.0013	0.0061
ETHYLBENZENE	0.0000	0.0001
XYLENE	0.0004	0.0019

232862-1

 CAPILLARY ANALYSIS - METHOD GPA 2286-95
 HEAVY END FRACTION

COMPONENT NAME	MOL %	WEIGHT %
METHANE	0.000	0.000
ETHANE	0.000	0.000
PROPANE	0.000	0.000
ISO-BUTANE	0.000	0.000
N-BUTANE	0.000	0.000
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.000	0.000
ISOPENTANE	0.000	0.000
N-PENTANE	0.000	0.000
2,2-DIMETHYLBUTANE (NEOHEXANE)	4.346	4.137
2,3-DIMETHYLBUTANE	5.131	4.429
CYCLOPENTANE		
2-METHYLPENTANE	22.490	21.407
3-METHYLPENTANE	12.890	12.270
N-HEXANE	20.837	19.833
2,2-DIMETHYLPENTANE	0.925	1.023
METHYLCYCLOPENTANE	3.029	2.816
2,4-DIMETHYLPENTANE	0.379	0.420
2,2,3-TRIMETHYLBUTANE	0.245	0.271
BENZENE	0.466	0.402
3,3-DIMETHYLPENTANE	0.460	0.509
CYCLOHEXANE	2.474	2.299
2-METHYLHEXANE	4.535	5.020
2,3-DIMETHYLPENTANE	1.139	1.261
1,1-DIMETHYLCYCLOPENTANE	4.513	4.985
3-METHYLHEXANE		
1,t3-DIMETHYLCYCLOPENTANE	0.342	0.371
1,c3-DIMETHYLCYCLOPENTANE	0.598	0.650
3-ETHYLPENTANE		
1,t2-DIMETHYLCYCLOPENTANE	0.482	0.531
2,2,4-TRIMETHYLPENTANE		
N-HEPTANE	4.188	4.635
METHYLCYCLOHEXANE	3.846	4.233
1,1,3-TRIMETHYLCYCLOPENTANE		

CAPILLARY ANALYSIS - METHOD GPA 2286-95
HEAVY END FRACTION

COMPONENT NAME	MOL %	WEIGHT %
2,2-DIMETHYLHEXANE		
1,C2-DIMETHYLCYCLOPENTANE	0.355	0.385
2,5-DIMETHYLHEXANE	0.265	0.334
2,4-DIMETHYLHEXANE	0.496	0.564
2,2,3-TRIMETHYLPENTANE		
ETHYLCYCLOPENTANE		
1,t2,c4-TRIMETHYLCYCLOPENTANE	0.174	0.216
3,3-DIMETHYLHEXANE		
1,t2,C3-TRIMETHYLCYCLOPENTANE	0.032	0.039
2,3,4-TRIMETHYLPENTANE	0.008	0.010
TOLUENE	0.549	0.558
2,3-DIMETHYLHEXANE	0.152	0.191
1,1,2-TRIMETHYLCYCLOPENTANE	0.023	0.028
2-METHYLHEPTANE	0.752	0.949
4-METHYLHEPTANE	0.280	0.353
3,4-DIMETHYLHEXANE	0.065	0.082
3-METHYLHEPTANE	0.811	1.023
3-ETHYLHEXANE		
1,c3-DIMETHYLCYCLOHEXANE	0.505	0.625
1,c2,t3-TRIMETHYLCYCLOPENTANE		
1,c2,t4-TRIMETHYLCYCLOPENTANE		
1,t4-DIMETHYLCYCLOHEXANE	0.015	0.018
2,2,5-TRIMETHYLHEXANE	0.071	0.100
1,1-DIMETHYLCYCLOHEXANE	0.009	0.011
1,methyl-t3-ETHYLCYCLOPENTANE		
1-methyl-C3-ETHYLCYCLOPENTANE	0.017	0.021
1-methyl-t2-ETHYLCYCLOPENTANE	0.008	0.011
2,2,4-TRIMETHYLHEXANE		
1-methyl-1-ETHYLCYCLOPENTANE	0.585	0.738
CYCLOHEPTANE		
N-OCTANE		
1,T2-DIMETHYLCYCLOCHEXANE	0.091	0.112
UNKNOWN	0.003	0.004
1,t3-DIMETHYLCYCLOHEXANE	0.078	0.097
1,c4-DIMETHYLCYCLOHEXANE		
1,c2,c3-TRIMETHYLCYCLOPENTANE		
2,4,4-TRIMETHYLHEXANE	0.004	0.005
ISOPROPYLCYCLOPENTANE	0.007	0.009
UNKNOWN	0.013	0.018
2,2-DIMETHYLHEPTANE	0.028	0.039
2,4-DIMETHYLHEPTANE	0.043	0.057
1-methyl-c2-ETHYLCYCLOPENTANE		
2,2,3-TRIMETHYLHEXANE	0.009	0.013

CAPILLARY ANALYSIS - METHOD GPA 2286-95
HEAVY END FRACTION

COMPONENT NAME	MOL %	WEIGHT %
1,c2-DIMETHYLCYCLOHEXANE	0.046	0.058
2,6-DIMETHYLHEPTANE		
N-PROPYLCYCLOPENTANE	0.018	0.024
1,c3,c5-TRIMETHYLCYCLOHEXANE		
2,5-DIMETHYLHEPTANE	0.149	0.187
3,5-DIMETHYLHEPTANE		
ETHYLCYCLOHEXANE		
1,1,3-TRIMETHYLCYCLOHEXANE	0.026	0.037
2,3,3-TRIMETHYLHEXANE		
3,3-DIMETHYLHEPTANE		
1,1,4-TRIMETHYLCYCLOHEXANE	0.005	0.007
UNKNOWN	0.000	0.000
2,3,4-TRIMETHYLHEXANE	0.005	0.007
ETHYLBENZENE	0.010	0.012
1,t2,t4-TRIMETHYLCYCLOHEXANE	0.027	0.037
1,c3,t5-TRIMETHYLCYCLOHEXANE		
2,3-DIMETHYLHEPTANE		
M-XYLENE	0.133	0.156
P-XYLENE		
3,4-DIMETHYLHEPTANE		
2-METHYLOCTANE	0.134	0.190
4-METHYLOCTANE		
UNKNOWN	0.001	0.001
3-METHYLOCTANE	0.086	0.122
UNKNOWN	0.002	0.003
1,t2,c3-TRIMETHYLCYCLOHEXANE	0.009	0.012
1,t2,c4-TRIMETHYLCYCLOHEXANE		
O-XYLENE	0.018	0.021
1,1,2-TRIMETHYLCYCLOHEXANE	0.006	0.009
UNKNOWN	0.010	0.016
ISOBUTYLCYCLOPENTANE	0.005	0.007
N-NONANE	0.064	0.090
UNKNOWN	0.003	0.004
1,c2,c3-TRIMETHYLCYCLOHEXANE	0.002	0.003
1,c2,t3-TRIMETHYLCYCLOHEXANE		
UNKNOWN	0.001	0.001
ISOPROPYLBENZENE	0.005	0.006
2,2-DIMETHYLOCTANE	0.004	0.006
ISOPROPYLCYCLOHEXANE	0.011	0.014
CYCLOOCTANE		
UNKNOWN	0.000	0.000
N-BUTYLCYCLOPENTANE	0.002	0.003
N-PROPYLCYCLOHEXANE		
3,3-DIMETHYLOCTANE	0.010	0.015

CAPILLARY ANALYSIS - METHOD GPA 2286-95
HEAVY END FRACTION

COMPONENT NAME	MOL %	WEIGHT %
UNKNOWN	0.003	0.004
N-PROPYLBENZENE	0.013	0.017
UNKNOWN	0.003	0.004
M-ETHYLTOLUENE	0.003	0.004
P-ETHYLTOLUENE	0.003	0.004
2,3-DIMETHYLOCTANE		
4-METHYLNONANE	0.008	0.012
5-METHYLNONANE		
1,3,5-TRIMETHYLBENZENE		
2-METHYLNONANE	0.017	0.027
3-ETHYLOCTANE	0.002	0.003
O-ETHYLTOLUENE	0.007	0.010
3-METHYLNONANE		
UNKNOWN	0.002	0.003
1,2,4-TRIMETHYLBENZENE	0.004	0.005
t-BUTYLBENZENE		
METHYLCYCLOOCTANE		
tert-BUTYLCYCLOHEXANE	0.006	0.009
ISO-BUTYLCYCLOHEXANE	0.010	0.016
N-DECANE	0.018	0.028
ISOBUTYLBENZENE	0.006	0.009
sec-BUTYLBENZENE	0.003	0.005
UNKNOWN	0.003	0.006
1-METHYL-3-ISOPROPYLBENZENE	0.002	0.003
1,2,3-TRIMETHYLBENZENE	0.008	0.011
1-METHYL-4-ISOPROPYLBENZENE		
UNKNOWN	0.003	0.005
1-METHYL-2-ISOPROPYLBENZENE	0.009	0.013
UNKNOWN	0.000	0.000
N-BUTYLCYCLOHEXANE	0.010	0.016
UNKNOWN	0.005	0.009
1,3-DIETHYLBENZENE	0.016	0.023
1-METHYL-3-PROPYLBENZENE		
1,2-DIETHYLBENZENE	0.005	0.007
N-BUTYLBENZENE		
1-METHYL-4-PROPYLBENZENE		
1,4-DIETHYLBENZENE	0.003	0.004
1-METHYL-2-PROPYLBENZENE	0.004	0.006
1,4-DIMETHYL-2-ETHYLBENZENE	0.004	0.006
UNKNOWN	0.005	0.008
1,2-DIMETHYL-4-ETHYLBENZENE	0.005	0.007

CAPILLARY ANALYSIS - METHOD GPA 2286-95
HEAVY END FRACTION

COMPONENT NAME	MOL %	WEIGHT %
1,3-DIMETHYL-2-ETHYLBENZENE	0.009	0.013
UNKNOWN	0.008	0.013
1,2-DIMETHYL-3-ETHYLBENZENE	0.003	0.004
UNKNOWN	0.001	0.002
N-UNDECANE	0.007	0.012
UNKNOWN	0.003	0.005
1,2,4,5-TETRAMETHYLBENZENE	0.012	0.018
1,2,3,5-TETRAMETHYLBENZENE	0.002	0.003
UNKNOWN	0.005	0.009
1,2,3,4-TETRAMETHYLBENZENE	0.009	0.014
CYCLODECANE		
UNKNOWN	0.006	0.011
NAPHTHALENE	0.008	0.012
N-DODECANE	0.031	0.058
ISOTRIDECANES PLUS	0.160	0.376
Total:	100.000	100.000

Specific Gravity @ 60 Deg. F. (Air = 1)	3.1138
Molecular Weight	90.62
Compressibility Factor	0.8881
Summation Factor	0.0872
Cu. Ft. Vapor/Gal @ 14.696 & 60 Deg. F.	24.259
Cu. Ft. Vapor/Gal @ 14.730 & 60 Deg. F.	24.203
Cu. Ft. Vapor/Gal @ 14.650 & 60 Deg. F.	24.335
Btu/cu. Ft. @ 14.696 PSIA, Dry	4950.66
Btu/cu. Ft. @ 14.730 PSIA, Dry	4962.11
BTU/LB	20771



Certificate of Analysis

Number: 1030-14040325-001A

Houston Laboratories
8820 Interchange Drive
Houston, TX 77054
Phone 713-660-0901

W. Steven Kiser
Dominion Transmission
335 US Highway 33 West
Weston , WV 26452

Apr. 10, 2014

Station Name: New Martinsville
Station Location: Natrium
Sample Point: Inlet Cotactor
Cylinder No: 126
Analyzed: 04/10/2014 06:49:59 by JD

Sampled By: Derby
Sample Of: Gas Spot
Sample Date: 03/26/2014 11:45
Sample Conditions: 1125 psig, @ 95 °F
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia	
Nitrogen	0.478	0.664		GPM TOTAL C2+ 5.387
Carbon Dioxide	0.148	0.323		GPM TOTAL C3+ 1.850
Hydrogen Sulfide	NIL	NIL		GPM TOTAL iC5+ 0.209
Methane	79.916	63.605		
Ethane	13.217	19.716	3.537	
Propane	4.092	8.952	1.128	
Iso-Butane	0.635	1.831	0.208	
n-Butane	0.967	2.788	0.305	
Iso-Pentane	0.228	0.816	0.083	
n-Pentane	0.157	0.562	0.057	
Hexanes	0.089	0.369	0.035	
Heptanes Plus	0.073	0.374	0.034	
	100.000	100.000	5.387	

Physical Properties	Total	C7+
Relative Density Real Gas	0.6980	3.4812
Calculated Molecular Weight	20.16	100.82
Compressibility Factor	0.9967	

GPA 2172-09 Calculation:

Calculated Gross BTU per ft³ @ 14.696 psia & 60°F

Real Gas Dry BTU	1224	5427
Water Sat. Gas Base BTU	1203	5332

Comments: H2O Mol% : 1.744 ; Wt% : 1.562
Field Comments: 17.9 gallons per minute

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



Certificate of Analysis

Number: 1030-14040325-001A

Houston Laboratories
8820 Interchange Drive
Houston, TX 77054
Phone 713-660-0901

W. Steven Kiser
Dominion Transmission
335 US Highway 33 West
Weston , WV 26452

Apr. 10, 2014

Station Name: New Martinsville
Station Location: Natrium
Sample Point: Inlet Cotactor
Cylinder No: 126
Analyzed: 04/10/2014 06:49:59 by JD

Sampled By: Derby
Sample Of: Gas Spot
Sample Date: 03/26/2014 11:45
Sample Conditions: 1125 psig, @ 95 °F
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia	
Nitrogen	0.478	0.664		
Methane	79.916	63.605		
Carbon Dioxide	0.148	0.323		
Hydrogen Sulfide	NIL	NIL		
Ethane	13.217	19.716	3.537	
Propane	4.092	8.952	1.128	
Iso-Butane	0.635	1.831	0.208	
n-Butane	0.967	2.788	0.305	
Iso-Pentane	0.228	0.816	0.083	
n-Pentane	0.157	0.562	0.057	
i-Hexanes	0.058	0.240	0.023	
n-Hexane	0.031	0.129	0.012	
Benzene	0.001	0.004	NIL	
Cyclohexane	0.005	0.020	0.002	
i-Heptanes	0.029	0.142	0.013	
n-Heptane	0.010	0.050	0.005	
Toluene	0.003	0.013	0.001	
i-Octanes	0.020	0.114	0.010	
n-Octane	0.002	0.010	0.001	
Ethylbenzene	NIL	NIL	NIL	
Xylenes	0.002	0.009	0.001	
i-Nonanes	0.001	0.012	0.001	
n-Nonane	NIL	NIL	NIL	
i-Decanes	NIL	NIL	NIL	
n-Decane	NIL	NIL	NIL	
Undecanes	NIL	NIL	NIL	
Dodecanes	NIL	NIL	NIL	
Tridecanes	NIL	NIL	NIL	
Tetradecanes Plus	NIL	NIL	NIL	
	<u>100.000</u>	<u>100.000</u>	<u>5.387</u>	

GPM TOTAL C2+ 5.387



Certificate of Analysis

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W. Steven Kiser
Dominion Transmission
335 US Highway 33 West
Weston , WV 26452

Apr. 10, 2014

Station Name: New Martinsville
Station Location: Natrium
Sample Point: Inlet Cotactor
Cylinder No: 126
Analyzed: 04/10/2014 06:49:59 by JD

Sampled By: Derby
Sample Of: Gas Spot
Sample Date: 03/26/2014 11:45
Sample Conditions: 1125 psig, @ 95 °F
Method: GPA 2286

Physical Properties	Total
Calculated Molecular Weight	20.157
GPA 2172-09 Calculation:	
Calculated Gross BTU per ft³ @ 14.696 psia & 60°F	
Real Gas Dry BTU	1223.8
Water Sat. Gas Base BTU	1203
Relative Density Real Gas	0.6980
Compressibility Factor	0.9967
Comments: Field Comments: 17.9 gallons per minute	

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Natrium Plant Dehydration Unit S006
File Name: C:\Users\lx-general\Desktop\Natrium Dehy S006 PTE Aug 2017 - 40 gpm.ddf
Date: July 31, 2017

DESCRIPTION:

Description: 460 MMscf/day glycol dehydration. Emissions
are 98% controlled. 2017 gas analysis.
Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 120.00 deg. F
Pressure: 1200.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.1490
Nitrogen	0.3330
Methane	81.7370
Ethane	11.9690
Propane	3.5880
Isobutane	0.6170
n-Butane	0.8980
Isopentane	0.2660
n-Pentane	0.2040
n-Hexane	0.0498
Other Hexanes	0.1061
Heptanes	0.0555
Benzene	0.0011
Toluene	0.0013
Xylenes	0.0004
C8+ Heavies	0.0248

DRY GAS:

Flow Rate: 460.0 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Flow Rate: 40.0 gpm

PUMP:

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

Flash Control: Combustion device
Flash Control Efficiency: 98.00 %
Temperature: 125.0 deg. F
Pressure: 75.0 psig

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device: Condenser
Temperature: 125.0 deg. F
Pressure: 14.7 psia
Control Device: Combustion Device
Destruction Efficiency: 98.0 %
Excess Oxygen: 0.0 %
Ambient Air Temperature: 80.0 deg. F

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Natrium Plant Dehydration Unit S006

File Name: C:\Users\tx-general\Desktop\Natrium Dehy S006 PTE Aug 2017 - 40 gpm.ddf

Date: July 31, 2017

DESCRIPTION:

Description: 460 MMscf/day glycol dehydration. Emissions are 98% controlled.

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0870	2.089	0.3812
Ethane	0.1692	4.061	0.7411
Propane	0.2084	5.002	0.9128
Isobutane	0.0698	1.676	0.3058
n-Butane	0.1476	3.541	0.6463
Isopentane	0.0486	1.167	0.2130
n-Pentane	0.0513	1.230	0.2245
n-Hexane	0.0235	0.565	0.1030
Other Hexanes	0.0372	0.892	0.1629
Heptanes	0.0477	1.144	0.2088
Benzene	0.0228	0.547	0.0998
Toluene	0.0334	0.800	0.1461
Xylenes	0.0126	0.301	0.0550
C8+ Heavies	0.0020	0.049	0.0089
Total Emissions	0.9610	23.063	4.2090
Total Hydrocarbon Emissions	0.9610	23.063	4.2090
Total VOC Emissions	0.7047	16.914	3.0868
Total HAP Emissions	0.0922	2.213	0.4038
Total BTEX Emissions	0.0687	1.648	0.3008

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	4.3575	104.579	19.0857
Ethane	8.4790	203.497	37.1382
Propane	10.4842	251.622	45.9209
Isobutane	3.5254	84.611	15.4415
n-Butane	7.4757	179.417	32.7436
Isopentane	2.5008	60.019	10.9535
n-Pentane	2.6536	63.686	11.6227
n-Hexane	1.2702	30.485	5.5636
Other Hexanes	1.9788	47.492	8.6672
Heptanes	2.8916	69.397	12.6650
Benzene	1.3651	32.762	5.9791
Toluene	2.3656	56.775	10.3615
Xylenes	1.3096	31.431	5.7362
C8+ Heavies	6.0327	144.786	26.4234
Total Emissions	56.6900	1360.560	248.3022
Total Hydrocarbon Emissions	56.6900	1360.560	248.3022
Total VOC Emissions	43.8535	1052.484	192.0783
Total HAP Emissions	6.3106	151.454	27.6404
Total BTEX Emissions	5.0404	120.969	22.0768

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	1.2715	30.516	5.5691
Ethane	0.7826	18.781	3.4276
Propane	0.3839	9.215	1.6817
Isobutane	0.0886	2.126	0.3879
n-Butane	0.1430	3.431	0.6262
Isopentane	0.0431	1.033	0.1886
n-Pentane	0.0365	0.875	0.1598
n-Hexane	0.0101	0.243	0.0443
Other Hexanes	0.0208	0.499	0.0911
Heptanes	0.0119	0.286	0.0523
Benzene	0.0004	0.008	0.0015
Toluene	0.0004	0.010	0.0018
Xylenes	0.0001	0.002	0.0004
C8+ Heavies	0.0027	0.065	0.0119
Total Emissions	2.7955	67.091	12.2441
Total Hydrocarbon Emissions	2.7955	67.091	12.2441
Total VOC Emissions	0.7414	17.794	3.2474
Total HAP Emissions	0.0110	0.263	0.0480
Total BTEX Emissions	0.0008	0.020	0.0037

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	63.5747	1525.793	278.4572
Ethane	39.1277	939.064	171.3792
Propane	19.1974	460.737	84.0844
Isobutane	4.4285	106.283	19.3966
n-Butane	7.1486	171.566	31.3108
Isopentane	2.1527	51.666	9.4290
n-Pentane	1.8237	43.769	7.9879
n-Hexane	0.5055	12.131	2.2140
Other Hexanes	1.0402	24.965	4.5560
Heptanes	0.5966	14.317	2.6129
Benzene	0.0175	0.421	0.0768
Toluene	0.0204	0.489	0.0893
Xylenes	0.0045	0.107	0.0195
C8+ Heavies	0.1355	3.251	0.5934
Total Emissions	139.7733	3354.560	612.2071
Total Hydrocarbon Emissions	139.7733	3354.560	612.2071
Total VOC Emissions	37.0709	889.702	162.3707
Total HAP Emissions	0.5479	13.149	2.3996
Total BTEX Emissions	0.0424	1.017	0.1857

EQUIPMENT REPORTS:

