MAIN OFFICE
6141 RIVER ROAD
HARAHAN, LOUISIANA 70123
PHONE 504-733-5806
FAX 504-733-1752

WAREHOUSE
6120 JEFFERSON HWY.
HARAHAN, LOUISIANA 70123

April 19, 2016

Ms. Beverly McKeone
Division of Air Quality
WV Department of Environmental Protection
601 57th Street, SE
Charleston, West Virginia 25304

Dear Ms. McKeone:

Re: 45CSR13 Construction Permit Application
Methanol Storage and Chemical Handling Facility

X-Chem, LLC
393 Hwy 33 East
Weston, WV 26452

X-Chem, LLC would like to submit this 45CSR13 permit application, prepared by GHD Services Inc. on our behalf, for the methanol storage and chemical handling facility located at the above address.

Enclosed are the following documents:

- Original copy of the 45CSR13 construction permit application
- Two CD copies of the 45CSR13 construction permit application
- The application fee with check no. 689701 in the amount of $1,000.00

Please let me know if you have any questions or require additional information.

Sincerely,

Roy Mathew, Ph.D.
Corporate Environmental Manager
NCH Corporation

Encl:

cc: Brad Davisson – X-Chem, LLC
Manuel Bautista – GHD

NSR 45CSR13 Construction Permit Application

X-Chem, LLC
393 Hwy 33 East, Weston, WV 26452

GHD Services Inc.
6320 Rothway Suite 100 Houston Texas 77040
11111397 | Report No 1 | November 2015

Table of Contents

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):*
X-Chem, LLC

2. Federal Employer ID No. ***(FEIN):***
72-0952482

3. Name of facility *(if different from above):*

4. The applicant is the:
☐ **OWNER** ☐ **OPERATOR** ☒ **BOTH**

5A. Applicant's mailing address:
393 Hwy 33 East, Weston, WV 26452

5B. Facility's present physical address:
393 Hwy 33 East, Weston, WV 26452

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☐ **YES** ☒ **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 *proposed site?* ☒ **YES** ☐ **NO**

- If **YES,** please explain: Leased
- 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.):
Methanol Storage and Chemical Handling Facility

10. North American Industry Classification System **(NAICS)** code for the facility:
325998

11A. DAQ Plant ID No. (for existing facilities only):
–

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
NA

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**.

From the intersection of E 3rd St and Brown Ave, go 0.3 mi east of E 3rd St. then turn left on entrance to the facility.

12.B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
393 Hwy 33 East, Weston, WV 26452	Weston	Lewis
12.E. UTM Northing (KM): 4321.0632	12F. UTM Easting (KM): 547.3182	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:
Construction of Methanol Storage Tanks

14A. Provide the date of anticipated installation or change: 07/01/2016 – 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: 8/01/2016

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). $1,000.00 Application Fee attached.

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:

☒ Bulk Liquid Transfer Operations	☒ Haul Road Emissions	☐ Quarry
☐ Chemical Processes	☐ Hot Mix Asphalt Plant	☐ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	☒ Storage Tanks
☐ Grey Iron and Steel Foundry	☐ Indirect Heat Exchanger	
☐ General Emission Unit, specify		

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

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

☐ Absorption Systems	☐ Baghouse	☐ Flare
☐ Adsorption Systems	☐ Condenser	☐ Mechanical Collector
☐ Afterburner	☐ Electrostatic Precipitator	☐ Wet Collecting System

☐ Other Collectors, specify

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:

☐ Authority of Corporation or Other Business Entity	☐ Authority of Partnership
☐ Authority of Governmental Agency	☐ 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: 4/18/16

(Please use blue ink) *(Please use blue ink)*

35B. Printed name of signee: Kevin Wallace		35C. Title: VP Finance
35D. E-mail: kevin.wallace@nch.com	36E. Phone: 972-438-0869	36F. FAX:
36A. Printed name of contact person (if different from above):		36B. Title:
36C. E-mail:	36D. Phone:	36E. FAX:

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION
CERTIFICATE

ISSUED TO:
X-CHEM, LLC
393 US HIGHWAY 33 E
WESTON, WV 26452-8519

BUSINESS REGISTRATION ACCOUNT NUMBER: **2241-7129**

This certificate is issued on: **11/18/2014**

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

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

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

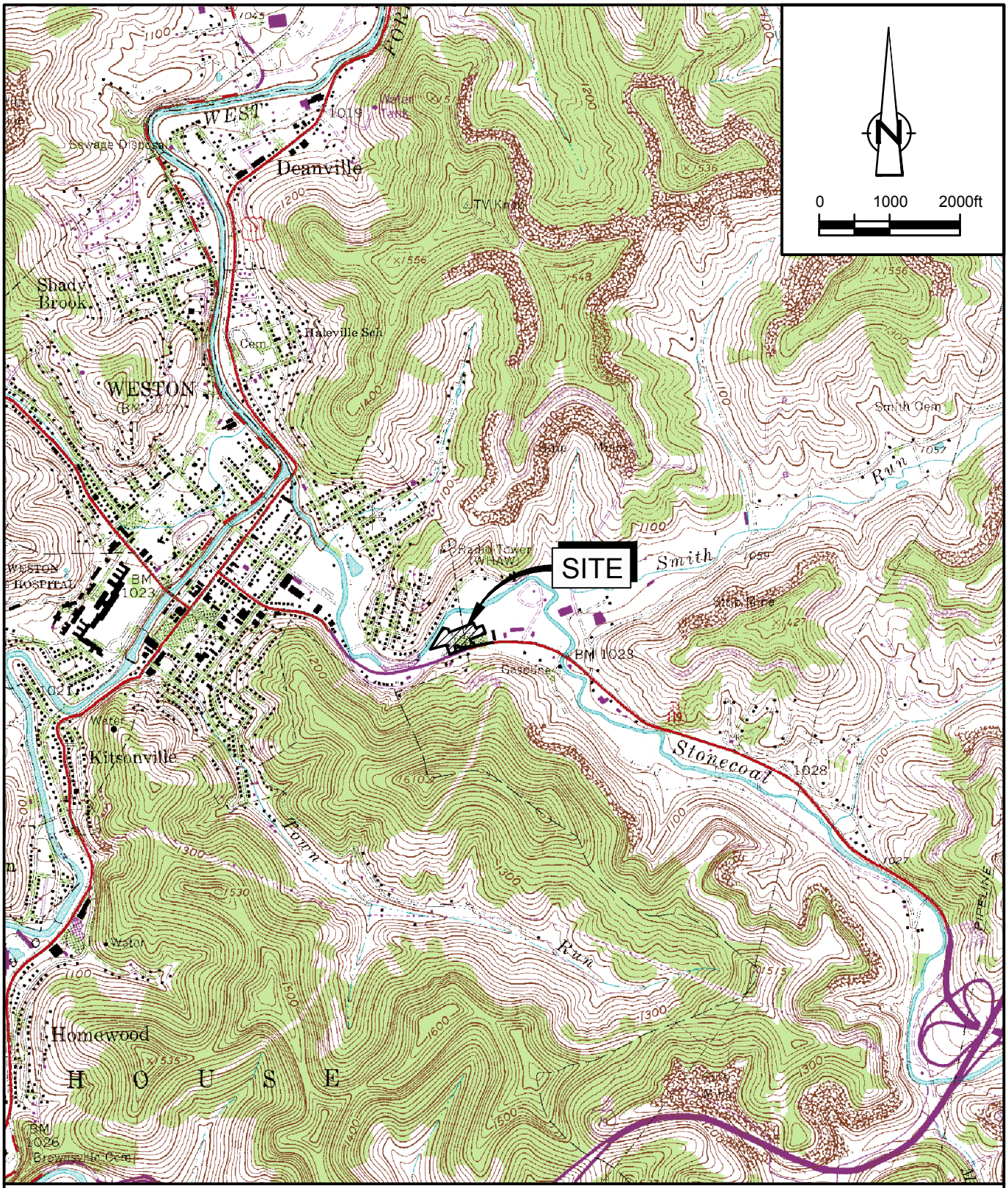
This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

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

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

atL006 v.4
L1216845376

Attachment B
Site Location Map



SOURCE: USGS QUADRANGLE MAP;
WESTON, WEST VIRGINIA

SITE COORDINATES: LAT. 39.037347, LONG. -80.453263
SITE ELEVATION: 1017 ft AMSL

GHD

Attachment B

AREA MAP
X-CHEM, LLC
Lewis County, West Virginia

Attachment C
Installation and Start-up Schedule

Attachment C

Installation and Start-up Schedule
X-Chem, LLC
Lewis County, West Virginia

Proposed Changes	Date
Install Storage Tanks	Upon issuance of permit
Startup	Upon issuance of permit

Attachment D
Regulatory Discussion

Attachment D

Regulatory Requirements
X-Chem LLC
Lewis County, WV

Below are the applicable State and Federal regulations. Each emission source and corresponding air pollutant emissions were evaluated to determine regulatory applicability.

STATE REGULATORY APPLICABILITY

45CSR13 (Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits, and Procedures for Evaluation)

The proposed facility is subject to the requirements of 45CSR13 because the hourly emissions of methanol, classified as a hazardous air pollutant exceeded the permit threshold of 2 lbs/hr. The facility submitted the proper application fee of $1,000.00 and will publish a Class I legal advertisement.