CONDENSER AND COMBUSTION DEVICE

Condenser Outlet Temperature: 125.00 deg. F
 Condenser Pressure: 14.70 psia
 Condenser Duty: 1.98e-001 MM BTU/hr
 Hydrocarbon Recovery: 0.67 bbls/day
 Produced Water: 108.27 bbls/day
 Ambient Temperature: 80.00 deg. F
 Excess Oxygen: 0.00 %
 Combustion Efficiency: 98.00 %
 Supplemental Fuel Requirement: 1.98e-001 MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	1.99%	98.01%
Isobutane	1.98%	98.02%
n-Butane	1.97%	98.03%
Isopentane	1.94%	98.06%
n-Pentane	1.93%	98.07%
n-Hexane	1.85%	98.15%
Other Hexanes	1.88%	98.12%
Heptanes	1.65%	98.35%
Benzene	1.67%	98.33%
Toluene	1.41%	98.59%
Xylenes	0.96%	99.04%
C8+ Heavies	0.03%	99.97%

ABSORBER

Calculated Absorber Stages: 1.67
 Specified Dry Gas Dew Point: 7.00 lbs. H2O/MMSCF
 Temperature: 120.0 deg. F
 Pressure: 1200.0 psig
 Dry Gas Flow Rate: 460.0000 MMSCF/day
 Glycol Losses with Dry Gas: 32.5653 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 89.44 lbs. H2O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 1.52 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	7.81%	92.19%
Carbon Dioxide	99.88%	0.12%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.97%	0.03%
Propane	99.96%	0.04%
Isobutane	99.96%	0.04%
n-Butane	99.94%	0.06%
Isopentane	99.95%	0.05%
n-Pentane	99.94%	0.06%
n-Hexane	99.92%	0.08%
Other Hexanes	99.93%	0.07%
Heptanes	99.88%	0.12%
Benzene	96.81%	3.19%
Toluene	96.06%	3.94%
Xylenes	93.87%	6.13%
C8+ Heavies	99.71%	0.29%

FLASH TANK

Flash Control: Combustion device
 Flash Control Efficiency: 98.00 %
 Flash Temperature: 125.0 deg. F
 Flash Pressure: 75.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.98%	0.02%
Carbon Dioxide	46.40%	53.60%
Nitrogen	5.91%	94.09%
Methane	6.41%	93.59%
Ethane	17.81%	82.19%
Propane	35.32%	64.68%
Isobutane	44.32%	55.68%
n-Butane	51.12%	48.88%
Isopentane	53.97%	46.03%
n-Pentane	59.47%	40.53%
n-Hexane	71.68%	28.32%
Other Hexanes	65.89%	34.11%
Heptanes	82.98%	17.02%
Benzene	98.79%	1.21%
Toluene	99.21%	0.79%
Xylenes	99.70%	0.30%
C8+ Heavies	98.07%	1.93%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	17.59%	82.41%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.93%	99.07%
n-Pentane	0.84%	99.16%
n-Hexane	0.70%	99.30%
Other Hexanes	1.52%	98.48%
Heptanes	0.60%	99.40%
Benzene	5.06%	94.94%
Toluene	7.97%	92.03%
Xylenes	13.00%	87.00%
C8+ Heavies	12.28%	87.72%

STREAM REPORTS:

WET GAS STREAM

Temperature: 120.00 deg. F
 Pressure: 1214.70 psia
 Flow Rate: 1.92e+007 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.88e-001	1.72e+003
Carbon Dioxide	1.49e-001	3.31e+003
Nitrogen	3.32e-001	4.71e+003
Methane	8.16e+001	6.62e+005
Ethane	1.19e+001	1.82e+005
Propane	3.58e+000	7.99e+004
Isobutane	6.16e-001	1.81e+004
n-Butane	8.96e-001	2.64e+004
Isopentane	2.65e-001	9.70e+003
n-Pentane	2.04e-001	7.44e+003
n-Hexane	4.97e-002	2.17e+003
Other Hexanes	1.06e-001	4.62e+003
Heptanes	5.54e-002	2.81e+003
Benzene	1.10e-003	4.34e+001
Toluene	1.30e-003	6.05e+001
Xylenes	3.99e-004	2.15e+001
C8+ Heavies	2.48e-002	2.13e+003
Total Components	100.00	1.01e+006

DRY GAS STREAM

Temperature: 120.00 deg. F
 Pressure: 1214.70 psia
 Flow Rate: 1.92e+007 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.47e-002	1.34e+002
Carbon Dioxide	1.49e-001	3.31e+003
Nitrogen	3.33e-001	4.71e+003
Methane	8.17e+001	6.62e+005
Ethane	1.20e+001	1.82e+005
Propane	3.59e+000	7.99e+004
Isobutane	6.17e-001	1.81e+004
n-Butane	8.97e-001	2.64e+004
Isopentane	2.66e-001	9.69e+003
n-Pentane	2.04e-001	7.43e+003
n-Hexane	4.98e-002	2.17e+003
Other Hexanes	1.06e-001	4.62e+003
Heptanes	5.54e-002	2.81e+003
Benzene	1.06e-003	4.20e+001
Toluene	1.25e-003	5.81e+001
Xylenes	3.75e-004	2.01e+001
C8+ Heavies	2.47e-002	2.13e+003
Total Components	100.00	1.01e+006

LEAN GLYCOL STREAM

Temperature: 120.00 deg. F
 Flow Rate: 4.00e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	2.22e+004
Water	1.50e+000	3.38e+002
Carbon Dioxide	1.74e-012	3.92e-010
Nitrogen	2.51e-013	5.65e-011
Methane	1.01e-017	2.28e-015
Ethane	9.98e-008	2.25e-005
Propane	5.37e-009	1.21e-006
Isobutane	1.06e-009	2.39e-007
n-Butane	1.61e-009	3.63e-007
Isopentane	1.04e-004	2.34e-002
n-Pentane	9.99e-005	2.25e-002
n-Hexane	3.96e-005	8.92e-003
Other Hexanes	1.35e-004	3.05e-002
Heptanes	7.78e-005	1.75e-002
Benzene	3.23e-004	7.28e-002
Toluene	9.10e-004	2.05e-001
Xylenes	8.69e-004	1.96e-001
C8+ Heavies	3.75e-003	8.45e-001
Total Components	100.00	2.25e+004

RICH GLYCOL STREAM

Temperature: 120.00 deg. F
 Pressure: 1214.70 psia
 Flow Rate: 4.35e+001 gpm
 NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.13e+001	2.22e+004
Water	7.91e+000	1.92e+003
Carbon Dioxide	1.61e-002	3.92e+000
Nitrogen	2.32e-003	5.64e-001
Methane	2.80e-001	6.79e+001
Ethane	1.96e-001	4.76e+001
Propane	1.22e-001	2.97e+001
Isobutane	3.28e-002	7.95e+000
n-Butane	6.02e-002	1.46e+001
Isopentane	1.93e-002	4.68e+000
n-Pentane	1.85e-002	4.50e+000
n-Hexane	7.35e-003	1.78e+000
Other Hexanes	1.26e-002	3.05e+000
Heptanes	1.44e-002	3.51e+000
Benzene	5.99e-003	1.46e+000
Toluene	1.07e-002	2.59e+000
Xylenes	6.22e-003	1.51e+000
C8+ Heavies	2.89e-002	7.01e+000
Total Components	100.00	2.43e+004

FLASH TANK OFF GAS STREAM

Temperature: 125.00 deg. F
 Pressure: 89.70 psia
 Flow Rate: 2.30e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	4.31e-001	4.72e-001
Carbon Dioxide	7.86e-001	2.10e+000
Nitrogen	3.12e-001	5.30e-001
Methane	6.53e+001	6.36e+001
Ethane	2.14e+001	3.91e+001
Propane	7.17e+000	1.92e+001
Isobutane	1.25e+000	4.43e+000
n-Butane	2.03e+000	7.15e+000
Isopentane	4.91e-001	2.15e+000
n-Pentane	4.16e-001	1.82e+000
n-Hexane	9.66e-002	5.05e-001
Other Hexanes	1.99e-001	1.04e+000
Heptanes	9.80e-002	5.97e-001
Benzene	3.70e-003	1.75e-002
Toluene	3.65e-003	2.04e-002
Xylenes	6.92e-004	4.46e-003
C8+ Heavies	1.31e-002	1.35e-001
Total Components	100.00	1.43e+002

FLASH TANK GLYCOL STREAM

Temperature: 125.00 deg. F
 Flow Rate: 4.32e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.18e+001	2.22e+004
Water	7.96e+000	1.92e+003
Carbon Dioxide	7.54e-003	1.82e+000
Nitrogen	1.38e-004	3.33e-002
Methane	1.81e-002	4.36e+000
Ethane	3.51e-002	8.48e+000
Propane	4.34e-002	1.05e+001
Isobutane	1.46e-002	3.53e+000
n-Butane	3.10e-002	7.48e+000
Isopentane	1.05e-002	2.52e+000
n-Pentane	1.11e-002	2.68e+000
n-Hexane	5.30e-003	1.28e+000
Other Hexanes	8.33e-003	2.01e+000
Heptanes	1.21e-002	2.91e+000
Benzene	5.96e-003	1.44e+000
Toluene	1.07e-002	2.57e+000
Xylenes	6.24e-003	1.51e+000
C8+ Heavies	2.85e-002	6.88e+000
Total Components	100.00	2.41e+004

FLASH GAS EMISSIONS

Flow Rate: 9.08e+003 scfh
 Control Method: Combustion Device
 Control Efficiency: 98.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.19e+001	2.67e+002
Carbon Dioxide	3.75e+001	3.95e+002
Nitrogen	7.91e-002	5.30e-001
Methane	3.31e-001	1.27e+000
Ethane	1.09e-001	7.83e-001
Propane	3.64e-002	3.84e-001
Isobutane	6.37e-003	8.86e-002
n-Butane	1.03e-002	1.43e-001
Isopentane	2.49e-003	4.31e-002
n-Pentane	2.11e-003	3.65e-002
n-Hexane	4.90e-004	1.01e-002
Other Hexanes	1.01e-003	2.08e-002
Heptanes	4.98e-004	1.19e-002
Benzene	1.88e-005	3.51e-004
Toluene	1.85e-005	4.08e-004
Xylenes	3.51e-006	8.92e-005
C8+ Heavies	6.65e-005	2.71e-003
Total Components	100.00	6.65e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 3.38e+004 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.86e+001	1.58e+003
Carbon Dioxide	4.64e-002	1.82e+000
Nitrogen	1.33e-003	3.33e-002
Methane	3.05e-001	4.36e+000
Ethane	3.16e-001	8.48e+000
Propane	2.67e-001	1.05e+001
Isobutane	6.80e-002	3.53e+000
n-Butane	1.44e-001	7.48e+000
Isopentane	3.89e-002	2.50e+000
n-Pentane	4.13e-002	2.65e+000
n-Hexane	1.65e-002	1.27e+000
Other Hexanes	2.58e-002	1.98e+000
Heptanes	3.24e-002	2.89e+000
Benzene	1.96e-002	1.37e+000
Toluene	2.88e-002	2.37e+000
Xylenes	1.38e-002	1.31e+000
C8+ Heavies	3.97e-002	6.03e+000
Total Components	100.00	1.64e+003

CONDENSER PRODUCED WATER STREAM

Temperature: 125.00 deg. F
 Flow Rate: 3.16e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	1.00e+002	1.58e+003	999774.
Carbon Dioxide	2.47e-003	3.90e-002	25.
Nitrogen	1.24e-006	1.97e-005	0.
Methane	3.10e-004	4.90e-003	3.
Ethane	6.77e-004	1.07e-002	7.
Propane	8.86e-004	1.40e-002	9.
Isobutane	1.61e-004	2.54e-003	2.
n-Butane	4.48e-004	7.08e-003	4.
Isopentane	1.03e-004	1.63e-003	1.
n-Pentane	1.17e-004	1.84e-003	1.
n-Hexane	4.39e-005	6.93e-004	0.
Other Hexanes	5.61e-005	8.86e-004	1.
Heptanes	4.89e-005	7.73e-004	0.
Benzene	6.50e-003	1.03e-001	65.
Toluene	7.76e-003	1.23e-001	78.
Xylenes	3.01e-003	4.76e-002	30.
C8+ Heavies	1.28e-006	2.03e-005	0.
Total Components	100.00	1.58e+003	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 125.00 deg. F
 Flow Rate: 1.96e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	2.75e-002	2.29e-003
Carbon Dioxide	9.22e-003	7.68e-004
Nitrogen	2.08e-005	1.73e-006
Methane	9.67e-003	8.05e-004
Ethane	1.07e-001	8.87e-003
Propane	6.00e-001	4.99e-002
Isobutane	3.85e-001	3.21e-002
n-Butane	1.09e+000	9.08e-002
Isopentane	8.17e-001	6.80e-002
n-Pentane	1.07e+000	8.87e-002
n-Hexane	1.12e+000	9.33e-002
Other Hexanes	1.42e+000	1.19e-001
Heptanes	6.10e+000	5.08e-001
Benzene	1.48e+000	1.24e-001
Toluene	6.91e+000	5.75e-001
Xylenes	7.62e+000	6.34e-001
C8+ Heavies	7.12e+001	5.93e+000
Total Components	100.00	8.33e+000

CONDENSER VENT STREAM

Temperature: 125.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 5.19e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.33e+001	3.27e+000
Carbon Dioxide	2.96e+000	1.78e+000
Nitrogen	8.70e-002	3.33e-002
Methane	1.99e+001	4.35e+000
Ethane	2.06e+001	8.46e+000
Propane	1.73e+001	1.04e+001
Isobutane	4.39e+000	3.49e+000
n-Butane	9.29e+000	7.38e+000
Isopentane	2.47e+000	2.43e+000
n-Pentane	2.60e+000	2.56e+000
n-Hexane	9.99e-001	1.18e+000
Other Hexanes	1.58e+000	1.86e+000
Heptanes	1.74e+000	2.38e+000
Benzene	1.07e+000	1.14e+000
Toluene	1.32e+000	1.67e+000
Xylenes	4.32e-001	6.28e-001
C8+ Heavies	4.36e-002	1.01e-001
Total Components	100.00	5.31e+001

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 8.68e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	2.37e+001	8.70e-002
Ethane	2.46e+001	1.69e-001
Propane	2.07e+001	2.08e-001
Isobutane	5.25e+000	6.98e-002
n-Butane	1.11e+001	1.48e-001
Isopentane	2.95e+000	4.86e-002
n-Pentane	3.11e+000	5.13e-002
n-Hexane	1.19e+000	2.35e-002
Other Hexanes	1.89e+000	3.72e-002
Heptanes	2.08e+000	4.77e-002
Benzene	1.28e+000	2.28e-002
Toluene	1.58e+000	3.34e-002
Xylenes	5.17e-001	1.26e-002
C8+ Heavies	5.21e-002	2.03e-003
Total Components	100.00	9.61e-001

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Natrium Plant Dehydration Unit
File Name: T:\Blue Racer Midstream - 646\646-12 Natrium Cryo Addition Permitting\Calculations\Natrium Dehy Calculations 2015.ddf
Date: June 27, 2015

DESCRIPTION:

Description: 230 MMscf/day glycol dehydration. Emissions are 98% controlled. 2014 gas analysis.
Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 120.00 deg. F
Pressure: 1200.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.1480
Nitrogen	0.4780
Methane	79.9160
Ethane	13.2170
Propane	4.0920
Isobutane	0.6350
n-Butane	0.9670
Isopentane	0.2280
n-Pentane	0.1570
n-Hexane	0.0310
Cyclohexane	0.0050
Other Hexanes	0.0580
Heptanes	0.0390
Benzene	0.0010
Toluene	0.0030
Xylenes	0.0020
C8+ Heavies	0.0230

DRY GAS:

Flow Rate: 230.0 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Flow Rate: 40.0 gpm

PUMP:

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

Flash Control: Combustion device
Flash Control Efficiency: 98.00 %
Temperature: 125.0 deg. F
Pressure: 75.0 psig

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device: Condenser
Temperature: 125.0 deg. F
Pressure: 14.7 psia
Control Device: Combustion Device
Destruction Efficiency: 98.0 %
Excess Oxygen: 0.0 %
Ambient Air Temperature: 80.0 deg. F

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Natrium Plant Dehydration Unit
 File Name: T:\Blue Racer Midstream - 646\646-12 Natrium Cryo Addition Permitting\Calculations\Natrium Dehy Ca
 Date: June 27, 2015

DESCRIPTION:

Description: 230 MMscf/day glycol dehydration. Emissions are 98% controlled.

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0895	2.147	0.3918
Ethane	0.2108	5.060	0.9235
Propane	0.2352	5.644	1.0301
Isobutane	0.0728	1.748	0.3190
n-Butane	0.1608	3.859	0.7042
Isopentane	0.0425	1.020	0.1862
n-Pentane	0.0401	0.963	0.1758
n-Hexane	0.0148	0.355	0.0648
Cyclohexane	0.0126	0.303	0.0553
Other Hexanes	0.0208	0.500	0.0912
Heptanes	0.0328	0.787	0.1436
Benzene	0.0197	0.473	0.0862
Toluene	0.0652	1.564	0.2855
Xylenes	0.0430	1.031	0.1882
C8+ Heavies	0.0012	0.030	0.0054
Total Emissions	1.0618	25.484	4.6508
Total Hydrocarbon Emissions	1.0618	25.484	4.6508
Total VOC Emissions	0.7615	18.277	3.3355
Total HAP Emissions	0.1426	3.423	0.6247
Total BTEX Emissions	0.1278	3.068	0.5599

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	4.4765	107.435	19.6069
Ethane	10.5630	253.513	46.2661
Propane	11.8457	284.297	51.8843
Isobutane	3.6904	88.569	16.1638
n-Butane	8.1841	196.418	35.8463
Isopentane	2.2194	53.266	9.7210
n-Pentane	2.1117	50.680	9.2491
n-Hexane	0.8297	19.913	3.6341
Cyclohexane	0.7415	17.795	3.2476
Other Hexanes	1.1392	27.342	4.9899
Heptanes	2.1744	52.186	9.5240
Benzene	1.2291	29.499	5.3837
Toluene	5.3833	129.199	23.5788
Xylenes	6.2676	150.422	27.4519
C8+ Heavies	6.0062	144.148	26.3071
Total Emissions	66.8618	1604.683	292.8546
Total Hydrocarbon Emissions	66.8618	1604.683	292.8546
Total VOC Emissions	51.8223	1243.734	226.9815
Total HAP Emissions	13.7097	329.033	60.0485
Total BTEX Emissions	12.8800	309.120	56.4144

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	1.3285	31.883	5.8187
Ethane	0.9234	22.162	4.0446
Propane	0.4545	10.908	1.9907
Isobutane	0.0947	2.272	0.4147
n-Butane	0.1599	3.837	0.7002
Isopentane	0.0382	0.918	0.1675
n-Pentane	0.0290	0.696	0.1270
n-Hexane	0.0064	0.154	0.0281
Cyclohexane	0.0015	0.036	0.0065
Other Hexanes	0.0116	0.279	0.0509
Heptanes	0.0083	0.200	0.0365
Benzene	0.0003	0.008	0.0014
Toluene	0.0009	0.022	0.0040
Xylenes	0.0004	0.010	0.0018
C8+ Heavies	0.0023	0.054	0.0099
Total Emissions	3.0599	73.438	13.4024
Total Hydrocarbon Emissions	3.0599	73.438	13.4024
Total VOC Emissions	0.8080	19.393	3.5392
Total HAP Emissions	0.0080	0.193	0.0352
Total BTEX Emissions	0.0016	0.039	0.0072

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	66.4232	1594.157	290.9337
Ethane	46.1714	1108.113	202.2306
Propane	22.7254	545.409	99.5372
Isobutane	4.7339	113.613	20.7344
n-Butane	7.9929	191.830	35.0090
Isopentane	1.9116	45.878	8.3727
n-Pentane	1.4500	34.799	6.3509
n-Hexane	0.3202	7.686	1.4027
Cyclohexane	0.0745	1.787	0.3261
Other Hexanes	0.5808	13.939	2.5439
Heptanes	0.4170	10.009	1.8266
Benzene	0.0159	0.381	0.0695
Toluene	0.0453	1.087	0.1983
Xylenes	0.0209	0.502	0.0916
C8+ Heavies	0.1131	2.714	0.4953
Total Emissions	152.9960	3671.904	670.1224
Total Hydrocarbon Emissions	152.9960	3671.904	670.1224
Total VOC Emissions	40.4014	969.633	176.9581
Total HAP Emissions	0.4023	9.655	1.7621
Total BTEX Emissions	0.0821	1.970	0.3594

EQUIPMENT REPORTS:

CONDENSER AND COMBUSTION DEVICE

Condenser Outlet Temperature: 125.00 deg. F
 Condenser Pressure: 14.70 psia
 Condenser Duty: 2.17e-001 MM BTU/hr
 Hydrocarbon Recovery: 1.09 bbls/day
 Produced Water: 54.16 bbls/day
 Ambient Temperature: 80.00 deg. F
 Excess Oxygen: 0.00 %
 Combustion Efficiency: 98.00 %
 Supplemental Fuel Requirement: 2.17e-001 MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	1.99%	98.01%
Isobutane	1.97%	98.03%
n-Butane	1.96%	98.04%
Isopentane	1.92%	98.08%
n-Pentane	1.90%	98.10%
n-Hexane	1.78%	98.22%
Cyclohexane	1.70%	98.30%
Other Hexanes	1.83%	98.17%
Heptanes	1.51%	98.49%
Benzene	1.60%	98.40%
Toluene	1.21%	98.79%
Xylenes	0.69%	99.31%
C8+ Heavies	0.02%	99.98%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
 Calculated Dry Gas Dew Point: 6.86 lbs. H2O/MMSCF