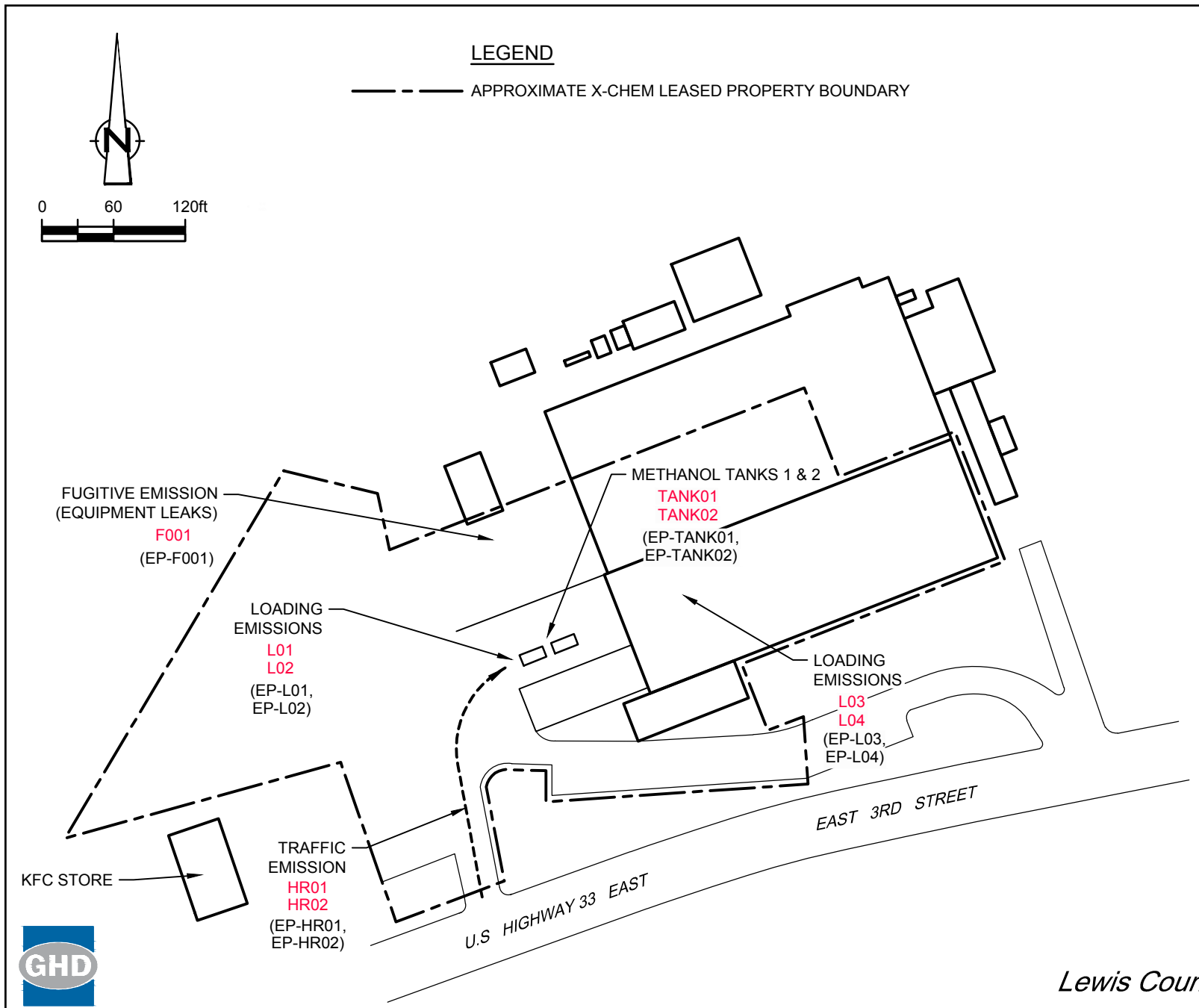
45CSR22 (Air Quality Management Fee Program)

This rule establishes a program to collect fees for certificates to operate and for permits to construct, modify or relocate sources of air pollution. The facility will demonstrate compliance with this rule by obtaining a Certificate to Operate (CTO) and paying annual fees in order to maintain a current CTO.

FEDERAL REGULATORY APPLICABILITY

The only stationary sources of emissions from the facility are the methanol storage tanks. Total annual emissions is estimated at 0.84 ton per year. There are no affected emission sources at this facility that are subject to 40 CFR §60 New Source Performance Standards and 40 CFR §63 National Emissions Standards for Hazardous Air Pollutants