Temperature: 120.0 deg. F
 Pressure: 1200.0 psig
 Dry Gas Flow Rate: 230.0000 MMSCF/day
 Glycol Losses with Dry Gas: 16.8830 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 89.52 lbs. H2O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 3.03 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	7.65%	92.35%
Carbon Dioxide	99.76%	0.24%
Nitrogen	99.97%	0.03%
Methane	99.98%	0.02%
Ethane	99.94%	0.06%
Propane	99.92%	0.08%
Isobutane	99.91%	0.09%
n-Butane	99.89%	0.11%
Isopentane	99.90%	0.10%
n-Pentane	99.88%	0.12%
n-Hexane	99.83%	0.17%
Cyclohexane	99.23%	0.77%
Other Hexanes	99.86%	0.14%
Heptanes	99.74%	0.26%
Benzene	93.69%	6.31%
Toluene	92.23%	7.77%
Xylenes	88.27%	11.73%
C8+ Heavies	99.38%	0.62%

FLASH TANK

Flash Control: Combustion device
 Flash Control Efficiency: 98.00 %
 Flash Temperature: 125.0 deg. F
 Flash Pressure: 75.0 psig

Component	Left in		Removed in	
		Glycol	Flash Gas	
Water	99.97%		0.03%	
Carbon Dioxide		45.26%		54.74%
Nitrogen	6.03%			93.97%
Methane	6.31%			93.69%
Ethane	18.62%			81.38%
Propane	34.26%			65.74%
Isobutane	43.81%			56.19%
n-Butane	50.59%			49.41%
Isopentane	53.96%			46.04%
n-Pentane	59.49%			40.51%
n-Hexane	72.29%			27.71%
Cyclohexane	91.17%			8.83%
Other Hexanes	66.57%			33.43%
Heptanes	83.99%			16.01%
Benzene	98.79%			1.21%
Toluene	99.23%			0.77%
Xylenes	99.71%			0.29%
C8+ Heavies	98.37%			1.63%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining		Distilled	
		in Glycol	Overhead	
Water	29.85%		70.15%	
Carbon Dioxide	0.00%		100.00%	
Nitrogen	0.00%		100.00%	
Methane	0.00%		100.00%	
Ethane	0.00%		100.00%	
Propane	0.00%		100.00%	
Isobutane	0.00%		100.00%	
n-Butane	0.00%		100.00%	
Isopentane	0.93%		99.07%	
n-Pentane	0.84%		99.16%	
n-Hexane	0.69%		99.31%	
Cyclohexane	3.51%		96.49%	
Other Hexanes	1.50%		98.50%	
Heptanes	0.60%		99.40%	
Benzene	5.06%		94.94%	
Toluene	7.97%		92.03%	
Xylenes	12.98%		87.02%	
C8+ Heavies	12.23%		87.77%	

STREAM REPORTS:

WET GAS STREAM

Temperature: 120.00 deg. F
 Pressure: 1214.70 psia
 Flow Rate: 9.60e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.89e-001	8.60e+002
Carbon Dioxide	1.48e-001	1.65e+003
Nitrogen	4.77e-001	3.38e+003
Methane	7.98e+001	3.24e+005
Ethane	1.32e+001	1.00e+005
Propane	4.08e+000	4.56e+004
Isobutane	6.34e-001	9.32e+003
n-Butane	9.65e-001	1.42e+004
Isopentane	2.28e-001	4.16e+003
n-Pentane	1.57e-001	2.86e+003
n-Hexane	3.09e-002	6.75e+002
Cyclohexane	4.99e-003	1.06e+002
Other Hexanes	5.79e-002	1.26e+003
Heptanes	3.89e-002	9.87e+002
Benzene	9.98e-004	1.97e+001
Toluene	2.99e-003	6.98e+001
Xylenes	2.00e-003	5.36e+001
C8+ Heavies	2.30e-002	9.90e+002
Total Components	100.00	5.10e+005

DRY GAS STREAM

Temperature: 120.00 deg. F
 Pressure: 1214.70 psia
 Flow Rate: 9.58e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.45e-002	6.58e+001
Carbon Dioxide	1.48e-001	1.64e+003
Nitrogen	4.78e-001	3.38e+003
Methane	7.99e+001	3.24e+005
Ethane	1.32e+001	1.00e+005
Propane	4.09e+000	4.56e+004
Isobutane	6.35e-001	9.32e+003
n-Butane	9.66e-001	1.42e+004
Isopentane	2.28e-001	4.15e+003
n-Pentane	1.57e-001	2.86e+003
n-Hexane	3.10e-002	6.74e+002
Cyclohexane	4.96e-003	1.05e+002
Other Hexanes	5.79e-002	1.26e+003
Heptanes	3.89e-002	9.85e+002
Benzene	9.37e-004	1.85e+001
Toluene	2.77e-003	6.44e+001
Xylenes	1.77e-003	4.74e+001
C8+ Heavies	2.29e-002	9.84e+002
Total Components	100.00	5.09e+005

LEAN GLYCOL STREAM

Temperature: 120.00 deg. F
 Flow Rate: 4.00e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	2.22e+004
Water	1.50e+000	3.38e+002
Carbon Dioxide	1.76e-012	3.97e-010
Nitrogen	3.90e-013	8.79e-011
Methane	1.06e-017	2.38e-015
Ethane	1.19e-007	2.68e-005
Propane	6.25e-009	1.41e-006
Isobutane	1.12e-009	2.53e-007
n-Butane	1.78e-009	4.01e-007
Isopentane	9.22e-005	2.08e-002
n-Pentane	7.95e-005	1.79e-002
n-Hexane	2.57e-005	5.78e-003
Cyclohexane	1.20e-004	2.70e-002
Other Hexanes	7.72e-005	1.74e-002
Heptanes	5.78e-005	1.30e-002
Benzene	2.91e-004	6.55e-002
Toluene	2.07e-003	4.66e-001
Xylenes	4.15e-003	9.35e-001
C8+ Heavies	3.72e-003	8.37e-001
Total Components	100.00	2.25e+004

RICH GLYCOL STREAM

Temperature: 120.00 deg. F
 Pressure: 1214.70 psia
 Flow Rate: 4.20e+001 gpm
 NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.42e+001	2.22e+004
Water	4.81e+000	1.13e+003
Carbon Dioxide	1.69e-002	3.97e+000
Nitrogen	3.74e-003	8.79e-001
Methane	3.01e-001	7.09e+001
Ethane	2.41e-001	5.67e+001
Propane	1.47e-001	3.46e+001
Isobutane	3.58e-002	8.42e+000
n-Butane	6.88e-002	1.62e+001
Isopentane	1.76e-002	4.15e+000
n-Pentane	1.52e-002	3.58e+000
n-Hexane	4.91e-003	1.16e+000
Cyclohexane	3.58e-003	8.43e-001
Other Hexanes	7.39e-003	1.74e+000
Heptanes	1.11e-002	2.60e+000
Benzene	5.57e-003	1.31e+000
Toluene	2.51e-002	5.89e+000
Xylenes	3.07e-002	7.22e+000
C8+ Heavies	2.96e-002	6.96e+000
Total Components	100.00	2.35e+004

FLASH TANK OFF GAS STREAM

Temperature: 125.00 deg. F
 Pressure: 89.70 psia
 Flow Rate: 2.49e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.57e-001	3.04e-001
Carbon Dioxide	7.52e-001	2.17e+000
Nitrogen	4.49e-001	8.26e-001
Methane	6.30e+001	6.64e+001
Ethane	2.34e+001	4.62e+001
Propane	7.84e+000	2.27e+001
Isobutane	1.24e+000	4.73e+000
n-Butane	2.09e+000	7.99e+000
Isopentane	4.03e-001	1.91e+000
n-Pentane	3.06e-001	1.45e+000
n-Hexane	5.66e-002	3.20e-001
Cyclohexane	1.35e-002	7.45e-002
Other Hexanes	1.03e-001	5.81e-001
Heptanes	6.33e-002	4.17e-001
Benzene	3.09e-003	1.59e-002
Toluene	7.48e-003	4.53e-002
Xylenes	3.00e-003	2.09e-002
C8+ Heavies	1.01e-002	1.13e-001
Total Components	100.00	1.56e+002

FLASH TANK GLYCOL STREAM

Temperature: 125.00 deg. F
 Flow Rate: 4.17e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.49e+001	2.22e+004
Water	4.84e+000	1.13e+003
Carbon Dioxide	7.69e-003	1.80e+000
Nitrogen	2.27e-004	5.30e-002
Methane	1.92e-002	4.48e+000
Ethane	4.52e-002	1.06e+001
Propane	5.07e-002	1.18e+001
Isobutane	1.58e-002	3.69e+000
n-Butane	3.50e-002	8.18e+000
Isopentane	9.59e-003	2.24e+000
n-Pentane	9.11e-003	2.13e+000
n-Hexane	3.58e-003	8.35e-001
Cyclohexane	3.29e-003	7.68e-001
Other Hexanes	4.95e-003	1.16e+000
Heptanes	9.36e-003	2.19e+000
Benzene	5.54e-003	1.29e+000
Toluene	2.50e-002	5.85e+000
Xylenes	3.08e-002	7.20e+000
C8+ Heavies	2.93e-002	6.84e+000
Total Components	100.00	2.34e+004

FLASH GAS EMISSIONS

Flow Rate: 9.91e+003 scfh
 Control Method: Combustion Device
 Control Efficiency: 98.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.18e+001	2.91e+002
Carbon Dioxide	3.76e+001	4.33e+002
Nitrogen	1.13e-001	8.26e-001
Methane	3.17e-001	1.33e+000
Ethane	1.18e-001	9.23e-001
Propane	3.95e-002	4.55e-001
Isobutane	6.24e-003	9.47e-002
n-Butane	1.05e-002	1.60e-001
Isopentane	2.03e-003	3.82e-002
n-Pentane	1.54e-003	2.90e-002
n-Hexane	2.84e-004	6.40e-003
Cyclohexane	6.77e-005	1.49e-003
Other Hexanes	5.16e-004	1.16e-002
Heptanes	3.19e-004	8.34e-003
Benzene	1.56e-005	3.18e-004
Toluene	3.76e-005	9.06e-004
Xylenes	1.51e-005	4.18e-004
C8+ Heavies	5.08e-005	2.26e-003
Total Components	100.00	7.27e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 1.73e+004 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.69e+001	7.94e+002
Carbon Dioxide	8.97e-002	1.80e+000
Nitrogen	4.16e-003	5.30e-002
Methane	6.13e-001	4.48e+000
Ethane	7.72e-001	1.06e+001
Propane	5.90e-001	1.18e+001
Isobutane	1.40e-001	3.69e+000
n-Butane	3.09e-001	8.18e+000
Isopentane	6.76e-002	2.22e+000
n-Pentane	6.43e-002	2.11e+000
n-Hexane	2.12e-002	8.30e-001
Cyclohexane	1.94e-002	7.41e-001
Other Hexanes	2.91e-002	1.14e+000
Heptanes	4.77e-002	2.17e+000
Benzene	3.46e-002	1.23e+000
Toluene	1.28e-001	5.38e+000
Xylenes	1.30e-001	6.27e+000
C8+ Heavies	7.75e-002	6.01e+000
Total Components	100.00	8.62e+002

CONDENSER PRODUCED WATER STREAM

Temperature: 125.00 deg. F
 Flow Rate: 1.58e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	1.00e+002	7.90e+002	999667.
Carbon Dioxide	2.23e-003	1.76e-002	22.
Nitrogen	1.79e-006	1.42e-005	0.
Methane	2.88e-004	2.28e-003	3.
Ethane	7.63e-004	6.03e-003	8.
Propane	9.06e-004	7.16e-003	9.
Isobutane	1.52e-004	1.20e-003	2.
n-Butane	4.42e-004	3.49e-003	4.
Isopentane	8.18e-005	6.46e-004	1.
n-Pentane	8.27e-005	6.54e-004	1.
n-Hexane	2.50e-005	1.98e-004	0.
Cyclohexane	1.19e-004	9.37e-004	1.
Other Hexanes	2.85e-005	2.25e-004	0.
Heptanes	3.05e-005	2.41e-004	0.
Benzene	5.09e-003	4.02e-002	51.
Toluene	1.37e-002	1.09e-001	137.
Xylenes	9.33e-003	7.38e-002	93.
C8+ Heavies	7.10e-007	5.61e-006	0.
Total Components	100.00	7.90e+002	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 125.00 deg. F
 Flow Rate: 3.18e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	3.78e-002	5.11e-003
Carbon Dioxide	8.95e-003	1.21e-003
Nitrogen	7.39e-005	1.00e-005
Methane	8.42e-003	1.14e-003
Ethane	1.08e-001	1.46e-002
Propane	5.91e-001	7.99e-002
Isobutane	3.55e-001	4.80e-002
n-Butane	1.05e+000	1.41e-001
Isopentane	6.88e-001	9.30e-002
n-Pentane	7.74e-001	1.05e-001
n-Hexane	6.63e-001	8.97e-002
Cyclohexane	8.07e-001	1.09e-001
Other Hexanes	7.21e-001	9.76e-002
Heptanes	3.95e+000	5.35e-001
Benzene	1.51e+000	2.04e-001
Toluene	1.49e+001	2.02e+000
Xylenes	2.99e+001	4.05e+000
C8+ Heavies	4.39e+001	5.94e+000
Total Components	100.00	1.35e+001

CONDENSER VENT STREAM

Temperature: 125.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 5.73e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.33e+001	3.62e+000
Carbon Dioxide	2.67e+000	1.78e+000
Nitrogen	1.25e-001	5.30e-002
Methane	1.85e+001	4.47e+000
Ethane	2.32e+001	1.05e+001
Propane	1.76e+001	1.18e+001
Isobutane	4.15e+000	3.64e+000
n-Butane	9.16e+000	8.04e+000
Isopentane	1.95e+000	2.13e+000
n-Pentane	1.84e+000	2.01e+000
n-Hexane	5.68e-001	7.40e-001
Cyclohexane	4.97e-001	6.31e-001
Other Hexanes	8.00e-001	1.04e+000
Heptanes	1.08e+000	1.64e+000
Benzene	8.34e-001	9.84e-001
Toluene	2.34e+000	3.26e+000
Xylenes	1.34e+000	2.15e+000
C8+ Heavies	2.40e-002	6.18e-002
Total Components	100.00	5.85e+001

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 9.62e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	2.20e+001	8.95e-002
Ethane	2.77e+001	2.11e-001
Propane	2.10e+001	2.35e-001
Isobutane	4.94e+000	7.28e-002
n-Butane	1.09e+001	1.61e-001
Isopentane	2.32e+000	4.25e-002
n-Pentane	2.19e+000	4.01e-002
n-Hexane	6.77e-001	1.48e-002
Cyclohexane	5.92e-001	1.26e-002
Other Hexanes	9.53e-001	2.08e-002
Heptanes	1.29e+000	3.28e-002
Benzene	9.94e-001	1.97e-002
Toluene	2.79e+000	6.52e-002
Xylenes	1.60e+000	4.30e-002
C8+ Heavies	2.86e-002	1.24e-003
Total Components	100.00	1.06e+000

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Natrium Plant Dehydration Unit

File Name: Y:\Projects\Blue Racer_646\Natrium\646-35 Permit Revision 2017\Calculations\Natrium Dehy S032 Cal

Date: December 11, 2017

DESCRIPTION:

Description: 230 MMscf/day glycol dehydration. Emissions
are 98% controlled. 2017 Gas analysis

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 120.00 deg. F

Pressure: 1200.00 psig

Wet Gas Water Content: Saturated

Component	Conc. (vol %)
-----	-----
Carbon Dioxide	0.1490
Nitrogen	0.3330
Methane	81.7370
Ethane	11.9690
Propane	3.5880
Isobutane	0.6170
n-Butane	0.8980
Isopentane	0.2660
n-Pentane	0.2040
n-Hexane	0.0498
Other Hexanes	0.1061
Heptanes	0.0555
Benzene	0.0011
Toluene	0.0013
Xylenes	0.0004
C8+ Heavies	0.0248

DRY GAS:

Flow Rate: 230.0 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H₂O
Flow Rate: 40.0 gpm

PUMP:

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

Flash Control: Combustion device
Flash Control Efficiency: 98.00 %
Temperature: 125.0 deg. F
Pressure: 75.0 psig

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device: Condenser
Temperature: 125.0 deg. F
Pressure: 14.7 psia

Control Device: Combustion Device
Destruction Efficiency: 98.0 %
Excess Oxygen: 0.0 %
Ambient Air Temperature: 80.0 deg. F

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Natrium Plant Dehydration Unit
 File Name: Y:\Projects\Blue Racer_646\Natrium\646-35 Permit Revision 2017\Calculations\Natrium Dehy S032 Ca
 Date: December 11, 2017

DESCRIPTION:

Description: 230 MMscf/day glycol dehydration. Emissions are 98% controlled.

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0929	2.229	0.4068
Ethane	0.1947	4.674	0.8530
Propane	0.2109	5.062	0.9238
Isobutane	0.0727	1.745	0.3185
n-Butane	0.1534	3.683	0.6721
Isopentane	0.0516	1.238	0.2259
n-Pentane	0.0543	1.304	0.2379
n-Hexane	0.0254	0.609	0.1111
Other Hexanes	0.0403	0.966	0.1763
Heptanes	0.0523	1.254	0.2289
Benzene	0.0239	0.573	0.1046
Toluene	0.0345	0.827	0.1510
Xylenes	0.0124	0.298	0.0543
C8+ Heavies	0.0022	0.053	0.0097
Total Emissions	1.0215	24.515	4.4740
Total Hydrocarbon Emissions	1.0215	24.515	4.4740
Total VOC Emissions	0.7338	17.612	3.2142
Total HAP Emissions	0.0961	2.307	0.4210
Total BTEX Emissions	0.0708	1.698	0.3099

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	4.6475	111.541	20.3562
Ethane	9.7537	234.089	42.7213
Propane	10.6054	254.530	46.4517
Isobutane	3.6725	88.140	16.0856
n-Butane	7.7740	186.576	34.0502
Isopentane	2.6543	63.704	11.6260
n-Pentane	2.8154	67.569	12.3314
n-Hexane	1.3736	32.966	6.0163
Other Hexanes	2.1476	51.543	9.4066
Heptanes	3.1936	76.645	13.9878
Benzene	1.3785	33.083	6.0377
Toluene	2.3986	57.566	10.5057
Xylenes	1.2908	30.979	5.6537
C8+ Heavies	6.8302	163.924	29.9161
Total Emissions	60.5357	1452.856	265.1463
Total Hydrocarbon Emissions	60.5357	1452.856	265.1463
Total VOC Emissions	46.1344	1107.226	202.0688
Total HAP Emissions	6.4414	154.594	28.2135
Total BTEX Emissions	5.0678	121.628	22.1971

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	1.3518	32.444	5.9210
Ethane	0.8355	20.052	3.6595
Propane	0.3988	9.570	1.7466
Isobutane	0.0923	2.215	0.4043
n-Butane	0.1487	3.570	0.6515
Isopentane	0.0448	1.075	0.1963
n-Pentane	0.0379	0.909	0.1658
n-Hexane	0.0104	0.249	0.0455
Other Hexanes	0.0214	0.514	0.0939
Heptanes	0.0120	0.288	0.0525
Benzene	0.0003	0.008	0.0015
Toluene	0.0004	0.009	0.0017
Xylenes	0.0001	0.002	0.0004
C8+ Heavies	0.0025	0.060	0.0110
Total Emissions	2.9570	70.967	12.9515
Total Hydrocarbon Emissions	2.9570	70.967	12.9515
Total VOC Emissions	0.7696	18.471	3.3709
Total HAP Emissions	0.0112	0.269	0.0491
Total BTEX Emissions	0.0008	0.020	0.0036

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	67.5917	1622.201	296.0518
Ethane	41.7753	1002.607	182.9758
Propane	19.9382	478.517	87.3293
Isobutane	4.6148	110.754	20.2127
n-Butane	7.4375	178.500	32.5762
Isopentane	2.2403	53.768	9.8126
n-Pentane	1.8928	45.428	8.2907
n-Hexane	0.5190	12.455	2.2730
Other Hexanes	1.0719	25.725	4.6948
Heptanes	0.5993	14.383	2.6250
Benzene	0.0174	0.418	0.0763
Toluene	0.0197	0.474	0.0864
Xylenes	0.0042	0.101	0.0184
C8+ Heavies	0.1257	3.018	0.5508
Total Emissions	147.8479	3548.349	647.5738
Total Hydrocarbon Emissions	147.8479	3548.349	647.5738
Total VOC Emissions	38.4809	923.541	168.5462
Total HAP Emissions	0.5603	13.448	2.4542
Total BTEX Emissions	0.0414	0.993	0.1812

EQUIPMENT REPORTS:

CONDENSER AND COMBUSTION DEVICE

Condenser Outlet Temperature: 125.00 deg. F
 Condenser Pressure: 14.70 psia
 Condenser Duty: 2.10e-001 MM BTU/hr
 Hydrocarbon Recovery: 0.75 bbls/day
 Produced Water: 54.11 bbls/day
 Ambient Temperature: 80.00 deg. F
 Excess Oxygen: 0.00 %
 Combustion Efficiency: 98.00 %
 Supplemental Fuel Requirement: 2.10e-001 MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	1.99%	98.01%
Isobutane	1.98%	98.02%
n-Butane	1.97%	98.03%
Isopentane	1.94%	98.06%
n-Pentane	1.93%	98.07%
n-Hexane	1.85%	98.15%
Other Hexanes	1.87%	98.13%
Heptanes	1.64%	98.36%
Benzene	1.73%	98.27%
Toluene	1.44%	98.56%
Xylenes	0.96%	99.04%
C8+ Heavies	0.03%	99.97%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
 Calculated Dry Gas Dew Point: 6.85 lbs. H2O/MMSCF

Temperature: 120.0 deg. F
 Pressure: 1200.0 psig
 Dry Gas Flow Rate: 230.0000 MMSCF/day
 Glycol Losses with Dry Gas: 16.2785 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 89.44 lbs. H2O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 3.03 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	7.64%	92.36%
Carbon Dioxide	99.76%	0.24%
Nitrogen	99.97%	0.03%
Methane	99.98%	0.02%
Ethane	99.94%	0.06%
Propane	99.92%	0.08%
Isobutane	99.91%	0.09%
n-Butane	99.88%	0.12%
Isopentane	99.90%	0.10%
n-Pentane	99.87%	0.13%
n-Hexane	99.83%	0.17%
Other Hexanes	99.86%	0.14%
Heptanes	99.73%	0.27%
Benzene	93.57%	6.43%
Toluene	92.01%	7.99%
Xylenes	87.92%	12.08%
C8+ Heavies	99.35%	0.65%

FLASH TANK

Flash Control: Combustion device
 Flash Control Efficiency: 98.00 %
 Flash Temperature: 125.0 deg. F
 Flash Pressure: 75.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.97%	0.03%
Carbon Dioxide	45.77%	54.23%
Nitrogen	6.14%	93.86%
Methane	6.43%	93.57%
Ethane	18.93%	81.07%
Propane	34.72%	65.28%
Isobutane	44.31%	55.69%
n-Butane	51.11%	48.89%
Isopentane	54.46%	45.54%
n-Pentane	60.00%	40.00%
n-Hexane	72.72%	27.28%
Other Hexanes	67.04%	32.96%
Heptanes	84.28%	15.72%
Benzene	98.81%	1.19%
Toluene	99.25%	0.75%
Xylenes	99.72%	0.28%
C8+ Heavies	98.41%	1.59%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	29.87%	70.13%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.92%	99.08%
n-Pentane	0.83%	99.17%
n-Hexane	0.69%	99.31%
Other Hexanes	1.49%	98.51%
Heptanes	0.59%	99.41%
Benzene	5.06%	94.94%
Toluene	7.96%	92.04%
Xylenes	12.98%	87.02%
C8+ Heavies	12.22%	87.78%

STREAM REPORTS:

WET GAS STREAM

Temperature: 120.00 deg. F
 Pressure: 1214.70 psia
 Flow Rate: 9.60e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.88e-001	8.59e+002
Carbon Dioxide	1.49e-001	1.66e+003
Nitrogen	3.32e-001	2.36e+003
Methane	8.16e+001	3.31e+005
Ethane	1.19e+001	9.09e+004
Propane	3.58e+000	4.00e+004
Isobutane	6.16e-001	9.06e+003
n-Butane	8.96e-001	1.32e+004
Isopentane	2.65e-001	4.85e+003
n-Pentane	2.04e-001	3.72e+003
n-Hexane	4.97e-002	1.08e+003
Other Hexanes	1.06e-001	2.31e+003
Heptanes	5.54e-002	1.41e+003
Benzene	1.10e-003	2.17e+001
Toluene	1.30e-003	3.03e+001
Xylenes	3.99e-004	1.07e+001
C8+ Heavies	2.48e-002	1.07e+003
Total Components	100.00	5.04e+005

DRY GAS STREAM

Temperature: 120.00 deg. F
 Pressure: 1214.70 psia
 Flow Rate: 9.58e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.44e-002	6.56e+001
Carbon Dioxide	1.49e-001	1.65e+003
Nitrogen	3.33e-001	2.36e+003
Methane	8.17e+001	3.31e+005
Ethane	1.20e+001	9.09e+004
Propane	3.59e+000	3.99e+004
Isobutane	6.17e-001	9.05e+003
n-Butane	8.97e-001	1.32e+004
Isopentane	2.66e-001	4.84e+003
n-Pentane	2.04e-001	3.71e+003
n-Hexane	4.97e-002	1.08e+003
Other Hexanes	1.06e-001	2.31e+003
Heptanes	5.54e-002	1.40e+003
Benzene	1.03e-003	2.03e+001
Toluene	1.20e-003	2.78e+001
Xylenes	3.52e-004	9.43e+000
C8+ Heavies	2.46e-002	1.06e+003
Total Components	100.00	5.03e+005

LEAN GLYCOL STREAM

Temperature: 120.00 deg. F
 Flow Rate: 4.00e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	2.22e+004
Water	1.50e+000	3.38e+002
Carbon Dioxide	1.77e-012	3.99e-010
Nitrogen	2.70e-013	6.08e-011
Methane	1.08e-017	2.43e-015
Ethane	1.08e-007	2.43e-005
Propane	5.52e-009	1.24e-006
Isobutane	1.10e-009	2.49e-007
n-Butane	1.68e-009	3.77e-007
Isopentane	1.09e-004	2.46e-002
n-Pentane	1.05e-004	2.37e-002
n-Hexane	4.22e-005	9.51e-003
Other Hexanes	1.44e-004	3.25e-002
Heptanes	8.46e-005	1.91e-002
Benzene	3.26e-004	7.35e-002
Toluene	9.22e-004	2.08e-001
Xylenes	8.55e-004	1.92e-001
C8+ Heavies	4.22e-003	9.51e-001
Total Components	100.00	2.25e+004

RICH GLYCOL STREAM

Temperature: 120.00 deg. F
 Pressure: 1214.70 psia
 Flow Rate: 4.20e+001 gpm
 NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.43e+001	2.22e+004
Water	4.81e+000	1.13e+003
Carbon Dioxide	1.70e-002	3.99e+000
Nitrogen	2.59e-003	6.08e-001
Methane	3.07e-001	7.22e+001
Ethane	2.19e-001	5.15e+001
Propane	1.30e-001	3.05e+001
Isobutane	3.52e-002	8.29e+000
n-Butane	6.47e-002	1.52e+001
Isopentane	2.09e-002	4.92e+000
n-Pentane	2.01e-002	4.73e+000
n-Hexane	8.09e-003	1.90e+000
Other Hexanes	1.38e-002	3.25e+000
Heptanes	1.62e-002	3.81e+000
Benzene	6.25e-003	1.47e+000
Toluene	1.12e-002	2.63e+000
Xylenes	6.33e-003	1.49e+000
C8+ Heavies	3.36e-002	7.91e+000
Total Components	100.00	2.35e+004

FLASH TANK OFF GAS STREAM

Temperature: 125.00 deg. F
 Pressure: 89.70 psia
 Flow Rate: 2.44e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.57e-001	2.97e-001
Carbon Dioxide	7.65e-001	2.17e+000
Nitrogen	3.17e-001	5.71e-001
Methane	6.55e+001	6.76e+001
Ethane	2.16e+001	4.18e+001
Propane	7.03e+000	1.99e+001
Isobutane	1.23e+000	4.61e+000
n-Butane	1.99e+000	7.44e+000
Isopentane	4.83e-001	2.24e+000
n-Pentane	4.08e-001	1.89e+000
n-Hexane	9.36e-002	5.19e-001
Other Hexanes	1.93e-001	1.07e+000
Heptanes	9.30e-002	5.99e-001
Benzene	3.47e-003	1.74e-002
Toluene	3.33e-003	1.97e-002
Xylenes	6.17e-004	4.21e-003
C8+ Heavies	1.15e-002	1.26e-001
Total Components	100.00	1.51e+002

FLASH TANK GLYCOL STREAM

Temperature: 125.00 deg. F
 Flow Rate: 4.17e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.49e+001	2.22e+004
Water	4.84e+000	1.13e+003
Carbon Dioxide	7.83e-003	1.83e+000
Nitrogen	1.60e-004	3.73e-002
Methane	1.99e-002	4.65e+000
Ethane	4.18e-002	9.75e+000
Propane	4.54e-002	1.06e+001
Isobutane	1.57e-002	3.67e+000
n-Butane	3.33e-002	7.77e+000
Isopentane	1.15e-002	2.68e+000
n-Pentane	1.22e-002	2.84e+000
n-Hexane	5.92e-003	1.38e+000
Other Hexanes	9.33e-003	2.18e+000
Heptanes	1.38e-002	3.21e+000
Benzene	6.22e-003	1.45e+000
Toluene	1.12e-002	2.61e+000
Xylenes	6.35e-003	1.48e+000
C8+ Heavies	3.33e-002	7.78e+000
Total Components	100.00	2.34e+004

FLASH GAS EMISSIONS

Flow Rate: 9.60e+003 scfh
 Control Method: Combustion Device
 Control Efficiency: 98.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.19e+001	2.82e+002
Carbon Dioxide	3.75e+001	4.17e+002
Nitrogen	8.05e-002	5.71e-001
Methane	3.33e-001	1.35e+000
Ethane	1.10e-001	8.36e-001
Propane	3.57e-002	3.99e-001
Isobutane	6.28e-003	9.23e-002
n-Butane	1.01e-002	1.49e-001
Isopentane	2.45e-003	4.48e-002
n-Pentane	2.07e-003	3.79e-002
n-Hexane	4.76e-004	1.04e-002
Other Hexanes	9.83e-004	2.14e-002
Heptanes	4.73e-004	1.20e-002
Benzene	1.76e-005	3.49e-004
Toluene	1.69e-005	3.95e-004
Xylenes	3.14e-006	8.42e-005
C8+ Heavies	5.83e-005	2.51e-003
Total Components	100.00	7.03e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 1.72e+004 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.70e+001	7.93e+002
Carbon Dioxide	9.16e-002	1.83e+000
Nitrogen	2.94e-003	3.73e-002
Methane	6.39e-001	4.65e+000
Ethane	7.15e-001	9.75e+000
Propane	5.30e-001	1.06e+001
Isobutane	1.39e-001	3.67e+000
n-Butane	2.95e-001	7.77e+000
Isopentane	8.11e-002	2.65e+000
n-Pentane	8.60e-002	2.82e+000
n-Hexane	3.51e-002	1.37e+000
Other Hexanes	5.49e-002	2.15e+000
Heptanes	7.02e-002	3.19e+000
Benzene	3.89e-002	1.38e+000
Toluene	5.74e-002	2.40e+000
Xylenes	2.68e-002	1.29e+000
C8+ Heavies	8.84e-002	6.83e+000
Total Components	100.00	8.55e+002

CONDENSER PRODUCED WATER STREAM

Temperature: 125.00 deg. F
 Flow Rate: 1.58e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)	
Water	1.00e+002	7.90e+002	999782.
Carbon Dioxide	2.34e-003	1.85e-002	23.
Nitrogen	1.30e-006	1.03e-005	0.
Methane	3.09e-004	2.44e-003	3.
Ethane	7.28e-004	5.75e-003	7.
Propane	8.38e-004	6.62e-003	8.
Isobutane	1.56e-004	1.24e-003	2.
n-Butane	4.35e-004	3.44e-003	4.
Isopentane	1.02e-004	8.08e-004	1.
n-Pentane	1.15e-004	9.12e-004	1.
n-Hexane	4.42e-005	3.49e-004	0.
Other Hexanes	5.68e-005	4.48e-004	1.
Heptanes	5.01e-005	3.96e-004	1.
Benzene	6.38e-003	5.04e-002	64.
Toluene	7.49e-003	5.92e-002	75.
Xylenes	2.78e-003	2.20e-002	28.
C8+ Heavies	1.31e-006	1.03e-005	0.
Total Components	100.00	7.90e+002	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 125.00 deg. F
 Flow Rate: 2.19e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	2.73e-002	2.55e-003
Carbon Dioxide	8.73e-003	8.13e-004
Nitrogen	2.11e-005	1.97e-006
Methane	9.66e-003	8.99e-004
Ethane	1.15e-001	1.07e-002
Propane	5.67e-001	5.28e-002
Isobutane	3.75e-001	3.49e-002
n-Butane	1.06e+000	9.86e-002
Isopentane	8.06e-001	7.51e-002
n-Pentane	1.06e+000	9.83e-002
n-Hexane	1.13e+000	1.05e-001
Other Hexanes	1.44e+000	1.34e-001
Heptanes	6.23e+000	5.80e-001
Benzene	1.44e+000	1.34e-001
Toluene	6.62e+000	6.16e-001
Xylenes	6.97e+000	6.49e-001
C8+ Heavies	7.22e+001	6.72e+000
Total Components	100.00	9.31e+000

CONDENSER VENT STREAM

Temperature: 125.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 5.55e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.33e+001	3.50e+000
Carbon Dioxide	2.81e+000	1.81e+000
Nitrogen	9.11e-002	3.73e-002
Methane	1.98e+001	4.64e+000
Ethane	2.21e+001	9.74e+000
Propane	1.64e+001	1.05e+001
Isobutane	4.28e+000	3.64e+000
n-Butane	9.03e+000	7.67e+000
Isopentane	2.44e+000	2.58e+000
n-Pentane	2.57e+000	2.72e+000
n-Hexane	1.01e+000	1.27e+000
Other Hexanes	1.60e+000	2.01e+000
Heptanes	1.78e+000	2.61e+000
Benzene	1.05e+000	1.19e+000
Toluene	1.28e+000	1.72e+000
Xylenes	4.00e-001	6.20e-001
C8+ Heavies	4.44e-002	1.11e-001
Total Components	100.00	5.64e+001

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 9.30e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	2.36e+001	9.29e-002
Ethane	2.64e+001	1.95e-001
Propane	1.95e+001	2.11e-001
Isobutane	5.11e+000	7.27e-002
n-Butane	1.08e+001	1.53e-001
Isopentane	2.92e+000	5.16e-002
n-Pentane	3.07e+000	5.43e-002
n-Hexane	1.20e+000	2.54e-002
Other Hexanes	1.91e+000	4.03e-002
Heptanes	2.13e+000	5.23e-002
Benzene	1.25e+000	2.39e-002
Toluene	1.53e+000	3.45e-002
Xylenes	4.77e-001	1.24e-002
C8+ Heavies	5.30e-002	2.21e-003
Total Components	100.00	1.02e+000

**CALCULATION OF PRESSURIZED TRUCK UNLOADING POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC**

Emissions from Disconnecting Loading Lines from Pressurized Truck Unloading
 Line Diameter 4 inches
 Line Length 8 feet
 Volume in Line 0.698 ft³

A maximum of 30,000 bbl/day of condensate or NGL can be unloaded at the Plant. Assumed 200 barrels/truck for calculation of disconnects. Assumed that unloading operations are carried out only during daytime work shift.

Sample Calculations:

Hourly PTE = (Pressure, psia) * (Volume, ft³) * (Molecular Weight, lb/lbmol) * (Number of Disconnects per Hour) * (% VOC) / ((Temperature, deg R) * (Gas Constant, ft³*psia/lb-mol*deg R)) * (1-% Control, %)

Hourly PTE = (150.0 psia) * (0.698 cubic ft) * (46.25 lb/lbmol) * (2.5 disconnects/hr) * (0.85) / ((529.7 deg R) * (10.73 cubic ft*psia/lb-mol*deg R)) * (1-0.00) = 9.05 lb/hr

Annual PTE = (Pressure, psia) * (Volume, ft³) * (Molecular Weight, lb/lb-mol) * (Number of Disconnects per Year) * (% VOC) / ((Temperature, deg R) * (Gas Constant, ft³*psia/lb-mol*deg R)) * (2,000 lbs/T) * (1-% Control, %)

Annual PTE = (150.0 psia) * (0.698 cubic ft) * (46.25 lb/lbmol) * (54,750 disconnects/yr) * (0.85) / ((529.7 deg R) * (10.73 cubic ft*psia/lb-mol*deg R)) * (1-0.00) = 19.83 T/yr

Emission Unit ID	Emission Description	Emission Point ID	Hourly Number of Disconnects (disconnects/hr)	Annual Number of Disconnects (disconnects/yr)	Vapor Pressure (psia)	Molecular Weight (lb/lb-mole)	Temp. (deg R)	Gas Constant (ft ³ *psia/lb-mol*deg R)	Volume (ft ³)	% VOC	% Methane	% Carbon Dioxide	% Control	Hourly PTE VOC (lb/hr)	Annual PTE VOC (T/yr)	Annual PTE Methane (T/yr)	Annual PTE Carbon Dioxide (T/yr)
S055	Pressurized Condensate/NGL Unloading	P055	13	54,750	150.0	46.25	529.7	10.73	0.698	85%	1.00%	1.00%	0%	9.05	19.83	0.23	0.23

1. Emission calculations are for unloading of condensate and NGL into slug catchers at the inlet of the Plant. Condensate representation has been selected to be conservative.

2. VOC, methane, and carbon dioxide percentages taken from stream composition for condensate gas.

3. VOC emission specification based on condensate gas compositions. Emission specification is as shown below.

Component	Condensate	
	Hourly (lb/hr)	Annual (T/yr)
Benzene	0.00	0.00
Toluene	0.00	0.00
Ethylbenzene	0.00	0.00
Xylene	0.00	0.00
n-Hexane	0.46	1.02

**CALCULATION OF PRESSURIZED TRUCK LOADING POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC**

Emissions from Disconnecting Loading Lines from Pressurized Truck Loading
 Line Diameter 4 inches
 Line Length 8 feet
 Volume in Line 0.698 ft³

A. maximum of 1,000 trucks are loaded for each product on an annual basis. Assumed 200 barrels/truck for calculation of disconnects. Assumed that unloading operations are carried out only during daytime work shift.

Sample Calculations:

Hourly PTE = (Pressure, psia) * (Volume, ft³) * (Molecular Weight, lb/lbmol) * (Number of Disconnects per Hour) * (% VOC) / ((Temperature, deg R) * (Gas Constant, ft³*psia/lb-mol*deg R)) * (1-% Control, %)
 Hourly PTE = (150.0 psia) * (0.698 cubic ft) * (44.01 lb/lbmol) * (1.00) / ((529.7 deg R) * (10.73 cubic ft*psia/lb-mol*deg R)) * (1-0.00) = 0.81 lb/hr

Annual PTE = (Pressure, psia) * (Volume, ft³) * (Molecular Weight, lb/lb-mol) * (Number of Disconnects per Year) * (% VOC) / ((Temperature, deg R) * (Gas Constant, ft³*psia/lb-mol*deg R)) * (2,000 lbs/T) * (1-% Control, %)
 Annual PTE = (150.0 psia) * (0.698 cubic ft) * (44.01 lb/lbmol) * (1,000 disconnects/yr) * (1.00) / ((529.7 deg R) * (10.73 cubic ft*psia/lb-mol*deg R)) * (1-0.00) = 0.41 T/yr

Emission Unit ID	Emission Unit Description	Emission Point ID	Hourly Number of Disconnects (disconnects/hr)	Annual Number of Disconnects (disconnects/yr)	Vapor Pressure (psia)	Molecular Weight (lb/lb-mole)	Temp. (deg R)	Gas Constant (ft ³ *psia/lb-mol*deg R)	Volume (ft ³)	% VOC	% Methane	% Carbon Dioxide	% Control	Hourly PTE VOC (lb/hr)	Annual PTE VOC (T/yr)	Annual PTE Methane (T/yr)	Annual PTE Carbon Dioxide (T/yr)
S008	Pressurized Propane Loading	P008	1	1,000	150.0	44.01	529.7	10.73	0.698	100%	0.000%	0.000%	0%	0.81	0.41	0.00	0.00
S008	Pressurized i-Butane Loading	P008	1	1,000	150.0	57.79	529.7	10.73	0.698	100%	0.000%	0.000%	0%	1.06	0.53	0.00	0.00
S008	Pressurized Butanes Loading	P008	1	1,000	150.0	58.21	529.7	10.73	0.698	100%	0.000%	0.000%	0%	1.07	0.54	0.00	0.00
S008	Pressurized Natural Gasoline Loading	P008	1	1,000	150.0	76.82	529.7	10.73	0.698	100%	0.000%	0.000%	0%	1.42	0.71	0.00	0.00
Total:														4.36	2.18	0.00	0.00

1. Emission calculations are for truck loading of propane, butane, and natural gasoline products for offsite transportation.
2. VOC, methane, and carbon dioxide percentages taken from stream composition for each product.
3. VOC emission speciation based on product compositions. Emission speciation is as shown below.

Component	Propane		i-Butane		Butane		Natural Gasoline		Total	
	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)
Benzene	--	--	--	--	--	--	0.01	0.01	0.01	0.01
Toluene	--	--	--	--	--	--	0.01	0.01	0.01	0.01
Ethylbenzene	--	--	--	--	--	--	0.001	0.0004	0.001	0.0004
Xylene	--	--	--	--	--	--	0.004	0.002	0.004	0.002
n-Hexane	--	--	--	--	--	--	0.07	0.03	0.07	0.03

**BARGE LOADING POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC**

Sample Calculations for Emission Unit ID S033 (Natural Gasoline):

Hourly Emissions = (Max. Hourly Throughput, Mgal/hr) * (Max. Loading Loss, lb/Mgal) * (VOC Fraction)
 Hourly Emissions = (240.00 Mgal/hr) * (0.41 lb/Mgal) * (1.00) = 97.22 lb/hr

Annual Emissions = (Max. Annual Throughput, Mgal/yr) * (Max. Loading Loss, lb/Mgal) * (VOC Fraction) / (2,000 lb/T)
 Annual Emissions = (156,240.00 Mgal/yr) * (0.41 lb/Mgal) * (1.00) / (2,000 lb/T) = 31.65 T/yr

Emission Unit ID	Emission Unit Description	Emission Point ID	Emission Point Description	VOC Fraction	Hourly Throughput (Mgal/hr)	Barge Capacity (bbl)	Number of Loading Events per Month	Annual Throughput (Mgal/yr)	Loading Loss (lb/Mgal)	Hourly Emissions (lb/hr)	Annual Emissions (T/yr)
S033	Barge Loading Vent	P033	Barge Loading Vent	1.00	240.00	10,000.00	31	156,240.00	0.41	97.22	31.65
S033	Barge Loading Vent	P033	Barge Loading Vent	1.00	240.00	25,000.00	20	252,000.00	0.41	97.22	51.04
Total:										97.22	82.69

1. Loading Loss (lb/Mgal) determined as the maximum VOC emissions measured during several loading events.
2. Hourly throughput based on pump capacity of 4,000 gal/min.
3. Barge capacity of 10,000 bbl based on the current maximum barge size. Barge capacity of 25,000 bbl is based on proposed project expectations.
4. HAP emissions estimated based on weight percentages from Safety Data Sheet as shown:
5. Annual throughput based on current production volumes, adjusted for anticipated production volumes.