Attachment E
Plot Plan

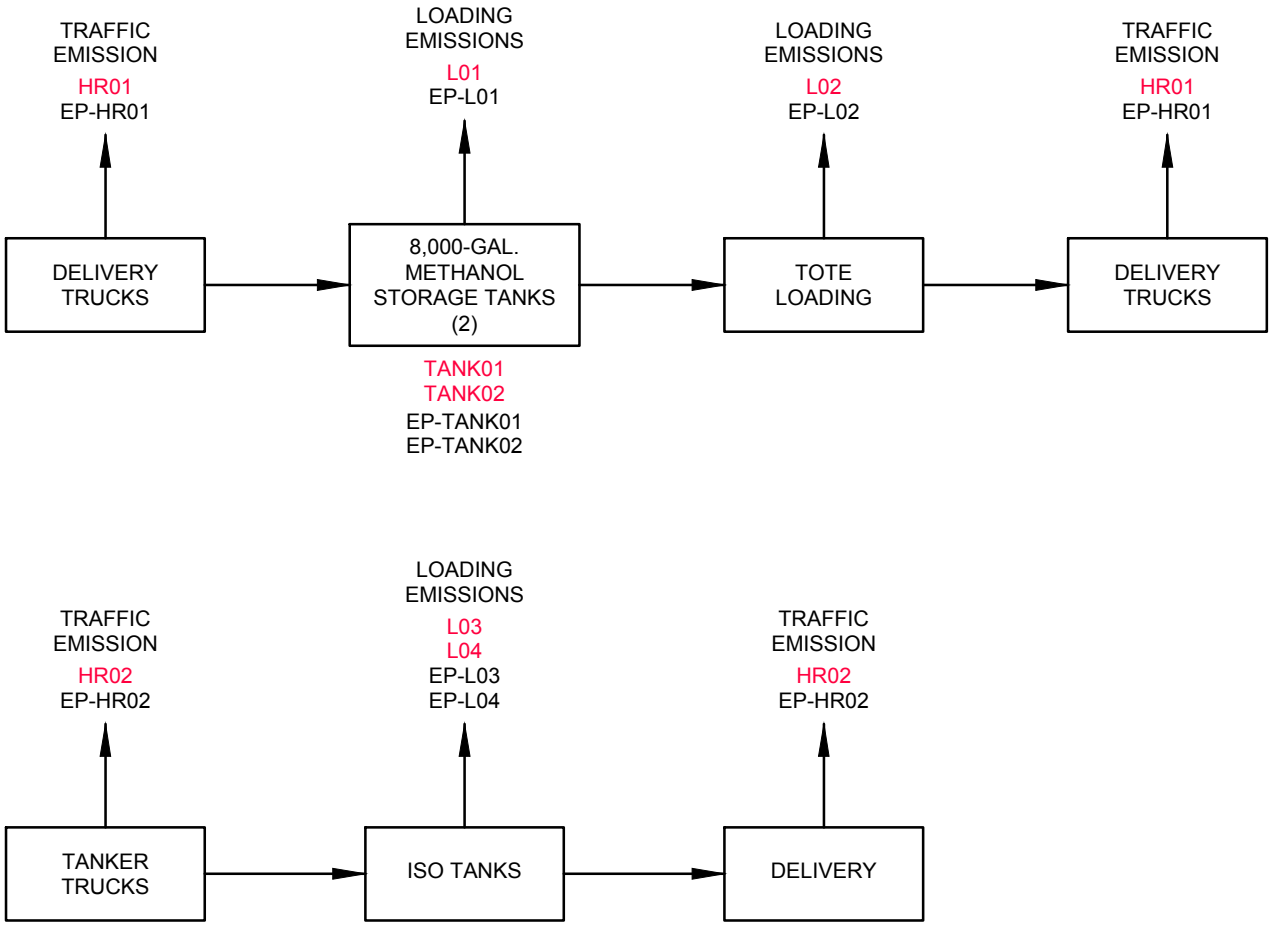


Attachment E

PLOT PLAN
X-CHEM, LLC
Lewis County, West Virginia

11111397-00(001)GN-WA002 APR 11, 2016

Attachment F
Process Flow Diagram



Attachment F

PROCESS FLOW DIAGRAM
X-CHEM, LLC
Lewis County, West Virginia

Attachment G
Process Description

Attachment G

Process Description
X-Chem LLC
Lewis County, WV

The facility receives methanol from suppliers via tanker trucks. These are unloaded and stored in two–8000 gal storage tanks. Methanol is then transferred from storage tanks to 330 gal-totes for delivery to customers. The facility also receives anionic and cationic polyacrylamides via tanker trucks. These are transferred into 6340 gallon-isotanks for delivery to customers.

The air contaminants from the facility are the VOC emissions resulting from unloading of methanol from the tanker trucks to the two storage tanks (TANK01 and 02) working and breathing losses, transfer of methanol from the storage tanks to totes, transfer of polyacrylamides from tanker trucks to isotanks, and the particulate (traffic) emissions (HR01 and HR02) from paved roads when tankers and delivery trucks come in and out of the site. VOC and particulate emissions are in Tables 2 of Attachment N.

Attachment H
Material Safety Data Sheets (MSDS)

Attachment H

Description of Material Safety Data Sheets (MSDS)
X-Chem LLC
Lewis County, West Virginia

The SDS of methanol and polyacrylamide from current supplier are included.

Safety Data Sheet
Methanol

Version 1.9 Revision Date: 04/08/2015

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Methanol
Product Use Description : Solvent., Fuel, Animal Feedstock

Manufacturer or supplier's details

Company : Nexeo Solutions LLC
Address 3 Waterway Square Place Suite 1000
Woodlands, Tx. 77380
United States of America

Emergency telephone number:
Health North America: 1-855-NEXEO4U (1-855-639-3648)
Health International: 1-855-NEXEO4U (1-855-639-3648)
Transport North America: CHEMTREC 800.424.9300

Additional Information: : Responsible Party: Product Safety Group
E-Mail: msds@nexeosolutions.com
SDS Requests: 1-855-429-2661
SDS Requests Fax: 1-281-500-2370
Website: www.nexeosolutions.com

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquids : Category 2

Acute toxicity (Oral) : Category 3

Acute toxicity (Inhalation) : Category 3

Acute toxicity (Dermal) : Category 3

Specific target organ toxicity - single exposure : Category 1 (Eyes, Central nervous system)

GHS Label element

Hazard pictograms :

Signal word : Danger

Hazard statements : H225 Highly flammable liquid and vapour.

H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhaled
H370 Causes damage to organs (Eyes, Central nervous system).

Precautionary statements : **Prevention:**
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. 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.
P260 Do not breathe dust/ fume/ 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.
P280 Wear protective gloves/ eye protection/ face protection.
Response:
P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P311 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician.
P307 + P311 IF exposed: Call a POISON CENTER or doctor/ physician.
P363 Wash contaminated clothing before reuse.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Potential Health Effects

Carcinogenicity:

IARC No component of this product present at levels greater

than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

OSHA No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Emergency Overview

Appearance	liquid
Colour	colourless, clear
Odour	mild, alcohol-like
Hazard Summary	No information available.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Pure substance

Hazardous components

CAS-No.	Chemical Name	Concentration (%)
67-56-1	Methanol	90 - 100

Molecular formula : C-H4-O

Synonyms : Methyl alcohol,

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Consult a physician.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : If unconscious place in recovery position and seek

		medical advice. If symptoms persist, call a physician. Oxygen or artificial respiration if needed.
In case of skin contact	:	If on skin, rinse well with water. If on clothes, remove clothes. If skin irritation persists, call a physician.
In case of eye contact	:	Immediately flush eyes for at least 15 minutes. Get medical attention. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
If swallowed	:	Keep respiratory tract clear. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Alcohol-resistant foam Water spray Dry chemical Carbon dioxide (CO2)
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during firefighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	Carbon oxides toxic fumes
Specific extinguishing methods	:	Use a water spray to cool fully closed containers.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments.

Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for fire-fighting if necessary.

NFPA Flammable and Combustible Liquids Classification:
Flammable Liquid Class IB

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	Avoid formation of aerosol. Do not breathe vapours/dust. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Take precautionary measures against static discharges. Provide sufficient air exchange and/or exhaust in work rooms. Container may be opened only under exhaust ventilation hood. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations.
Conditions for safe storage	:	No smoking. Keep container tightly closed in a dry and well-ventilated place.

Containers which are opened must be carefully re-sealed and kept upright to prevent leakage.
Observe label precautions.
Electrical installations / working materials must comply with the technological safety standards.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

CAS-No.	Components	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
67-56-1	Methanol	TWA	200 ppm	ACGIH
		STEL	250 ppm	ACGIH
		TWA	200 ppm 260 mg/m3	NIOSH REL
		ST	250 ppm 325 mg/m3	NIOSH REL
		TWA	200 ppm 260 mg/m3	OSHA Z-1
		STEL	250 ppm 325 mg/m3	OSHA P0
		TWA	200 ppm 260 mg/m3	OSHA P0

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Methanol	67-56-1	Methanol	Urine	End of shift (As soon as possible after exposure ceases)	15 mg/l	ACGIH BEI

Personal protective equipment

Respiratory protection : No personal respiratory protective equipment normally required.
In the case of vapour formation use a respirator with an approved filter.

Hand protection

Remarks	:	The suitability for a specific workplace should be discussed with the producers of the protective gloves.
Eye protection	:	Eye wash bottle with pure water Tightly fitting safety goggles
Skin and body protection	:	impervious clothing Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Hygiene measures	:	Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	colourless, clear
Odour	:	mild, alcohol-like
Odour Threshold	:	4.2 - 8940 ppm
pH	:	No data available
Freezing Point (Melting point/freezing point)	:	-97.8 °C (-144.0 °F)
Boiling Point (Boiling point/boiling range)	:	64 °C (147 °F)
Flash point	:	11 °C (52 °F)
Evaporation rate	:	5.9 n-Butyl Acetate
Flammability (solid, gas)	:	No data available
Burning rate	:	No data available
Upper explosion limit	:	36.5 %(V)
Lower explosion limit	:	6 %(V)
Vapour pressure	:	96 mmHg @ 20 °C (68 °F)

Relative vapour density	:	1.01 @ 15 - 20 °C (59 - 68 °F) AIR=1
Relative density	:	0.791 - 0.793Reference substance: (water = 1)
Density	:	No data available
Bulk density	:	No data available
Solubility(ies)		
Water solubility	:	completely soluble
Solubility in other solvents	:	soluble Solvent: Benzene soluble Solvent: Alcohol soluble Solvent: Chloroform soluble Solvent: Acetone soluble Solvent: Ether
Partition coefficient: n-octanol/water	:	log Pow: -0.82 - -0.66
Auto-ignition temperature	:	No data available
Thermal decomposition	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	No hazards to be specially mentioned.
Conditions to avoid	:	Heat, flames and sparks.

Incompatible materials	:	Strong bases strong mineral acids strong organic acids strong oxidizing agents halogenated hydrocarbons Aluminium Lead Copper alloys Zinc magnesium
Hazardous decomposition products	:	carbon dioxide and carbon monoxide Formaldehyde formic acid toxic fumes

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Components:

67-56-1:

Acute oral toxicity	:	LD50 (rat): 100 mg/kg Assessment: The component/mixture is toxic after single ingestion.
Acute inhalation toxicity	:	LC50 (rat): 5 mg/l Assessment: The component/mixture is toxic after short term inhalation.
Acute dermal toxicity	:	LD50 (rabbit): 300 mg/kg Assessment: The component/mixture is toxic after single contact with skin.

Skin corrosion/irritation

Components:

67-56-1:
Species: rabbit
Result: No skin irritation

Serious eye damage/eye irritation

Components:

67-56-1:
Species: rabbit

Result: No eye irritation

Respiratory or skin sensitisation

Components:

67-56-1:
Test Type: Maximisation Test (GPMT)
Species: guinea pig
Method: OECD Test Guideline 406
Result: Did not cause sensitisation on laboratory animals.

Germ cell mutagenicity

Components:

67-56-1:

Genotoxicity in vitro	:	Test Type: DNA damage and/or repair Metabolic activation: with and without metabolic activation Result: Ambiguous
Genotoxicity in vivo	:	Test Type: In vivo micronucleus test Test species: mouse (male and female) Cell type: Bone marrow Application Route: Intraperitoneal Exposure time: Single Dose: 0, 1920, 3200, 4480 mg/kg Result: negative
Germ cell mutagenicity-Assessment	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

Carcinogenicity

Components:

67-56-1:

Carcinogenicity - Assessment	:	Not classifiable as a human carcinogen.

Reproductive toxicity

Components:

67-56-1:

Effects on fertility	:	Test Type: Two-generation study Species: rat, male and female Application Route: Inhalation Dose: 0, 0.013, 0.13, 1.3 mg/L Duration of Single Treatment: 20 h General Toxicity - Parent: NOAEC: 1.3 mg/l General Toxicity F1: NOAEC: 0.13 mg/l

Fertility: NOAEC: 1.3 mg/l
Symptoms: Effects on postnatal development.
Result: Animal testing did not show any effects on fertility.

Reproductive toxicity - Assessment : Fertility classification not possible from current data.
Embryotoxicity classification not possible from current data.

STOT - single exposure

Product: No data available

Components:

67-56-1:

Exposure routes:	Target Organs:	Assessment:	Remarks:
	Eyes, Central nervous system	Causes damage to organs., The substance or mixture is classified as specific target organ toxicant, single exposure, category 1.	

STOT - repeated exposure

Product: No data available

Components:

67-56-1: No data available

Repeated dose toxicity

Components:

67-56-1:
Species: mouse, male and female
NOAEL: 1.3 mg/l
Application Route: Inhalation
Exposure time: 12 mths
Number of exposures: Continuous
Dose: 0, 0.013, 0.13, 1.3 mg/L

Aspiration toxicity

Product:

No aspiration toxicity classification

Further information

Product:

Remarks: Solvents may degrease the skin.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

67-56-1:

Toxicity to fish	:	LC50 (Lepomis macrochirus (Bluegill sunfish)): 15,400 mg/l Exposure time: 96 h Test Type: flow-through test
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 10,000 mg/l Exposure time: 48 h Test Type: static test
Toxicity to algae	:	EC50 (Scenedesmus capricornutum (fresh water algae)): 22,000 mg/l End point: Growth rate Exposure time: 96 h Test Type: static test Method: OECD Test Guideline 201
Toxicity to bacteria	:	IC50 (activated sludge): > 1,000 mg/l End point: Growth rate Exposure time: 3 h Test Type: Static Method: OECD Test Guideline 209

Persistence and degradability

Components:

67-56-1:

Biodegradability	:	aerobic Result: Readily biodegradable. Biodegradation: 72 % Remarks: Readily biodegradable
Biochemical Oxygen Demand (BOD)	:	600 - 1,120 mg/g
Chemical Oxygen Demand (COD)	:	1,420 mg/g
BOD/COD	:	BOD: 600 - 1120COD: 1420

Stability in water	:	Hydrolysis: 91 % at19 °C(72 h) Remarks: Hydrolyses on contact with water. Hydrolyses readily.

Bioaccumulative potential

Components:

67-56-1:

Bioaccumulation	:	Species: Cyprinus carpio (Carp) Bioconcentration factor (BCF): 1.0 Exposure time: 72 d Temperature: 20 °C Concentration: 5 mg/l Remarks: This substance is not considered to be very persistent nor very bioaccumulating (vPvB).
Partition coefficient: n-octanol/water	:	log Pow: -0.77

Mobility in soil

No data available

Other adverse effects

No data available

Product:

Regulation	40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks	This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Additional ecological information	:	No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact NEXEO's Environmental Services Group at 800-637-7922.

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.
Do not re-use empty containers.
Do not burn, or use a cutting torch on, the empty drum.

SECTION 14. TRANSPORT INFORMATION

IATA (International Air Transport Association): UN1230, METHANOL, 3 (6.1), II, Flash Point:11 °C(52 °F)

IMDG (International Maritime Dangerous Goods): UN1230, METHANOL, 3, (6.1), II

DOT (Department of Transportation): UN1230, Methanol, 3, II

SECTION 15. REGULATORY INFORMATION

OSHA Hazards : Flammable liquid, Toxic by ingestion, Toxic by skin absorption

WHMIS Classification : B2: Flammable liquid
D1B: Toxic Material Causing Immediate and Serious Toxic Effects

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Methanol	67-56-1	5000	5000

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard

SARA 302 : SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

67-56-1	Methanol	100 %

Clean Air Act

The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61):

67-56-1	Methanol	100 %

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

67-56-1	Methanol	100 %

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.
This product does not contain any Hazardous Chemicals listed under the U.S. Clean-Water Act, Section 311, Table 117.3.
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

US State Regulations

Massachusetts Right To Know

67-56-1	Methanol	90 - 100 %

Pennsylvania Right To Know

67-56-1	Methanol	90 - 100 %

New Jersey Right To Know

67-56-1	Methanol	90 - 100 %

California Prop 65 WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

67-56-1	Methanol

The components of this product are reported in the following inventories:

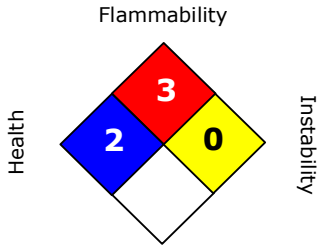
Switzerland. New notified substances and declared preparations	:	y (positive listing) (The formulation contains substances listed on the Swiss Inventory)
United States TSCA Inventory	:	y (positive listing) (On TSCA Inventory)
Canadian Domestic Substances List (DSL)	:	y (positive listing) (All components of this product are on

		the Canadian DSL.)
Australia Inventory of Chemical Substances (AICS)	:	y (positive listing) (On the inventory, or in compliance with the inventory)
New Zealand. Inventory of Chemical Substances	:	y (positive listing) (On the inventory, or in compliance with the inventory)
Japan. ENCS - Existing and New Chemical Substances Inventory	:	y (positive listing) (On the inventory, or in compliance with the inventory)
Japan. ISHL - Inventory of Chemical Substances (METI)	:	y (positive listing) (On the inventory, or in compliance with the inventory)
Korea. Korean Existing Chemicals Inventory (KECI)	:	y (positive listing) (On the inventory, or in compliance with the inventory)
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	:	y (positive listing) (On the inventory, or in compliance with the inventory)
China. Inventory of Existing Chemical Substances in China (IECSC)	:	y (positive listing) (On the inventory, or in compliance with the inventory)

SECTION 16. OTHER INFORMATION

Further information

NFPA:



HMIS III:

HEALTH	2
FLAMMABILITY	3
PHYSICAL HAZARD	0

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 =Extreme, * = Chronic

The information accumulated is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made become available subsequently to the date hereof, we do not assume any responsibility for the results of its use. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This MSDS has been prepared by NEXEO™ Solutions EHS Product Safety Department (1-855-429-2661) MSDS@nexeosolutions.com.