Component	Weight %	Hourly (lb/hr)	Annual (T/yr)
Benzene	0.45%	0.44	0.37
Toluene	0.75%	0.73	0.62
Xylene	0.29%	0.28	0.24

**GASOLINE DISPENSER POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC**

Sample Calculations for Emission Unit ID L-1 (Gasoline):

$$\text{Hourly Emissions} = (\text{Max. Hourly Throughput, Mgal/hr}) * (\text{Max. Loading Loss, lb/Mgal}) * (\text{VOC Fraction})$$

$$\text{Hourly Emissions} = (0.02 \text{ Mgal/hr}) * (12.00 \text{ lb/Mgal}) * (1.00) = 0.18 \text{ lb/hr}$$

$$\text{Annual Emissions} = (\text{Max. Annual Throughput, Mgal/yr}) * (\text{Max. Loading Loss, lb/Mgal}) * (\text{VOC Fraction}) / (2,000 \text{ lb/T})$$

$$\text{Annual Emissions} = (0.01 \text{ Mgal/yr}) * (12.00 \text{ lb/Mgal}) * (1.00) / (2,000 \text{ lb/T}) = 0.00005 \text{ T/yr}$$

Emission Unit ID	Emission Unit Description	Emission Point ID	Emission Point Description	VOC Fraction	Hourly Throughput (Mgal/hr)	Number of Loading Events per Month	Annual Throughput (Mgal/yr)	Loading Loss (lb/Mgal)	Hourly Emissions (lb/hr)	Annual Emissions (T/yr)
L-1	Gasoline Dispenser Loading	L-1	Gasoline Dispenser Loading	1.00	0.02	1	0.01	12.00	0.18	0.00005

1. Loading Loss (lb/Mgal) is from AP-42, Table 5.2-5, dated June 2008. The Loading Loss used is for gasoline splash loading - dedicated normal service.
2. HAP emissions are expected to be negligible.

**TRUCK LOADING POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC**

Sample Calculations:

Maximum Loading Loss = $12.46 * (\text{Saturation Factor}) * (\text{Max. Vapor Pressure, psia}) * (\text{Vapor MW, lb/lbmol}) / (\text{Max. Temp., R})$
 Maximum Loading Loss = $12.46 * (0.60) * (0.30 \text{ psia}) * (60.00 \text{ lb/lbmole}) / (61.50 + 460) \text{ R} = 0.2580 \text{ lb/Mgal}$

Average Loading Loss = $12.46 * (\text{Saturation Factor}) * (\text{Avg. True Vapor Pressure, psia}) * (\text{Vapor MW, lb/lbmol}) / (\text{Avg. Temp., R})$
 Average Loading Loss = $12.46 * (0.60) * (0.12 \text{ psia}) * (60.00 \text{ lb/lbmole}) / (58.43 + 460) \text{ R} = 0.1073 \text{ lb/Mgal}$

Hourly PTE = $(\text{Hourly Throughput, Mgal/hr}) * (\text{Max. Loading Loss, lb/Mgal})$
 Hourly PTE = $(9.00 \text{ Mgal/hr}) * (0.2580 \text{ lb/Mgal}) = 2.32 \text{ lb/hr}$

Annual PTE = $(\text{Annual Throughput, Mgal/yr}) * (\text{Avg. Loading Loss, lb/Mgal}) / (2,000 \text{ lb/T})$
 Annual PTE = $(2,007.07 \text{ Mgal/yr}) * (0.1073 \text{ lb/Mgal}) / (2,000 \text{ lb/T}) = 0.11 \text{ T/yr}$

Emission Unit ID	Emission Point ID	Emission Unit Description	Saturation Factor	Max. Vapor Pressure (psia)	Avg. Vapor Pressure (psia)	Vapor Molecular Weight (lb/lbmol)	Max. Temp. (F)	Avg. Temp. (F)	Hourly Throughput (Mgal/hr)	Annual Throughput (Mgal/yr)	VOC Fraction	Max. Loading Loss (lb/Mgal)	Avg. Loading Loss (lb/Mgal)	Control Efficiency	VOC Hourly PTE (lb/hr)	VOC Annual PTE (T/yr)
S015	P015	Slop Water Truck Loading	0.60	0.30	0.12	60.00	61.50	58.43	9.00	2,007.07	1.00	0.2580	0.1073	0%	2.32	0.11

1. Calculation method and factors per AP-42, Section 5.2, dated June 2008.
2. True Vapor Pressure, Molecular Weight, and Temperature taken from storage tank calculations.
3. Methane, carbon dioxide, and HAP emissions are expected to be negligible.

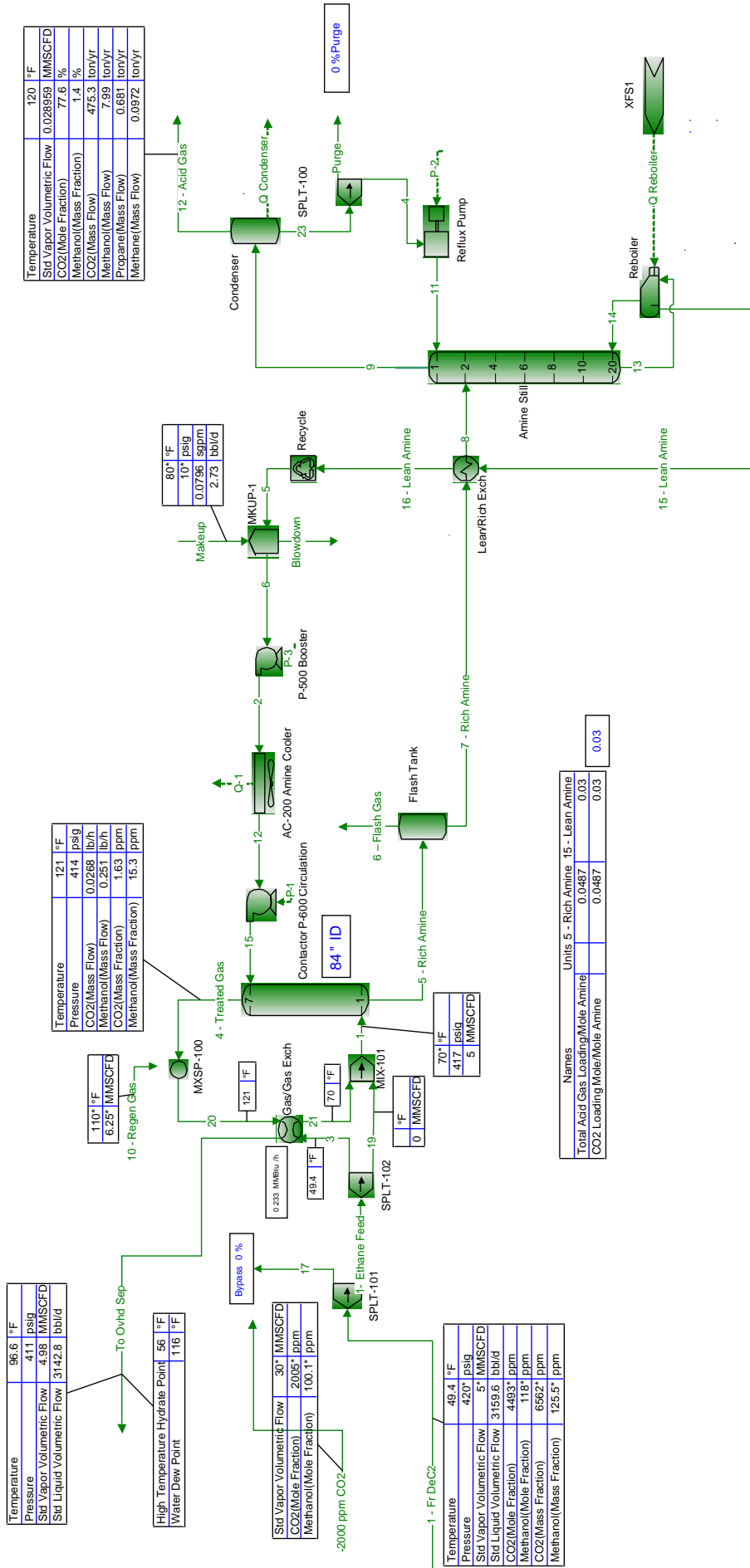
**STORAGE TANKS POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC**

Variable	Description	Units	Value
L _T	Total Loss = L _s + L _w	ton/yr	See Table
L _s	Standing Loss = 365 V _v W _v K _e K _s	lb/yr	See Table
L _w	Working Loss = 0.001 M _v P _v Q _v K _v K _p	lb/yr	See Table
L _g	Hourly Working Loss = 0.001 M _v P _v K _v Q _v h	lb/hr	See Table
	Roof Construction		Dome
DP _b	Breather Vent Pressure Range	psi	0.06
I	Solar Insolation Factor	Btu(ft ² -day)	1,123
P _A	Atmospheric Pressure	psia	14.7
T	Annual Average Temperature	°F	51.7
T _{max}	Daily Maximum Ambient Temperature	°R	521.5
T _{min}	Daily Minimum Ambient Temperature	°R	501.8
DT _A	Daily Average Ambient Temperature	°R	19.7
K _p	Product Factor		1

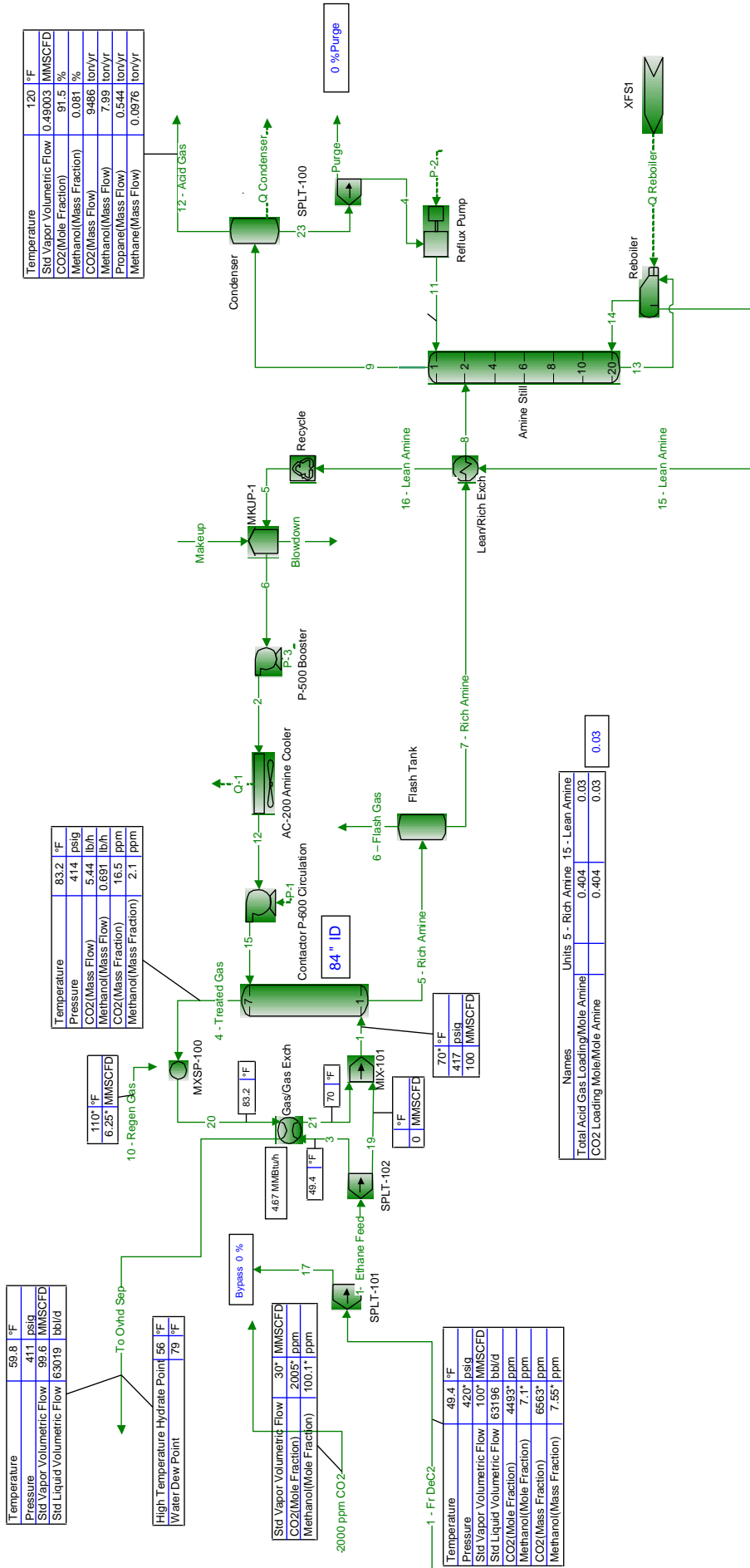
Description	Emission Unit ID	Material	Tank Type	Tank Specifications			Material Specifications										VOC									
				V/H	D	H/L	Capacity (bbl)	Color	a	M _v	P _{max}	Q ¹	DT _v	H _w	V _v	I _s	P _{av}	W _v	DP _v	K _e	K _s	K _v	L _s	L _w	L _T	L _g
1,000 gal Gasoline Dispensing Storage Tank	TK-L-1	Gasoline	H	5.42	6.00	23.81	White	Good	0.17	66.00	10.00	2.8571	19.53	2.71	62.41	513.17	6.20	0.07	1.03	0.15	0.53	1.00	135.83	116.91	15.71	0.13
Slur Oil Storage Tank	TK-906	Water	V	15.50	16.00	493.48	Aluminum	Good	0.60	60.00	0.30	493.48	33.05	9.06	1,709.88	518.43	0.12	0.001	0.07	0.06	0.94	1.00	50.57	44.06	8.88	0.05
Produced Water Storage Tank	TK-2907	Water	V	21.50	24.00	1,497.67	Aluminum	Good	0.60	60.00	0.30	1,497.67	33.05	13.47	4,891.29	518.43	0.12	0.001	0.07	0.06	0.92	1.00	140.81	133.71	26.96	0.14
Slur Oil Storage Tank	TK-2906	Water	V	15.50	16.00	493.48	Aluminum	Good	0.60	60.00	0.30	493.48	33.05	9.06	1,709.88	518.43	0.12	0.001	0.07	0.06	0.94	1.00	50.57	44.06	8.88	0.05
Produced Water Storage Tank	TK-2907	Water	V	21.50	24.00	1,497.67	Aluminum	Good	0.60	60.00	0.30	1,497.67	33.05	13.47	4,891.29	518.43	0.12	0.001	0.07	0.06	0.92	1.00	140.81	133.71	26.96	0.14
Glycol Sump	UT-607	Water	H	4.50	11.79	33.40	--	--	--	62.10	0.12	4.76	406.80	--	--	--	0.12	--	--	--	--	1.00	0.00	2.99	0.04	0.001
Glycol Sump	UT-608	Water	H	4.50	11.79	33.40	--	--	--	62.10	0.12	4.76	406.80	--	--	--	0.12	--	--	--	--	1.00	0.00	2.99	0.04	0.001

NOTE: Tank working and breathing emissions are based on the equations found in EPA AP-42, Chapter 7. All factors used are represented in the table on this page. Gasoline properties are taken from AP-42, Table 7.1-2 for RVP 10 gasoline. Slur oil and produced water tank contents assume liquids are 98% water and 2% RVP 15 gasoline. Glycol sumps are located underground, thus no standing losses are generated.

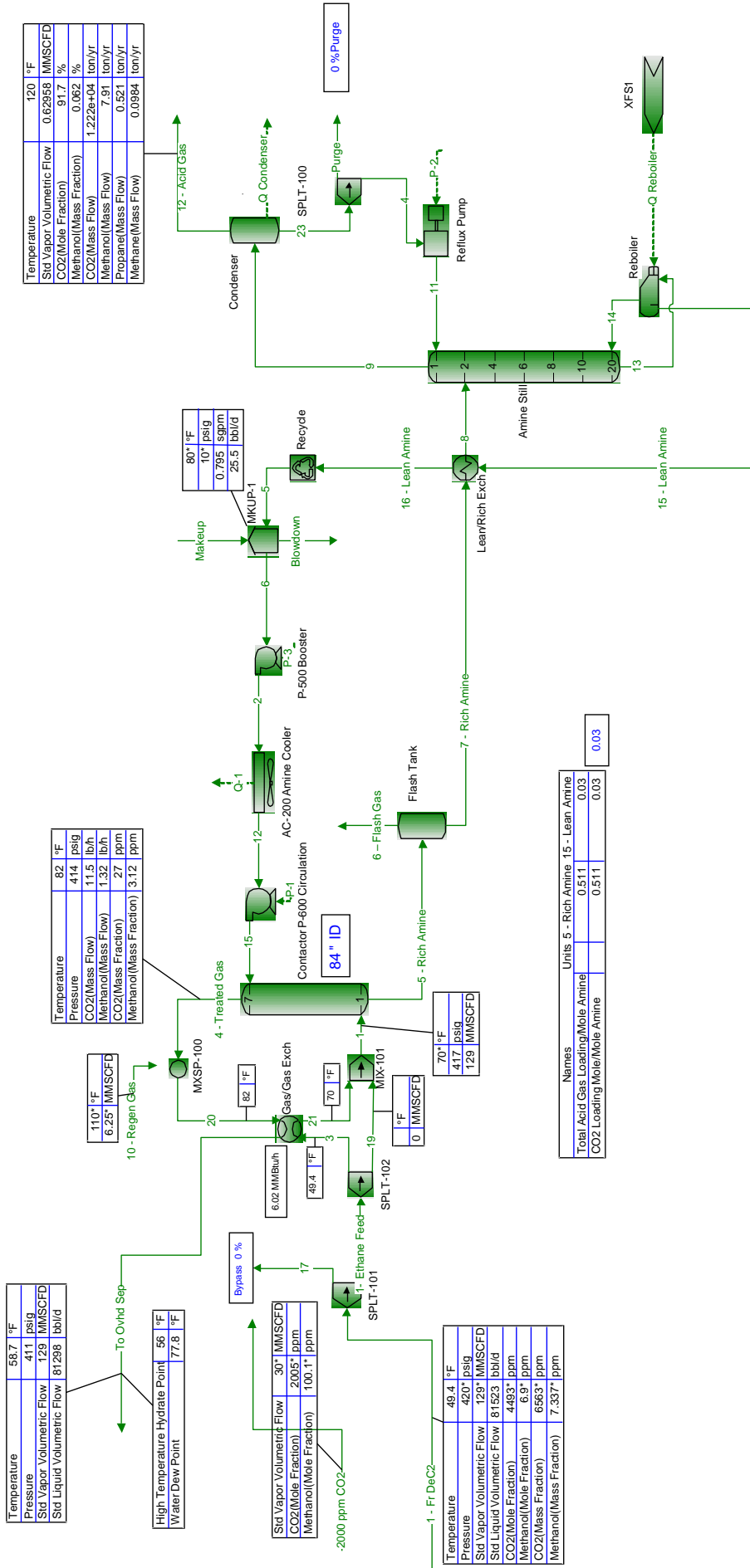
Blue Racer Ethane Treating – DGA (Expansion Case)



Blue Racer Ethane Treating – DGA (Expansion Case)



Blue Racer Ethane Treating – DGA (Expansion Case)



Temperature	58.7 °F
Pressure	411 psig
Std Vapor Volumetric Flow	129 MMSCFD
Std Liquid Volumetric Flow	81,298 bbl/d

High Temperature Hydrate Point	56 °F
Water Dew Point	77.8 °F

Std Vapor Volumetric Flow	30 MMSCFD
CO2(Mole Fraction)	2005 ppm
Methanol(Mole Fraction)	100.1 ppm

Temperature	49.4 °F
Pressure	420 psig
Std Vapor Volumetric Flow	129 MMSCFD
Std Liquid Volumetric Flow	81,523 bbl/d
CO2(Mole Fraction)	4493 ppm
Methanol(Mole Fraction)	6.9 ppm
CO2(Mass Fraction)	6563 ppm
Methanol(Mass Fraction)	7.337 ppm

Temperature	82 °F
Pressure	414 psig
CO2(Mass Flow)	11.5 lb/h
Methanol(Mass Flow)	1.32 lb/h
CO2(Mass Fraction)	27 ppm
Methanol(Mass Fraction)	3.12 ppm

110 °F	6.25 MMSCFD
--------	-------------

80 °F	10 psig
0.795	sgpm
25.5	bbbl/d

Names	Units	5 - Rich Amine	15 - Lean Amine
Total Acid Gas Loading/Mole Amine		0.511	0.03
CO2 Loading Mole/Mole Amine		0.511	0.03
			0.03

Temperature	120 °F
Std Vapor Volumetric Flow	0.62958 MMSCFD
CO2(Mole Fraction)	91.7 %
Methanol(Mass Fraction)	0.062 %
CO2(Mass Flow)	1.222e+04 ton/yr
Methanol(Mass Flow)	7.91 ton/yr
Propane(Mass Flow)	0.521 ton/yr
Methane(Mass Flow)	0.0984 ton/yr