Legecy MSDS: R0001447, 140000001042

Material number:
16076584, 20298, 160329, 20303, 16056428, 16061181, 16056425, 16056426, 16056427, 16055184, 16053934, 16049742, 16048212, 16047323, 16039562, 16034861, 16032613, 16031073, 16024445, 16024444, 16021152, 16018469, 16016316, 779915, 743459, 736115, 730007, 730006, 717897, 716726, 713298, 710534, 699273, 695309, 695256, 694361, 689940, 690224, 682513, 638917, 627702, 625491, 602665, 600798, 554053, 554376, 554361, 554308, 554052, 554159, 546854, 546132, 508417, 122681, 136311, 117978, 132227, 131334, 146769, 161018, 118306, 116867, 117981, 145658, 161021, 144602, 130207, 130736, 131538, 159527, 115232, 82339, 160328, 82470, 115098, 159524, 115229, 143136, 508297, 504381, 504224, 501342, 39841, 22244, 22243, 20305, 20304, 20302, 20301, 20300, 20299, 20297, 500031

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chem-	LOAEL	Lowest Observed Adverse Effect

	ical Substances		Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philipines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Compositon, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50		Lethal Concentration 50%	

MSDS: 0090338
Print Date: 03/19/2010
Revision Date: 03/19/2010

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: **KemFlow A-4251**
Product Description: Anionic polyacrylamide in water-in-oil emulsion
Chemical Family: Anionic polyacrylamide
Intended/Recommended Use: Stimulation / Cementing Additive

KEMIRA CHEMICALS, INC., 1950 VAUGHN ROAD, KENNESAW, GEORGIA 30144, USA Telephone 1-770-436-1542, Telefax 1-770-436-3432
ProductSafety.US.Kennesaw@Kemira.com
For Product Information call 1-800-347-1542.
EMERGENCY PHONE: For emergency involving spill, leak, fire, exposure or accident call 1-770-422-1250, CHEMTREC: 1-800-424-9300 or 1-703-527-3887, CANUTEC 1-613-966-6666.

2. COMPOSITION/INFORMATION ON INGREDIENTS

OSHA REGULATED COMPONENTS

Component / CAS No.	% (w/w)	OSHA (PEL):	ACGIH (TLV)	Carcinogen
Petroleum distillate hydrotreated light 64742-47-8	22.0 - 25.0	500 ppm 1200 mg/m^3 (Supplier) 165 ppm (Supplier)	(hud)	- .

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

APPEARANCE AND ODOR:

Color:	white
Appearance:	liquid
Odor:	petroleum distillate

STATEMENTS OF HAZARD:

WARNING! CAUSES SKIN IRRITATION
MAY CAUSE EYE IRRITATION

POTENTIAL HEALTH EFFECTS

EFFECTS OF EXPOSURE:
Direct contact with this material can cause moderate skin and mild eye irritation. Refer to Section 11 for toxicology information on the regulated components of this product. Overexposure to vapor may cause respiratory tract irritation and central nervous system depression. The estimated acute oral (rat) LD50, acute dermal (rabbit) LD50 and 4-hour inhalation (rat) LC50 values for this material are >5,000 mg/kg, >2,000 mg/kg and >20 mg/L, respectively.

4. FIRST AID MEASURES

Ingestion:
Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person. If swallowed, call a physician immediately.

Skin Contact:
Do not reuse contaminated clothing without laundering. Wash immediately with plenty of water. Remove contaminated clothing and shoes without delay. Get medical attention if pain or irritation persists after washing or if signs and symptoms of overexposure appear.

Eye Contact:
Rinse immediately with plenty of water for at least 15 minutes.

Inhalation:
Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Use water spray, carbon dioxide or dry chemical.

Protective Equipment:
Wear full firefighting protective clothing. See MSDS Section 8 (Exposure Controls/Personal Protection). Firefighters, and others exposed, wear self-contained breathing apparatus.

Special Hazards:
Keep containers cool by spraying with water if exposed to fire.

Mechanical/Static Sensitivity Statements:
None

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Where exposure level is not known, wear approved, positive pressure, self-contained respirator. Where exposure level is known, wear approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8 (Exposure Controls/Personal Protection), wear impermeable boots.

Methods For Cleaning Up:
Spilled material should be absorbed onto an inert material and scooped up. Flush spill area with water. Product may cause a slip hazard. If slipperiness remains apply more dry-sweeping compound.