FIRE PUMP #2 POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID	S003
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Item	Value	Units
Rated Horsepower	700	Hp
Max. Fuel Consumption Rate	35.9	gal/hr
Max. Fuel Consumption Rate	4.92	MMBtu/hr
Annual Operating Hours	100	hr/yr
Annual Fuel Consumption	3,590	gal/yr
Sulfur Content of Fuel	0.0015	%
Heat Content of Fuel	137,030	Btu/gal

Pollutant	CAS	REF	Emission Factor	Units	Potential Emissions	
					lb/hr	T/yr
Criteria Pollutants						
NO _x	N/A	1	3	g/hp-hr	4.63	0.23
CO	630-08-0	1	2.6	g/hp-hr	4.01	0.20
VOC	N/A	1	3	g/hp-hr	4.63	0.23
PM ₁₀	N/A	1	0.15	g/hp-hr	0.23	0.01
PM _{2.5}	N/A	1	0.15	g/hp-hr	0.23	0.01
SO ₂	7446-09-5	2	1.52E-03	lb/MMBtu	0.01	0.0004
Hazardous Air Pollutants						
Acetaldehyde	75-07-0	3	2.52E-05	lb/MMBtu	1.2E-04	6.2E-06
Acrolein	107-02-8	3	7.88E-06	lb/MMBtu	3.9E-05	1.9E-06
Benzene	71-43-2	3	7.76E-04	lb/MMBtu	3.8E-03	1.9E-04
Formaldehyde	50-00-0	3	7.89E-05	lb/MMBtu	3.9E-04	1.9E-05
Toluene	108-88-3	3	2.81E-04	lb/MMBtu	1.4E-03	6.9E-05
Xylenes	1330-20-7	3	1.93E-04	lb/MMBtu	9.5E-04	4.7E-05
PAHs						
Acenaphthylene	208-96-8	4	9.23E-06	lb/MMBtu	4.5E-05	2.3E-06
Acenaphthene	83-32-9	4	4.68E-06	lb/MMBtu	2.3E-05	1.2E-06
Anthracene	120-12-7	4	1.23E-06	lb/MMBtu	6.1E-06	3.0E-07
Benzo(a)anthracene	56-55-3	4	6.22E-07	lb/MMBtu	3.1E-06	1.5E-07
Benzo(a)pyrene	50-32-8	4	2.57E-07	lb/MMBtu	1.3E-06	6.3E-08
Benzo(b)fluoranthene	205-99-2	4	1.11E-06	lb/MMBtu	5.5E-06	2.7E-07
Benzo(g,h,i)perylene	191-24-2	4	5.56E-07	lb/MMBtu	2.7E-06	1.4E-07
Benzo(k)fluoranthene	205-82-3	4	2.18E-07	lb/MMBtu	1.1E-06	5.4E-08
Chrysene	218-01-9	4	1.53E-06	lb/MMBtu	7.5E-06	3.8E-07
Dibenz(a,h)anthracene	53-70-3	4	3.46E-07	lb/MMBtu	1.7E-06	8.5E-08
Fluoranthene	206-44-0	4	4.03E-06	lb/MMBtu	2.0E-05	9.9E-07
Fluorene	86-73-7	4	1.28E-05	lb/MMBtu	6.3E-05	3.1E-06
Ideno(1,2,3-cd)pyrene	193-39-5	4	4.14E-07	lb/MMBtu	2.0E-06	1.0E-07
Naphthalene	91-20-3	4	1.30E-04	lb/MMBtu	6.4E-04	3.2E-05
Phenanthrene	85-01-8	4	4.08E-05	lb/MMBtu	2.0E-04	1.0E-05
Pyrene	129-00-0	4	3.71E-06	lb/MMBtu	1.8E-05	9.1E-07
Total PAH	---	4	2.12E-04	lb/MMBtu	1.0E-03	5.2E-05
Greenhouse Gases						
Carbon dioxide	124-38-9	2	165	lb/MMBtu	811.70	40.58
Methane	74-82-8	2	0.0081	lb/MMBtu	0.04	0.00
Nitrous oxide	10024-97-2	---	0	lb/MMBtu	0.00	0.00
CO ₂ e	N/A	5	---	---	812.69	40.63

Total Criteria :	0.69	T/yr
Total HAPs:	0.0004	T/yr

- Notes: 1. 40 CFR 60 Subpart IIII, Table 4
2. AP-42 Table 3.4-1 (10/96)
3. AP-42 Table 3.4-3 (10/96)
4. AP-42 Table 3.4-4 (10/96)
5. 40 CFR 98 Table A-1

**CALCULATION OF EMERGENCY GENERATOR ENGINE POTENTIAL TO EMIT
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC**

Emission Unit ID	Emission Point ID	Description	Type	Engine Ratings		Fuel Gas Heating Value (Btu/scf)	Annual Operating Hours (hr/yr)	Emission Factors ^a	Units	Potential to Emit (PTE)		
				Rated Horsepower (hp)	Fuel Consumption (Btu/hp-hr)					Hourly ^a (lb/hr)	Annual ^b (T/yr)	
S057	P057	Generator Engine(s) Natural gas fired	4 Stroke Lean Burn	16,000	8,000	1,065	100	4.00 2.00 0.0099871 4 0.0528 0.008360 0.005140 0.002500 0.000440 0.001110 0.000408 0.0000397 0.000184 0.001214	g/hp-hr g/hp-hr lb/MMBtu ppm S g/hp-hr lb/MMBtu lb/MMBtu lb/MMBtu lb/MMBtu lb/MMBtu lb/MMBtu lb/MMBtu lb/MMBtu lb/MMBtu	141.10 70.55 1.28 0.08 35.27 6.76 1.07 0.66 0.32 0.06 0.14 0.05 0.01 0.02 0.16	7.05 3.53 0.06 0.004 1.76 0.34 0.05 0.03 0.02 0.003 0.01 0.003 0.0003 0.001 0.01	

^a This emission unit consists of one or more reciprocating engines with a total horsepower not to exceed 16,000 hp. The Emission Factors for CO, NO_x, and VOC are based on NSPS JJJJ emission limitations for new emergency engines.

An example calculation for hourly CO emissions for Emission Unit ID S057 follows:

$$\text{CO (lb/hr)} = (\text{Rated Horsepower, hp}) * (\text{Emission Factor, g/hp-hr}) * (1 \text{ lb}/453.59 \text{ g})$$

$$\text{CO (lb/hr)} = (16,000 \text{ hp}) * (4.00 \text{ g/hp-hr}) * (1 \text{ lb}/453.59 \text{ g})$$

$$= 141.10 \text{ lb/hr CO}$$

The PM/PM₁₀/PM_{2.5}, and HAP Emission Factors are from AP-42 Table 3.2-2 for Four-Stroke Lean Burn Engines (dated 7/00). An example calculation for hourly PM/PM₁₀/PM_{2.5} emissions for Emission Unit ID S057 follows:

$$\text{PM}/\text{PM}_{10}/\text{PM}_{2.5} \text{ (lb/hr)} = (\text{Fuel Consumption, Btu/hp-hr}) * (\text{Rated Horsepower, hp}) * (1 \text{ MMBtu}/10^6 \text{ Btu}) * (\text{Emission Factor, lb/MMBtu})$$

$$\text{PM}/\text{PM}_{10}/\text{PM}_{2.5} \text{ (lb/hr)} = (8,000 \text{ Btu/hp-hr}) * (16,000 \text{ hp}) * (1 \text{ MMBtu}/10^6 \text{ Btu}) * (0.0099871 \text{ lb/MMBtu})$$

$$= 1.28 \text{ lb/hr PM}$$

A material balance approach was used to estimate the SO₂ emission rates using the maximum sulfur concentration in the natural gas. An example calculation for hourly SO₂ emissions for Emission Unit ID S057 follows:

$$\text{SO}_2 \text{ (lb/hr)} = (\text{Fuel Consumption, Btu/hp-hr}) * (\text{Rated Horsepower, hp}) * (\text{Fuel Heating Value, scf gas/fuel Btu}) * (\text{Sulfur Content, scf S}/10^6 \text{ scf gas}) * (1 \text{ lb-mol}/379 \text{ scf}) * (32.06 \text{ lb S}/\text{lb-mol}) * (64.06 \text{ lb SO}_2/32.06 \text{ lb S})$$

$$\text{SO}_2 \text{ (lb/hr)} = (8,000 \text{ Btu/hp-hr}) * (16,000 \text{ hp}) * (1 \text{ scf gas}/1065 \text{ Btu}) * (4 \text{ scf S}/10^6 \text{ scf gas}) * (1 \text{ lb-mol}/379 \text{ scf}) * (32.06 \text{ lb S}/\text{lb-mol}) * (64.06 \text{ lb SO}_2/32.06 \text{ lb S})$$

$$= 0.08 \text{ lb/hr SO}_2$$

^b An example calculation for annual CO emissions for Emission Unit ID S057 follows:

$$\text{CO (T/yr)} = (\text{Hourly PTE, lb/hr}) * (\text{Annual Operating Hours, hr/yr}) * (1 \text{ T}/2,000 \text{ lb})$$

$$\text{CO (T/yr)} = (141.10 \text{ lb/hr}) * (0,100 \text{ hr/yr}) * (1 \text{ T}/2,000 \text{ lb})$$

$$= 7.05 \text{ T/yr CO}$$

**COMBUSTION SOURCES POTENTIAL TO EMIT GREENHOUSE GASES
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC**

Combustion-Related Greenhouse Gas Emissions

Combustion Source Emission Unit ID	Combustion Source Description	hp	Btu/hp-hr	MMBtu/hr	Annual Operating Hours	Annual Fuel Usage MMBtu/yr	CO ₂ ^a Emissions short T/yr	CH ₄ ^a Emissions short T/yr	N ₂ O ^a Emissions short T/yr	CO ₂ e ^b short T/yr	GHG Mass ^c short T/yr
S012	Regen Gas Heater	---	---	9.7	8,760	84,972.00	4,969.85	0.0937	0.0094	4,974.98	4,969.95
S013	Cryo HMO Heater	---	---	26.3	8,760	230,388.00	13,474.94	0.2540	0.0254	13,488.86	13,475.22
S016	Hot Oil Heater	---	---	61.6	8,760	539,440.80	31,550.83	0.5946	0.0595	31,583.42	31,551.49
S017	Hot Oil Heater	---	---	61.6	8,760	539,440.80	31,550.83	0.5946	0.0595	31,583.42	31,551.49
S018	Hot Oil Heater	---	---	61.6	8,760	539,440.80	31,550.83	0.5946	0.0595	31,583.42	31,551.49
S019	Hot Oil Heater	---	---	61.6	8,760	539,440.80	31,550.83	0.5946	0.0595	31,583.42	31,551.49
S022	Hot Oil Heater	---	---	61.6	8,760	539,440.80	31,550.83	0.5946	0.0595	31,583.42	31,551.49
S023	Hot Oil Heater	---	---	61.6	8,760	539,440.80	31,550.83	0.5946	0.0595	31,583.42	31,551.49
S024	Stabilizer Heater	---	---	10.1	8,760	88,388.40	5,169.66	0.0974	0.0097	5,175.00	5,169.77
S001	Hot Oil Heater	---	---	216.7	8,760	1,898,292.00	111,027.37	2.0925	0.2092	111,142.04	111,029.68
S024	Regen Gas Heater	---	---	9.7	8,760	84,972.00	4,969.85	0.0937	0.0094	4,974.98	4,969.95
S026	Cryo HMO Heater	---	---	26.3	8,760	230,388.00	13,474.94	0.2540	0.0254	13,488.86	13,475.22
S029	Glycol Reboiler	---	---	3.0	8,760	26,280.00	1,537.07	0.0290	0.0029	1,538.65	1,537.10
S036	Regen Gas Heater	---	---	9.7	8,760	84,972.00	4,969.85	0.0937	0.0094	4,974.98	4,969.95
S037	Cryo HMO Heater	---	---	26.3	8,760	230,388.00	13,474.94	0.2540	0.0254	13,488.86	13,475.22
S040	Regen Gas Heater	---	---	19.3	8,760	168,892.80	9,878.21	0.1862	0.0186	9,888.41	9,878.41
S041	Cryo HMO Heater	---	---	54.7	8,760	478,909.20	28,010.46	0.5279	0.0528	28,039.39	28,011.04
S044	Regen Gas Heater	---	---	9.7	8,760	84,972.00	4,969.85	0.0937	0.0094	4,974.98	4,969.95
S045	Cryo HMO Heater	---	---	26.3	8,760	230,388.00	13,474.94	0.2540	0.0254	13,488.86	13,475.22
S048	Regen Gas Heater	---	---	9.7	8,760	84,972.00	4,969.85	0.0937	0.0094	4,974.98	4,969.95
S049	Cryo HMO Heater	---	---	26.3	8,760	230,388.00	13,474.94	0.2540	0.0254	13,488.86	13,475.22
V003	Vapor Combustor	---	---	5.6	8,760	48,951.64	2,863.09	0.0540	0.0054	2,866.04	2,863.14
S034	Flare (Pigging)	---	---	170.7	---	2,048.54	141.97	0.0023	0.0002	142.09	141.97
S057	Generator Engine(s)	16,000	8,000	128.0	100	12,800.00	748.65	0.0141	0.0014	749.42	748.66

$$CO_2, CH_4, \text{ or } N_2O = \text{Fuel} * HHV * EF \text{ (Eq. C-1, §98.33(a)(1)(i) and C-8, §98.33(e)(1))}$$

Where:

CO₂, CH₄, or N₂O = annual emissions from combustion, kg

Fuel = volume of fuel combusted, scf/yr

HHV = high heat value of fuel, MMBtu/scf

EF = emission factors from Tables C-1 and C-2 of 40 CFR 98, Subpart C are as follows:

Propane	62.87 kg/MMBtu
Natural Gas	0.001 kg/MMBtu
CO ₂	53.06 kg/MMBtu
CH ₄	0.001 kg/MMBtu
N ₂ O	0.0001 kg/MMBtu

^a The unit design rating in MMBtu/hr was substituted for Fuel and HHV in Equation C-1 and a conversion from metric tons to short tons was applied, as shown in the following example calculation for Emissions Unit ID S012:
 $CO_2 \text{ (short T/yr)} = (0.001 \text{ metric T/kg}) * (\text{Fuel Usage, MMBtu/yr}) * (CO_2 \text{ EF, kg/MMBtu}) * (2,204.6 \text{ lb/metric T}) / (2,000 \text{ lb/short T})$
 $= \frac{4,969.85}{\text{short T/yr}}$

^b An example calculation for CO₂e using Eq. A-1 and global warming potential factors found in Table A-1 follows:
 $CO_2e \text{ (short T/yr)} = (CO_2 \text{ Emissions, short T/yr}) + 25 * (CH_4 \text{ Emissions, short T/yr}) + 298 * (N_2O \text{ Emissions, short T/yr})$
 $= \frac{4,974.98}{\text{short T/yr}}$

^c An example calculation for GHG Mass in short T/yr for Emission Unit ID S012 follows:
 $GHG \text{ Mass (short T/yr)} = (CO_2 \text{ Emissions, short T/yr}) + (CH_4 \text{ Emissions, short T/yr}) + (N_2O \text{ Emissions, short T/yr})$
 $= \frac{4,969.95}{\text{short T/yr}}$

Waste gas combustion GHG emissions from the flare are calculated on the following sheet.

GREENHOUSE GAS EMISSIONS FROM FLARE WASTE GAS COMBUSTION
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

CO₂ Combustion Emissions

Compound	Number of Carbon Atoms	Molecular Weight (lb/mol)	Closed Vent System (Area 2) ^a		Closed Vent System (Area 1) ^a		Maintenance and Blowdowns		Irregular Process Vents		Ethane Amine Flash Tanks		Total Emissions		Total CO ₂ Emissions	
			Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)
Methane	1	16.043	0.6233	2.7300	17.4889	76.6015	1.5095512	414.2790	8.8507	73.3621	0.3012	1.3193	1,536.8153	568.2919	4,172.7654	1,543.0279
Ethane	2	30.07	0.1728	0.7568	4.8051	21.0462	3.0682884	178.0590	4.4974	41.3045	81.7582	358.1009	3,159.5219	599.2673	9,153.8925	1,736.2211
Propane	3	44.097	0.3134	1.3726	3.4032	14.9062	154.1794	219.576	2.1075	12.3353	0.9592	4.2013	160.9627	54.7731	472.1894	160.6786
i-Butane	4	58.123	0.0239	0.1046	0.6337	3.9751	39.9751	5.6931	0.5464	3.1983	0.0000	0.0000	41.1791	11.7716	122.1989	34.9321
n-Butane	4	58.123	0.0330	0.1447	0.9173	4.0178	58.9831	8.4001	0.8063	4.7190	0.0000	0.0000	60.7397	17.2817	180.2449	51.2834
i-Pentane	5	72.15	0.0120	0.0526	0.3369	1.4757	22.0915	3.1462	0.3020	1.7675	0.0000	0.0000	22.7424	6.4420	67.9594	19.2502
n-Pentane	5	72.15	0.0092	0.0403	0.2358	1.1316	14.9732	2.1324	0.2047	1.1980	0.0000	0.0000	15.4454	4.5023	46.1544	13.4539
n-Hexane	6	86.172	0.0084	0.0368	0.2358	1.0329	19.6346	2.7963	0.2684	1.5709	0.0000	0.0000	20.1473	5.4369	60.4895	16.3237
Heptane	7	100.198	0.0035	0.0152	0.0976	0.4275	11.4125	0.6253	0.1560	0.9131	0.0000	0.0000	11.6696	2.9812	35.1538	8.9806
Benzene	6	78.00	0.0001	0.0002	0.0015	0.0066	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016	0.0068	0.0052	0.0227
Toluene	7	92.13	0.0001	0.0003	0.0021	0.0092	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0095	0.0071	0.0312
Ethylbenzene	8	106.165	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Xylene	8	106.165	0.0000	0.0000	0.0007	0.0033	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0034	0.0025	0.0110
Octane	8	114.224	0.0018	0.0079	0.0506	0.2215	4.3330	0.6171	0.0592	0.3467	0.0000	0.0000	4.4446	1.1931	13.4229	3.6032
Total CO₂ Emissions:														14,324.4859	3,587.8195	

Sample calculation CO₂ combustion (using methane):

$$\text{CO}_2 \text{ Hourly} = (\text{Total Waste Gas Emissions, lb/hr CH}_4) * (\text{Destruction Efficiency}) * (\text{No. of C, lb/mol C/lb mol CH}_4) * (44 \text{ lb CO}_2/\text{lb mol C}) / (\text{MW, lb CH}_4/\text{lb mol CH}_4)$$

$$= (1,536.8153 \text{ lb/hr CH}_4) * (0.99) * (1 \text{ lb mol C/lb mol CH}_4) * (44 \text{ lb CO}_2/\text{lb mol C}) / (16.04 \text{ lb CH}_4/\text{lb mol CH}_4)$$

$$= 4,172.7654 \text{ lb/hr CO}_2$$

$$\text{CO}_2 \text{ Annual} = (\text{Total Waste Gas Emissions, T/yr CH}_4) * (\text{Destruction Efficiency}) * (\text{No. of C, lb/mol C/lb mol CH}_4) * (44 \text{ lb CO}_2/\text{lb mol C}) / (\text{MW, lb CH}_4/\text{lb mol CH}_4)$$

$$= (568.2919 \text{ T/yr CH}_4) * (0.99) * (1 \text{ lb mol C/lb mol CH}_4) * (44 \text{ lb CO}_2/\text{lb mol C}) / (16.04 \text{ lb CH}_4/\text{lb mol CH}_4)$$

$$= 1,543.0279 \text{ T/yr CO}_2$$

$$\text{N}_2\text{O} = \text{Fuel} * \text{HHV} * 0.0001 \text{ (Eq. W-40, §98.233(o)(6))}$$

Where:

N₂O = annual emissions from combustion, kg
 Fuel = volume of fuel combusted, scf/yr
 HHV = high heat value of fuel, MMBtu/scf

N₂O Combustion Emissions

Closed Vent System (Area 2) ^a		Closed Vent System (Area 1) ^a		Maintenance and Blowdowns		Irregular Process Vents		Ethane Amine Flash Tanks	
Waste Gas Flow (scf/yr)	Heating Value (Btu/scf)	Waste Gas Flow (scf/yr)	Heating Value (Btu/scf)	Waste Gas Flow (scf/yr)	Heating Value (Btu/scf)	Waste Gas Flow (scf/yr)	Heating Value (Btu/scf)	Waste Gas Flow (scf/yr)	Heating Value (Btu/scf)
177,248.21	1,234.15	4,559,635.92	32,362,080.00	5,000,000.00	1051.56	5,000,000.00	1,528.61	1051.56	1,761.18
0.00002	0.00002	0.0006	0.004	0.001	0.0000002	0.001	0.0000002	0.0000002	0.0000002

Sample Calculation for Closed Vent System (Area 2) Emissions:

$$\text{N}_2\text{O} = (0.0001 \text{ kg N}_2\text{O/MMBtu}) * (\text{Waste Gas Flow, scf/yr}) * (\text{Heating Value, Btu/scf}) / (10^6 \text{ Btu/MMBtu}) / (0.4536 \text{ kg/lb}) / (2,000 \text{ lb/T})$$

$$= (0.0001 \text{ kg N}_2\text{O/MMBtu}) * (177,248.21 \text{ scf/yr}) * (1,234.15 \text{ Btu/scf}) / (10^6 \text{ Btu/MMBtu}) / (0.4536 \text{ kg/lb}) / (2,000 \text{ lb/T})$$

$$= 0.00002 \text{ T/yr}$$

Emission Summary:

CO ₂ (T/yr)	CH ₄ (T/yr)	Uncombusted CO ₂ (T/yr)	CH ₄ (T/yr)	Maintenance and Blowdowns		Irregular Process Vents		Ethane Amine Flash Tanks		Total Emissions		Combustion CO ₂ (T/yr)	Combustion N ₂ O (T/yr)	CO ₂ e ^b (T/yr)
				Uncombusted CO ₂ (T/yr)	CH ₄ (T/yr)	Uncombusted CO ₂ (T/yr)	CH ₄ (T/yr)	Uncombusted CO ₂ (T/yr)	CH ₄ (T/yr)	Uncombusted CO ₂ (T/yr)	CH ₄ (T/yr)			
0.04	0.03	1.16	0.81	2.00	4.14	0.36	0.73	1.33	0.01	4.90	5.73	3,587.82	0.006	3,737.76

^a Closed Vent System from Area 2 and Area 1 were taken from Closed Vent System Feed Rate To Flare worksheet.

^b Total GHG emissions from flare waste gas combustion are calculated as follows:
 (4.90 T/yr Uncombusted CO₂) + (3,587.82 T/yr Combustion CO₂) + ((5.73 T/yr Methane) * 25) + ((0.006 T/yr N₂O) * 298) = 3,737.76 T/yr CO₂e

ATTACHMENT O: MONITORING/RECORDKEEPING/REPORTING/TESTING PLANS

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

TABLE O-1
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID	Control Device ID	Emission Point ID	Description	Applicable Citation(s)	Limitation/Standard	Monitoring	Testing	Recordkeeping	Reporting
--	--	--	Site-Wide Requirements (Natural Gas Processing Plant)		Wet natural gas throughput: ≤ 1725 MMscf/day			Maintain records of the amount of natural gas processed in the gas processing plant	
S001		P001	Hot Oil Heater (216.7 MMBtu/hr)		Maximum heat input: ≤ 216.7 MMBtu/hr ≤ 225,571 scf/hr ≤ 1,976 MMscf/yr	Annual sampling for composition (extended analysis) and heat content of combined fuel gas stream.		Monthly and rolling 12-month total records of natural gas consumed. GHG emissions, estimated using the methodology in 40 CFR Part 98, the annual fuel gas sample(s), and the monthly natural gas combustion records.	
				45CSR§2-3.1, 45CSR§2-3.2	10% opacity	At such reasonable time as the Secretary may designate, conduct 40 CFR Part 60, Appendix A, Method 9 opacity observations.	Opacity must be determined by 40 CFR Part 60, Appendix A, Method 9 observations or by measurements from a COMS approved by the Director	Maintain records of all opacity observations.	Any opacity deviation (s), as soon as practicable, but within ten (10) calendar days of the occurrence. Report shall include at least the results of the observation, the cause or suspected cause of the violation(s), and any corrective measures taken or planned. SSM Excess opacity periods < 30 mins and ≤ 40% may be reported on a quarterly basis unless otherwise required by the Director. [45CSR§2-9.3.a] IfSSM > 30 mins or > 40%, report by telephone, telefax, or e-mail by the end of the next business day after becoming aware of such condition. Then file a certified written report concerning the malfunction with the Director within 30 days providing: a detailed explanation of the factors involved or causes of the malfunction; the date and time of duration (with starting and ending times) of the period of excess emissions; an estimate of the mass of excess emissions discharged during the malfunction period; the maximum opacity measured or observed during the malfunction; immediate remedial actions taken at the time of the malfunction to correct or mitigate the effects of the malfunction; and a detailed explanation of the corrective measures or program that will be implemented to prevent a recurrence of the malfunction and a schedule for such implementation. [45CSR§2-9.3.b]
				NSPS Db	0.32 lb/MMBtu SO ₂ , in order to qualify for exemption from §60.42b(k)(1) [40CFR§60.42b(k)(2)]	Weekly fuel analysis sampling [§60.47b(f) and §60.49b(r)(2)]. Requesting quarterly sampling instead of weekly sampling per §60.49b(r)(2)(iv). The owner or operator of an affected facility that only combusts very low sulfur oil, natural gas, or a mixture of these fuels with any other fuels not subject to an SO ₂ standard is not subject to the compliance and performance testing requirements of this section if the owner or operator obtains fuel receipts as described in §60.49b(r). [§60.45b(k)]	Daily fuel type and amount combusted [§60.48b(g)(1)] Obtain and maintain at the affected facility fuel receipts from the fuel supplier that certify that the gaseous fuel meets the definition of natural gas as defined in §60.41b [§60.49b(r)] or perform sampling of fuel gas in accordance with site-specific fuel analysis plan per §60.49b(r)(2).	Site-specific fuel analysis plan no later than 60 days before the date you intend to demonstrate compliance. [§60.49b(r)(2)]	
					0.1 lb/MMBtu NO _x [§60.44b(a)(1)(i)]	Install, calibrate, maintain, and operate CEMS for measuring NO _x and O ₂ (or CO ₂) emissions discharged to the atmosphere, and shall record the output of the system [§60.48b(b)(1)] CEMS shall be operated and data recorded during all periods of operation of the affected facility except for CEMS breakdowns and repairs. Data is recorded during calibration checks, and zero and span adjustments. [§60.48b(c)] In instances of CEMS breakdowns, repairs, calibration checks and zero and span adjustments, emission data will be obtained by using standby monitoring systems, Method 7/7A to provide data for a minimum of 75% of the daily operating hrs, in at least 22 out of 30 successive steam generating unit operating days.	Conduct initial performance test for NO _x using the CEMS to collect 30 days of data [§60.8 and §60.44b(e)(1)] Conduct subsequent performance tests as requested [§60.44b(e)(4)]	Record 1-hr avg NO _x measured by the CEMS, in ng/l or lb/MMBtu heat input, and used that to calculate the avg emission rates under §60.44b. The 1-hour averages shall be calculated using the data points required under §60.13(b)(2). [§60.48b(d)] Keep daily records of all measurements; hourly NO _x emission rates (measured or predicted); rolling 30-day avg NO _x emission rate (ng/l or lb/MMBtu heat input); all calibrations and span checks; excess emissions, with the reasons for such excess emissions as well as a description of corrective actions taken; missing pollutant data, including reasons for not obtaining sufficient data and a description of corrective actions taken; excluded emission data and the reasons for excluding data; "F" factor; out of range times; any modifications to the CEMS that could affect compliance with Perf. Spec 2 or 3; and results of daily CEMS drift tests and quarterly RATAs. [§60.49(g)]	Notice of start of construction and actual startup [§60.7 and §60.49b(a)] Report performance test data from the initial performance test and the performance evaluation of the CEMS using the applicable performance specifications in appendix B of this part. [§60.49b(b)] Semi-annual excess emissions reports [§60.7, §60.49b(h)(2)(i), and §60.49b(i)]
S012, S024, S036, S044, S048		P012, P024, P036, P044, P048	Regen Gas Heaters (9.7 MMBtu/hr each)		Maximum heat input: ≤ 9.7 MMBtu/hr ≤ 10,097 scf/hr ≤ 88 MMscf/yr			Monthly and rolling 12-month total records of natural gas consumed.	
S029		P029	Glycol Reboiler (3.0 MMBtu/hr)		S029 Maximum heat input: ≤ 3.0 MMBtu/hr ≤ 3,123 scf/hr ≤ 27 MMscf/yr				
				45CSR§2-3.1, 45CSR§2-3.2	10% opacity	At such reasonable time as the Secretary may designate, conduct 40 CFR Part 60, Appendix A, Method 9 opacity observations	Opacity must be determined by 40 CFR Part 60, Appendix A, Method 9 observations or by measurements from a COMS approved by the Director	Maintain records of all opacity observations.	Any opacity deviation (s), as soon as practicable, but within ten (10) calendar days of the occurrence. Report shall include at least the results of the observation, the cause or suspected cause of the violation(s), and any corrective measures taken or planned.
S040		P040	Regen Gas Heater (19.28 MMBtu/hr)		Maximum heat input: ≤ 19.28 MMBtu/hr ≤ 20,069 scf/hr ≤ 176 MMscf/yr			Monthly and rolling 12-month total records of natural gas consumed.	
				45CSR§2-3.1, 45CSR§2-3.2	10% opacity	At such reasonable time as the Secretary may designate, conduct 40 CFR Part 60, Appendix A, Method 9 opacity observations	Opacity must be determined by 40 CFR Part 60, Appendix A, Method 9 observations or by measurements from a COMS approved by the Director	Maintain records of all opacity observations.	Any opacity deviation (s), as soon as practicable, but within ten (10) calendar days of the occurrence. Report shall include at least the results of the observation, the cause or suspected cause of the violation(s), and any corrective measures taken or planned. SSM excess opacity periods < 30 mins and ≤ 40% may be reported on a quarterly basis unless otherwise required by the Director. [45CSR§2-9.3.a] IfSSM > 30 mins or > 40%, report by telephone, telefax, or e-mail by the end of the next business day after becoming aware of such condition. Then file a certified written report concerning the malfunction with the Director within 30 days providing: a detailed explanation of the factors involved or causes of the malfunction; the date and time of duration (with starting and ending times) of the period of excess emissions; an estimate of the mass of excess emissions discharged during the malfunction period; the maximum opacity measured or observed during the malfunction; immediate remedial actions taken at the time of the malfunction to correct or mitigate the effects of the malfunction; and a detailed explanation of the corrective measures or program that will be implemented to prevent a recurrence of the malfunction and a schedule for such implementation. [45CSR§2-9.3.b]

TABLE O-1
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID	Control Device ID	Emission Point ID	Description	Applicable Citation(s)	Limitation/Standard	Monitoring	Testing	Recordkeeping	Reporting
S013, S026, S037, S045, S049	--	P013, P026, P037, P045, P049	Cryo HMO Heaters (26.3 MMBtu/hr)		Maximum heat input: ≤ 26.3 MMBtu/hr ≤ 27,377 scf/hr ≤ 240 MMscf/yr			Monthly and rolling 12-month total records of natural gas consumed.	
S041		P041	S041 Cryo HMO heater (54.67 MMBtu/hr)		S041 Maximum heat input: ≤ 54.67 MMBtu/hr ≤ 56,908 scf/hr ≤ 499 MMscf/yr				
S016, S017, S018, S019, S052, S053		P016, P017, P018, P019, P052, P053	Hot Oil Heaters (61.6 MMBtu/hr)		Maximum heat input: ≤ 61.6 MMBtu/hr ≤ 64,101 scf/hr ≤ 562 MMscf/yr				
S056		P056	Stabilizer Heater (10.09 MMBtu/hr)		Maximum heat input: ≤ 10.09 MMBtu/hr ≤ 10,503 scf/hr ≤ 92 MMscf/yr				
				45CSR§2-3.1, 45CSR§2-3.2	10% opacity	At such reasonable time as the Secretary may designate, conduct 40 CFR Part 60, Appendix A, Method 9 opacity observations	Opacity must be determined by 40 CFR Part 60, Appendix A, Method 9 observations or by measurements from a COMS approved by the Director	Maintain records of all opacity observations.	Any opacity deviation (s), as soon as practicable, but within ten (10) calendar days of the occurrence. Report shall include at least the results of the observation, the cause or suspected cause of the violation(s), and any corrective measures taken or planned. SSM excess opacity periods < 30 mins and ≤ 40% may be reported on a quarterly basis unless otherwise required by the Director. [45CSR§2-9.3.a] IfSSM > 30 mins or > 40%, report by telephone, telefax, or e-mail by the end of the next business day after becoming aware of such condition. Then file a certified written report concerning the malfunction with the Director within 30 days providing: a detailed explanation of the factors involved or causes of the malfunction; the date and time of duration (with starting and ending times) of the period of excess emissions; an estimate of the mass of excess emissions discharged during the malfunction period; the maximum opacity measured or observed during the malfunction; immediate remedial actions taken at the time of the malfunction to correct or mitigate the effects of the malfunction; and a detailed explanation of the corrective measures or program that will be implemented to prevent a recurrence of the malfunction and a schedule for such implementation. [45CSR§2-9.3.b]
				NSPS Dc		Daily fuel type and amount combusted [§60.48c(g)(1)]		Daily fuel type and amount combusted [§60.48c(g)(1)] -OR- Monthly fuel type and amount combusted [§60.48c(g)(2)] -OR- Monthly fuel delivered to site [§60.48c(g)(3)]	Notice of start of construction and actual startup [§60.7, §60.48c(a)]
V003	--	V003	Vapor Combustor		Natural gas firing rate: ≤ 30.19 MMscf/yr The vapor combustor V003 will control emissions from the dehydration unit BTEX condenser and flash tank.	Heat content of each stream combusted in the vapor combustor, including dehydration unit flash gas and condenser vent waste gas, as determined using GlyCalc.		Monthly and rolling 12-month total records of fuel gas combusted. GHG emissions, estimated using the methodology in 40 CFR Part 98, the annual fuel gas sample(s), and the monthly natural gas combustion records.	
				45CSR§6	Pilot flame present at all times when emissions may be vented, except periods of SSM. Combustion and destruction efficiency of 98%. PM Emissions (lb/hr) = F x Incinerator Capacity (T/hr) Where, F = either 5.43 for an incinerator with a capacity <15,000 lbs/hr or 2.72 for an incinerator with a capacity ≥15,000 lbs/hr or greater. 20% opacity, except for up to 8 minutes/startup 40% opacity during startup, not to exceed 8 minutes total No objectionable odors. If unavoidable malfunction of equipment, excess emissions may be permitted by the Director for <=5 days upon specific application to the Director. Such application shall be made within 24 hrs of the malfunction. In cases of major equipment failure, additional time periods may be granted by the Director provided a corrective program has been submitted by the owner or operator and approved by the Director.	Continuous monitoring of pilot flame presence, using thermocouple or other equivalent device. The inlet gas flow rate, documenting ≤ the maximum specified by the manufacturer.	An initial operational assurance test by the vendor shall be conducted to ensure flame stability and smokeless operation of the vapor combustor. Monthly opacity observations, to demonstrate no visible emissions are observed for more than a total of 5 minutes during any 2 consecutive hour period using 40CFR60 Appendix A Method 22. The visible emission checks shall determine the presence or absence of visible emissions. At a minimum, the observer must be trained and knowledgeable regarding the effects of background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (condensing water vapor) on the visibility of emissions. If the vapor combustor fails the visible emissions test, the permittee must follow manufacturer's repair instructions, if available, or best combustion engineering practice as outlined in the unit inspection and maintenance plan, to return the unit to compliant operation. All repairs and maintenance activities for the vapor combustor must be recorded in a maintenance and repair log and must be available for inspection. Following return to operation from maintenance or repair activity, each device must pass an EPA Method 22, 40 CFR part 60, appendix A, visual observation. Upon Agency request, conduct PM stack sampling using EPA Method 5 or equivalent.	Monthly throughput to the vapor combustor. Records of the times and duration of all periods which the pilot flame was absent. Records of visible emissions tests. All repairs and maintenance activities must be recorded in a maintenance and repair log and must be available for inspection.	Report any deviation(s) from the allowable visible emission requirement for any emissions discovered during opacity observations in writing as soon as practicable, but <10 calendar days of the occurrence; include at least: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any corrective measures taken or planned. Any deviation(s) from the vapor combustor design and operation criteria shall be reported in writing to the Director as soon as practicable, but no later than ten (10) calendar days of discovery of such deviation. If testing is requested, submit a protocol at >30 days prior to testing and notification of the testing date at least 15 days prior to testing. Submit the testing results within 60 days of testing and provide all supporting calculations and testing data. SSM excess opacity periods < 30 mins and ≤ 40% may be reported on a quarterly basis unless otherwise required by the Director. [45CSR§2-9.3.a] IfSSM > 30 mins or > 40%, report by telephone, telefax, or e-mail by the end of the next business day after becoming aware of such condition. Then file a certified written report within 30 days providing: a detailed explanation of the factors involved or causes of the malfunction; the date and time of duration (with starting and ending times); an estimate of the mass of excess emissions discharged during the malfunction period; the maximum opacity measured or observed during the malfunction; immediate remedial actions taken at the time of the malfunction to correct or mitigate the effects of the malfunction; and a detailed explanation of the corrective measures or program that will be implemented to prevent a recurrence of the malfunction and a schedule for such implementation. [45CSR§2-9.3.b]

TABLE O-1
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID	Control Device ID	Emission Point ID	Description	Applicable Citation(s)	Limitation/Standard	Monitoring	Testing	Recordkeeping	Reporting
S004A	--	P004A	Ground Flare		Natural gas firing rate: ≤ 12.94 MMscf/yr The vent steam pressure shall be used to promote mixing at the burner tip in lieu of air or steam. The ground flare (S004A) will control emissions for maintenance events from multiple operations within the Plant.	Annual sampling for composition (extended) and heat content of stream combusted in the flare, including: Plant residue gas and flare waste gas stream during normal operations.		Monthly and rolling 12-month total records of fuel gas combusted. GHG emissions, estimated using the methodology in 40 CFR Part 98, the annual fuel gas sample(s), and the monthly natural gas combustion records.	
				45CSR§6	Pilot flame present at all times when emissions may be vented, except periods of SSM. Combustion efficiency of 98% and destruction efficiency of 98%. PM Emissions (lb/hr) = F x Incinerator Capacity (T/hr) Where, F = either 5.43 for an incinerator with a capacity <15,000 lbs/hr or 2.72 for an incinerator with a capacity $\geq 15,000$ lbs/hr or greater. 20% opacity, except for up to 8 minutes/startup 40% opacity during startup, not to exceed 8 minutes total No objectionable odors. If unavoidable malfunction of equipment, excess emissions may be permitted by the Director for ≤ 5 days upon specific application to the Director. Such application shall be made within 24 hrs of the malfunction. In cases of major equipment failure, additional time periods may be granted by the Director provided a corrective program has been submitted by the owner or operator and approved by the Director. Comply with the requirements of the permit during emergency operation of the flare.	Continuous monitoring of pilot flame presence, using thermocouple or other equivalent device. The inlet gas flow rate, documenting \leq the maximum specified by the manufacturer.	If requested, conduct opacity observation, to demonstrate no visible emissions are observed for more than a total of 5 minutes during any 2 consecutive hour period using 40CFR60 Appendix A Method 22. The visible emission checks shall determine the presence or absence of visible emissions. At a minimum, the observer must be trained and knowledgeable regarding the effects of background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (condensing water vapor) on the visibility of emissions. If the flare fails the visible emissions test, the permittee must follow manufacturer's repair instructions, if available, or best combustion engineering practice as outlined in the unit inspection and maintenance plan, to return the unit to compliant operation. All repairs and maintenance activities for the flare must be recorded in a maintenance and repair log and must be available for inspection. Following return to operation from maintenance or repair activity, each device must pass an EPA Method 22, 40 CFR part 60, appendix A, visual observation. Upon Agency request, conduct PM stack sampling using EPA Method 5 or equivalent.	Monthly throughput to the flare. Records of the times and duration of all periods which the pilot flame was absent. Records of visible emissions tests. All repairs and maintenance activities for the flare must be recorded in a maintenance and repair log and must be available for inspection.	Report any deviation(s) from the allowable visible emission requirement for any emissions discovered during opacity observations in writing as soon as practicable, but <10 calendar days of the occurrence; include at least: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any corrective measures taken or planned. Report the time, cause of event, estimate of emissions and corrective actions taken when the flare was used for an emergency at the facility. If testing is requested, submit a protocol at >30 days prior to testing and notification of the testing date at least 15 days prior to testing. Submit the testing results within 60 days of testing and provide all supporting calculations and testing data. SSM excess opacity periods < 30 mins and $\leq 40\%$ may be reported on a quarterly basis unless otherwise required by the Director. [45CSR§2-9.3.a] IfSSM > 30 mins or > 40%, report by telephone, telefax, or e-mail by the end of the next business day after becoming aware of such condition. Then file a certified written report within 30 days providing: a detailed explanation of the factors involved or causes of the malfunction; the date and time of duration (with starting and ending times); an estimate of the mass of excess emissions discharged during the malfunction period; the maximum opacity measured or observed during the malfunction; immediate remedial actions taken at the time of the malfunction to correct or mitigate the effects of the malfunction; and a detailed explanation of the corrective measures or program that will be implemented to prevent a recurrence of the malfunction and a schedule for such implementation. [45CSR§2-9.3.b]
				§60.18	No visible emissions, except 5 mins in any 2-hr period. Flame present at all times when receiving emissions. Diameter of $\geq 3"$, nonassisted, H2 content of $\geq 8\%$ vol, and exit velocity <122 fps and < Vmax. [§60.18(c)(3)(i)] -OR- Air Assist: Heat content ≥ 300 Btu/scf and veloc. <Vmax Steam Assist: ≥ 300 Btu/scf and 60 fps or lesser of Vmax and 400 fps -OR- >1,000 Btu/scf and 60 - 400 fps Nonassist: ≥ 200 Btu/scf and < 60 fps or lesser of Vmax or 400 fps -OR- > 1,000 Btu/scf and 60 - 400 fps [§60.18(c)(3)(ii), (c)(4)]	Continuous monitoring of pilot flame presence, using thermocouple or other equivalent device. [§60.18(f)(2)]	Visible emissions observations shall be made using EPA Method 22 as required per §60.18.	Maintain records of all Method 22 observations as required by §60.18.	
S034	--	P034	Flare (Pigging)		Natural gas firing rate: ≤ 0.9 MMscf/yr The flare will control emissions during propane pigging operations.	Annual sampling for composition and heat content gas combusted in the flare.		Monthly and rolling 12-month total records of fuel gas combusted. GHG emissions, estimated using the methodology in 40 CFR Part 98, the annual fuel gas sample(s), and the monthly natural gas combustion records.	
				45CSR§6	Combustion efficiency of 98% and destruction efficiency of 98%. PM Emissions (lb/hr) = F x Incinerator Capacity (T/hr) Where, F = either 5.43 for an incinerator with a capacity <15,000 lbs/hr or 2.72 for an incinerator with a capacity $\geq 15,000$ lbs/hr or greater. 20% opacity, except for up to 8 minutes/startup 40% opacity during startup, not to exceed 8 minutes total No objectionable odors. If unavoidable malfunction of equipment, excess emissions may be permitted by the Director for ≤ 5 days upon specific application to the Director. Such application shall be made within 24 hrs of the malfunction. In cases of major equipment failure, additional time periods may be granted by the Director provided a corrective program has been submitted by the owner or operator and approved by the Director. Comply with the requirements of the permit during emergency operation of the flare.	Monitor number of pigging events.	If requested, conduct opacity observation, to demonstrate no visible emissions are observed for more than a total of 5 minutes during any 2 consecutive hour period using 40CFR60 Appendix A Method 22. The visible emission checks shall determine the presence or absence of visible emissions. At a minimum, the observer must be trained and knowledgeable regarding the effects of background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (condensing water vapor) on the visibility of emissions. If the flare fails the visible emissions test, the permittee must follow manufacturer's repair instructions, if available, or best combustion engineering practice as outlined in the unit inspection and maintenance plan, to return the unit to compliant operation. All repairs and maintenance activities for the flare must be recorded in a maintenance and repair log and must be available for inspection. Following return to operation from maintenance or repair activity, each device must pass an EPA Method 22, 40 CFR part 60, appendix A, visual observation. Upon Agency request, conduct PM stack sampling using EPA Method 5 or equivalent.	Monthly throughput to the flare. Records of visible emissions tests. All repairs and maintenance activities for the flare must be recorded in a maintenance and repair log and must be available for inspection.	Report any deviation(s) from the allowable visible emission requirement for any emissions discovered during opacity observations in writing as soon as practicable, but <10 calendar days of the occurrence; include at least: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any corrective measures taken or planned. If testing is requested, submit a protocol at >30 days prior to testing and notification of the testing date at least 15 days prior to testing. Submit the testing results within 60 days of testing and provide all supporting calculations and testing data. SSM excess opacity periods < 30 mins and $\leq 40\%$ may be reported on a quarterly basis unless otherwise required by the Director. [45CSR§2-9.3.a] IfSSM > 30 mins or > 40%, report by telephone, telefax, or e-mail by the end of the next business day after becoming aware of such condition. Then file a certified written report within 30 days providing: a detailed explanation of the factors involved or causes of the malfunction; the date and time of duration (with starting and ending times); an estimate of the mass of excess emissions discharged during the malfunction period; the maximum opacity measured or observed during the malfunction; immediate remedial actions taken at the time of the malfunction to correct or mitigate the effects of the malfunction; and a detailed explanation of the corrective measures or program that will be implemented to prevent a recurrence of the malfunction and a schedule for such implementation. [45CSR§2-9.3.b]

TABLE O-1
AIR PERMIT APPLICATION
NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT
BLUE RACER MIDSTREAM, LLC

Emission Unit ID	Control Device ID	Emission Point ID	Description	Applicable Citation(s)	Limitation/Standard	Monitoring	Testing	Recordkeeping	Reporting
S002, S003	--	P002, P003	Fire Pump #1 (700 hp), Fire Pump #2 (700 hp)		Maximum heat input: ≤ 35.9 gal/hr ≤ 3,590 gal/yr Annual operating hours: ≤ 100 hr/yr		Stack testing at the request of the agency.	Monthly and rolling 12-month total of diesel fuel burned and hours of operation. Maintenance records relating to failure and/or repair of fire pump equipment. In the event of equipment or system failure, these records shall document the permittee's effort to maintain proper and effective operation of such equipment and/or systems.	Submit written reports of all performance tests.
				45CSR§2-3.1, 45CSR§2-3.2	10% opacity	At such reasonable time as the Secretary may designate, conduct 40 CFR Part 60, Appendix A, Method 9 opacity observations	Opacity must be determined by 40 CFR Part 60, Appendix A, Method 9 observations or by measurements from a COMS approved by the Director	Maintain records of all opacity observations.	Any opacity deviation (s), as soon as practicable, but within ten (10) calendar days of the occurrence. Report shall include at least the results of the observation, the cause or suspected cause of the violation(s), and any corrective measures taken or planned.
				NSPS IIII	Over life of engine: 3.0 g/hp-hr NMHC + NOX 2.6 g/hp-hr CO 0.15 g/hp-hr PM [§60.4205(c), Table 4, §60.4206] Nonemergency hours (for maintenance checks and readiness testing, etc.) limited to 100/yr. [§60.4211(f)] Fire diesel that meets 40 CFR §80.510(b) for nonroad diesel fuel. [§60.4207(b)] Purchase certified engine and operate per manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer; only change settings allowed by manufacturer; and meet 40 CFR Parts 89, 94, and 1068 as applicable. [§60.4211(a) and (c)]	Install a non-resettable hour meter prior to startup of the engine. [§60.4209(a)]		Maintain manufacturer certification documentation. [§60.4211(c)] Starting with the model years in table 5 to this subpart, if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the owner or operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time. [§60.4214(b)]	
S057	--	P057	Generator Engine(s)	MACT ZZZZ NSPS IIII	Meet MACT ZZZZ by complying with NSPS IIII. Natural gas spark-ignited emergency engines greater than 130 hp subject to the following emission limitations: CO: 4 g/hp-hr NOx: 2 g/hp-hr VOC: 1 g/hp-hr [Table 1 to Subpart IIII Part 60]	Comply with applicable NSPS IIII requirements.	Comply with applicable NSPS IIII requirements.	Comply with applicable NSPS IIII requirements.	Comply with applicable NSPS IIII requirements.
S006, S032	C001, C009	P001, V003	Two glycol dehydration units with waste gas emissions routed to vapor combustor, with flexibility to route waste gas to the hot oil heater or back to inlet suction.		Maximum wet natural gas throughput: 460 MMscfd to S006, and 230 MMscfd to S032 (rolling 12-month average) Dehydration unit S032 waste gas emissions are routed to the vapor combustor, with the flexibility to route the waste gas to the hot oil heater (EU# S001) as fuel or back to inlet suction. Dehydration unit S006 waste gas emissions are routed to the hot oil heater as fuel.			Monthly and rolling 12-month total of wet natural gas throughput.	
				MACT HH	Benzene emissions: < 1 T/yr [§63.764(e)] Calculate benzene annual emissions. [§63.772(b)(2)] If actual HAPs >= 5 T/yr of a single HAP or >= 12.5 T/yr of all HAPs, then update major source determination annually, using gas composition data measured during the preceding 12 months. [§63.760(c)]	Operating hours per quarter, Quarterly throughput (MMscf/quarter), Annual daily average (MMscf/day), and Maximum design capacity (MMscf/day). At least once Quarterly: Absorber temp and pressure, lean glycol circulation rate, glycol pump type and max design (gpm), flash tank temp and pressure, stripping gas flow rate, if applicable, wet gas annual sampling, wet gas water content, dry gas water content at a point directly after exiting the dehydration column and before any additional separation points. Can use default GRI-GLYCALC parameters for water contents and lean glycol circulation rate. [§63.772(b)(2)(i), 45 CSR§13-5.11]		For the purpose of documenting compliance with the emission limitations, HAP major source thresholds, as well as the benzene exemption, maintain records of all monitoring data, wet gas sampling, and annual GRI-GLYCALC emission estimates. [45 CSR§13-5.11, 40 CFR §63.764(e)(ii)]	
S011, S054	-- C011	P005, P054	Ethane Amine Regenerators		Maximum gas throughput: 129 MMscfd (rolling 12-month average) Ethane product CO ₂ content: < 1 mol%	Annual sampling for composition (C6+) of Amine inlet gas stream. Monthly flow rate of amine unit ethane outlet.		Monthly and rolling 12-month total of amine unit feed stream. GHG emissions estimated using the methodology in 40 CFR Part 98, the annual gas analysis, and the flow rate records.	

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Emission Unit ID	Control Device ID	Emission Point ID	Description	Applicable Citation(s)	Limitation/Standard	Monitoring	Testing	Recordkeeping	Reporting
TK-802, TK-2802, TK-3802, TK-4802, TK-5802, TK-6802	C001 and C006	P001	Natural Gasoline Storage Tank TK-802, TK-2802, TK-3802, TK-4802, TK-5802, TK-6802 with Natural Gas Blanket and VRU to Hot Oil Heater		Emissions from the Gasoline Storage Tanks shall be controlled by a natural gas blanket and VRU. The VRU shall recover and direct any emissions from the tank (i.e., blanket gas) to the Hot Oil Heater (S001) for use as fuel. The VRU system will employ a vapor return which shall be designed to achieve a minimum guaranteed capture efficiency of 100% for the storage tank.			Malfunctions of VRU: occurrence and duration of any malfunction or operational shutdown of the VRU during which excess emissions occur. For each such case, the following information shall be recorded: the equipment involved; steps taken to minimize emissions during the event; duration of the event; estimated increase in emissions during the event; in case of equipment malfunction, also record the cause of the malfunction and the steps taken to correct the malfunction; and any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction, as required by permit standard conditions.	Upon request by the Director, report deviations within a requested time from of any occurrences when the control device was operated outside of the parameters defined in the monitoring plan.
				NSPS Kb	A closed vent system and control device meeting the following specifications: (i) The closed vent system shall be designed to collect all VOC vapors and gases discharged from the storage vessel and operated with no detectable emissions as indicated by an instrument reading of less than 500 ppm above background and visual inspections, as determined in part 60, subpart VV, § 60.485(b). (ii) The control device shall be designed and operated to reduce inlet VOC emissions by 95% or greater. If a flare is used as the control device, it shall meet the specifications described in the general control device requirements (§ 60.18) of the General Provisions. [§60.112b(a)(3)] Operate the closed vent system and control device and monitor the parameters of the closed vent system and control device in accordance with the operating plan submitted to the Administrator in accordance with paragraph (c)(1) of this section, unless the plan was modified by the Administrator during the review process. In this case, the modified plan applies. [§60.113b(c)]	Monitor parameters as laid out in the monitoring plan. [§60.113b] Storage temperature used to determine the maximum true vapor pressure may be determined per §60.116b(e).	A copy of the operating plan for the tank, closed vent system, and control device. A record of the measured values of the parameters monitored in accordance with §60.113b(c)(2). [§60.115b(c)] Readily accessible records showing the dimension of the storage vessel and an analysis showing the capacity of the storage vessel. [§60.116b(b)]	Submit an operating plan for the tank, closed vent system, and control device, including: 1) Documentation demonstrating that the control device will achieve the required control efficiency during maximum loading conditions. This documentation is to include a description of the gas stream which enters the control device, including flow and VOC content under varying liquid level conditions (dynamic and static) and manufacturer's design specifications for the control device. If the control device or the closed vent capture system receives vapors, gases, or liquids other than fuels from sources that are not designated sources under this subpart, the efficiency demonstration is to include consideration of all vapors, gases, and liquids received by the closed vent capture system and control device. If an enclosed combustion device with a minimum residence time of 0.75 seconds and a minimum temperature of 816 °C is used to meet the 95 percent requirement, documentation that those conditions will exist is sufficient to meet the requirements of this paragraph. 2) A description of the parameter or parameters to be monitored to ensure that the control device will be operated in conformance with its design and an explanation of the criteria used for selection of that parameter (or parameters). [§60.113b(c)]	
TK-7802	C012	TK-7802	Refrigerated Propane Storage Tank TK-7802 with VRU	NSPS Kb	A closed vent system and control device meeting the following specifications: (i) The closed vent system shall be designed to collect all VOC vapors and gases discharged from the storage vessel and operated with no detectable emissions as indicated by an instrument reading of less than 500 ppm above background and visual inspections, as determined in part 60, subpart VV, § 60.485(b). (ii) The control device shall be designed and operated to reduce inlet VOC emissions by 95% or greater. If a flare is used as the control device, it shall meet the specifications described in the general control device requirements (§ 60.18) of the General Provisions. [§60.112b(a)(3)] Operate the closed vent system and control device and monitor the parameters of the closed vent system and control device in accordance with the operating plan submitted to the Administrator in accordance with paragraph (c)(1) of this section, unless the plan was modified by the Administrator during the review process. In this case, the modified plan applies. [§60.113b(c)]	Monitor parameters as laid out in the monitoring plan. [§60.113b] Storage temperature used to determine the maximum true vapor pressure may be determined per §60.116b(e).		A copy of the operating plan for the tank, closed vent system, and control device. A record of the measured values of the parameters monitored in accordance with §60.113b(c)(2). [§60.115b(c)] Readily accessible records showing the dimension of the storage vessel and an analysis showing the capacity of the storage vessel. [§60.116b(b)]	Submit an operating plan for the tank, closed vent system, and control device, including: 1) Documentation demonstrating that the control device will achieve the required control efficiency during maximum loading conditions. This documentation is to include a description of the gas stream which enters the control device, including flow and VOC content under varying liquid level conditions (dynamic and static) and manufacturer's design specifications for the control device. If the control device or the closed vent capture system receives vapors, gases, or liquids other than fuels from sources that are not designated sources under this subpart, the efficiency demonstration is to include consideration of all vapors, gases, and liquids received by the closed vent capture system and control device. If an enclosed combustion device with a minimum residence time of 0.75 seconds and a minimum temperature of 816 °C is used to meet the 95 percent requirement, documentation that those conditions will exist is sufficient to meet the requirements of this paragraph. 2) A description of the parameter or parameters to be monitored to ensure that the control device will be operated in conformance with its design and an explanation of the criteria used for selection of that parameter (or parameters). [§60.113b(c)]
TK-906, TK-2906, TK-907, TK-2907, TK-L-1	--	TK-906, TK-2906, TK-907, TK-2907, TK-L-1	Slop Tanks TK-906 and TK-2906, Produced Water Tanks TK-907 and TK-2907, Gasoline Dispensing Tank		Throughput and material stored limitations.			Maintain records of throughput through each storage tank.	
S004A	C004A	P004A	Compressor Blowdown Vents, Closed Vent System Vents, and Process Vents					Maintain daily records of blowdowns and vents to flare, including duration, volume vented, reason for blowdown (i.e., MSS or upset).	
N/A	N/A	N/A	Refrigeration Compressors (Electric)					Maintain daily records of blowdowns and vents to flare, including duration, volume vented, reason for blowdown (i.e., MSS or upset).	
N/A	N/A	N/A	Residue Gas Compressors (Electric)					Maintain daily records of blowdowns and vents to flare, including duration, volume vented, reason for blowdown (i.e., MSS or upset).	
N/A	N/A	N/A	Ethane Compressors (Electric)					Maintain daily records of blowdowns and vents to flare, including duration, volume vented, reason for blowdown (i.e., MSS or upset).	
S008, S033	N/A	P008, P033	Propane, Butane, and Natural Gasoline Loading (Truck, Railcar, and Propane Barge) Barge Loading		Maximum throughput limitations. The system will employ a vapor balance (closed system) to route all vapors back to the tanks, for 100% control of loading emissions.			Maintain 12-month rolling total of product loading throughputs.	
N/A	N/A	N/A	Spherical Storage Tanks US-800, US-801, US-804, US-805, US-2800, US-2801, US-2804, US-2805		Maintain sufficient operating pressure to prevent air emissions to atmosphere. Pressure relief devices shall be vented to ground flare (C004A).				

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Emission Unit ID	Control Device ID	Emission Point ID	Description	Applicable Citation(s)	Limitation/Standard	Monitoring	Testing	Recordkeeping	Reporting
S015, L-1	N/A	P015, L-1	Slop / Produced Water Truck Loading, Gasoline Dispenser Loading		Throughput and material property limitations.			Maintain records of throughput and materials loaded.	
S055	N/A	P055	Pressurized NGL/Condensate Unloading		Throughput and material property limitations.			Maintain records of throughput and materials unloaded.	
FUG AREA 1	N/A	FUG AREA 1	Fugitive Area 1 (Cryo 1, Cryo 2, and Frac 1)	NSPS KKK	Comply with NSPS KKK for equipment in VOC service, defined as 10%wt VOC. Leak definition: 10,000 ppmv for most components, 500 ppmv for PRVs and closed vent systems. Leaking equipment shall be tagged; tag may be removed after repair. When a leak is detected, repair as soon as practicable, within 15 calendar days, or put on delay of repair list. First repair attempt must be within 5 calendar days. PRVs may not operate > 30 days after pressure release without monitoring. Flares must meet §60.18.	Implement NSPS KKK LDAR.	Implement NSPS KKK LDAR.	Maintain LDAR requirements as follows: 1) leaking equipment shall be tagged 2) tag may be removed after repair 3) for leaks, keep: instrument and operator ID, equipment ID, date detected, date(s) of each attempt to repair the leak, repair methods applied in each attempt to repair the leak, "above 10,000 ppm," repair delayed and reason for delay, if not repaired within 15 calendar days, signature of RO or designate who determined delay was necessary, expected date of repair for delayed repair, date of successful repair, 4) ID numbers for equipment with no detectable emissions 5) documentation proving exemption criteria are met	Semiannual report of LDAR monitoring results and records, including number of PRV leaks and repairs.
FUG AREA 2	N/A	FUG AREA 2	Fugitive Area 2 (Frac 2)	NSPS OOOO	Comply with NSPS OOOO for equipment in VOC service, defined as 10%wt VOC. Leak definition: 500 ppmv for most components, 2,000 ppmv for light liquid pumps. Leaking equipment shall be tagged; tag may be removed after repair. When a leak is detected, repair as soon as practicable, within 15 calendar days, or put on delay of repair list. First repair attempt must be within 5 calendar days. PRVs may not operate > 30 days after pressure release without monitoring. Flares must meet §60.18.	Implement NSPS OOOO LDAR.	Implement NSPS OOOO LDAR.	Maintain LDAR requirements as follows: 1) leaking equipment shall be tagged 2) tag may be removed after repair 3) for leaks, keep: instrument and operator ID, equipment ID, date detected, date(s) of each attempt to repair the leak, repair methods applied in each attempt to repair the leak, "above 500 ppm," repair delayed and reason for delay, if not repaired within 15 calendar days, signature of RO or designate who determined delay was necessary, expected date of repair for delayed repair, date of successful repair, 4) ID numbers for equipment with no detectable emissions 5) documentation proving exemption criteria are met	Semiannual report of LDAR monitoring results and records, including number of PRV leaks and repairs.
FUG AREA 3, FUG AREA 4, FUG AREA 5, FUG AREA 6, FUG AREA 7	N/A	FUG AREA 3, FUG AREA 4, FUG AREA 5, FUG AREA 6, FUG AREA 7	Fugitive Area 3 (Cryo 3), Fugitive Area 4 (Cryo 4), Fugitive Area 5 (Cryo 5), Fugitive Area 6 (Cryo 6), Fugitive Area 7 (Cryo 7)	NSPS OOOOa	Comply with NSPS OOOOa for equipment in VOC service, defined as 10%wt VOC. Leak definition: 500 ppmv for most components, 2,000 ppmv for light liquid pumps. Leaking equipment shall be tagged; tag may be removed after repair. When a leak is detected, repair as soon as practicable, within 15 calendar days, or put on delay of repair list. First repair attempt must be within 5 calendar days. PRVs may not operate > 30 days after pressure release without monitoring. Flares must meet §60.18.	Implement NSPS OOOOa LDAR.	Implement NSPS OOOOa LDAR.	Maintain LDAR requirements as follows: 1) leaking equipment shall be tagged 2) tag may be removed after repair 3) for leaks, keep: instrument and operator ID, equipment ID, date detected, date(s) of each attempt to repair the leak, repair methods applied in each attempt to repair the leak, "above 500 ppm," repair delayed and reason for delay, if not repaired within 15 calendar days, signature of RO or designate who determined delay was necessary, expected date of repair for delayed repair, date of successful repair, 4) ID numbers for equipment with no detectable emissions 5) documentation proving exemption criteria are met	Semiannual report of LDAR monitoring results and records, including number of PRV leaks and repairs.
ROADS	N/A	ROADS	Unpaved Roads	45 CSR 17	Maintain PM control of the plant premises, and plant owned, leased or controlled access roads, by paving, application of asphalt, chemical dust suppressants or other suitable dust control measures.				

ATTACHMENT P: PUBLIC NOTICE

RULE 13 AIR PERMIT APPLICATION

NATRIUM EXTRACTION AND FRACTIONATION PROCESSING PLANT

BLUE RACER MIDSTREAM, LLC

Notice of Application

Notice is given that Blue Racer Midstream, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Rule 13 Air Permit for a Modification to the Natrium Natural Gas Extraction and Processing Plant located on 14786 Energy Road, near Proctor, in Marshall County, West Virginia. The latitude and longitude coordinates are: 39° 45' 34.9" N; 80° 51' 42.2" W.

Blue Racer Midstream, LLC estimates the modification will result in the following increases of potential emissions of Regulated Air Pollutant discharges to the atmosphere:

Regulated Air Pollutant	Emissions (T/yr)
Oxides of Nitrogen (NO _x):	109.71
Carbon Monoxide (CO):	101.40
Volatile Organic Compounds (VOC):	313.64
Particulate Matter (PM):	38.47
PM with an aerodynamic diameter of less than or equal to 10 microns (PM ₁₀)	17.45
PM with an aerodynamic diameter of less than or equal to 2.5 microns (PM _{2.5})	10.58
Sulfur Dioxide (SO ₂):	0.86
Greenhouse Gases (CO ₂ e):	147,338

The addition of emission sources and operations are planned to begin on or about the 1st day of November, 2018. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th 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 (Day) day of (Month), (Year).

Richard Moncrief
President and COO
5949 Sherry Lane, Suite 1300
Dallas, Texas 75225