7. HANDLING AND STORAGE

HANDLING

Precautionary Measures: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Special Handling Statements: None

STORAGE
To avoid product degradation and equipment corrosion, do not use iron, copper or aluminum containers or equipment. Flashpoint determinations on materials of this type are required by certain regulations and scientific standards to be performed using a Pensky-Martens type closed cup test method. This method indicates a flash point greater than 93.3 C (200 F). Although there was no flashpoint detected below 93.3 C (200 F) by the Pensky-Martens Closed Tester method, some flammable vapors were evolved during the test as evidenced by the enlargement of the test flame; therefore, caution should be exercised during storage and handling.

Storage Temperature: Store at < 32 °C 90 °F
Reason: Integrity.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:
Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure.

Respiratory Protection:
Where exposures are below the established exposure limit, no respiratory protection is required. Where exposures exceed the established exposure limit, use respiratory protection recommended for the material and level of exposure.

Eye Protection:
Eyewash equipment and safety shower should be provided in areas of potential exposure. Wear eye/face protection such as chemical splash proof goggles or face shield.

Skin Protection:
Wear impermeable gloves and suitable protective clothing. Avoid skin contact.

Additional Advice:
Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water. Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	white	
Appearance:	liquid	
Odor:	petroleum distillate	
Boiling Point:	Similar to water	
Melting Point:		
Vapor Pressure:	Not available	
Specific Gravity/Density:	1.03 - 1.06	
Vapor Density:	Similar to water	
Percent Volatile (% by wt.):	56 - 62	
pH:	6 - 8	
Saturation In Air (% By Vol.):	Not available	
Evaporation Rate:	Not available	
Solubility In Water:	Limited by viscosity	
Volatile Organic Content:	Not available	
Flash Point:	>102 °C 215 °F	Pensky-Martens Closed Cup
Flammable Limits (% By Vol):	Not available	
Autoignition Temperature:	Not available	
Decomposition Temperature:	Not available	
Partition coefficient (n-octanol/water):	Not available	
Odor Threshold:	Not available	

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10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions To Avoid:	None known
Polymerization:	Will not occur
Conditions To Avoid:	None known
Materials To Avoid:	No specific incompatibility
Hazardous Decomposition Products:	Ammonia (NH3) Carbon dioxide Carbon monoxide (CO) oxides of nitrogen oxides of sulfur (includes sulfur di and tri oxides)

11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 3. HAZARDS IDENTIFICATION.
Toxicological information on the regulated components of this product is as follows:

Petroleum distillates, hydrotreated light (CAS# 64742-47-8) has acute oral (rat) and dermal (rabbit) LD50 values of >5 g/kg and >3.16 g/kg, respectively. Prolonged or repeated skin contact tends to remove skin oils, possibly leading to irritation and dermatitis. Direct contact may cause eye irritation. Overexposure to high vapor concentrations, >~700 ppm, are irritating to the eyes and respiratory tract and may cause headaches, dizziness, drowsiness, and other central nervous system effects, including death. Aspiration of minute amounts during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death. In a 90-day oral gavage (rats) study at 100, 500, or 1000 mg/kg, no treatment-related mortalities were observed. There were no significant changes in body weights or food consumption in any dose groups. Increased liver weights were observed in male and female rats a 500 and 1000 mg/kg. Increased kidney weights were observed only in male rats at 500 and 1000 mg/kg. Testes weights were significantly elevated in male rats at 1000 mg/kg. Kidney effects, indicative of light hydrocarbon nephropathy, occured in male rat kidneys at all dose levels. Histological findings of hepatocellular hypertrophy were seeen in the livers of male rats at 1000 mg/kg and in female rats at 500 and 1000 mg/kg. All treatment-related effects were reversible within the 4-week recovery period. Observed kidney effects (including light hydrocarbon nephropathy and increased kidney weight) are a unique response by male rats to chronic hydrocarbon exposure, which th U.S. EPA has declared `not relevant to humans`. High-dose liver effects (including hepatocellular hypertrophy, or enlarged liver cells) are a direct consequence of the sustained high-fat `hydrocarbon diet`. The No Observed Adverse Effect Level (NOAEL) for this study was 1000 mg/kg.

C12-14 alcohol ethoxylated toxicological properties have not been fully investigated. The oral LD50 (rat) of this mixture is expected to be consistent with the chemical family of ethoxylated alcohol surfactants, and range from 1.6 to 2.5 g/kg. The acute dermal (rabbit) LD50 value is estimated to be > 2.0 g/kg. One expected component of this mixture was severely irritating to rabbit eyes (undiluted, Draize score = 60). This mixture is expected to be moderately irritating to skin, based on data reported for C9-C11 6EO: (primary irritation index) PII = 5.3/8.

Ethoxylated oleyl amine toxicological properties have not been fully investigated. It is reported to have an oral (rat) LD50 value of 1500 mg/kg. It is also reported to be severely irritating to eyes and moderately irritating to the skin.

California Proposition 65 Warning (applicable in California only) - This product contains (a) chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm.

12. ECOLOGICAL INFORMATION

All ecological information provided was conducted on a structurally similar product.
This material is not classified as dangerous for the environment.
Acute toxicity tests conducted using environmentally representative water gave the following results:
The effects on aquatic organisms are due to an external (non-systemic) mode of action, and are significantly reduced (by a factor of 7-20) within 30 minutes due to binding of the product to dissolved organic carbon and inorganic sorbents such as clays and silts.

ALGAE TEST RESULTS

Test: Growth Inhibition (OECD 201)
Duration: 72 hr
Species: Green Algae (Selenastrum capricornutum)
>100 mg/l IC50

FISH TEST RESULTS

Test: Acute toxicity, freshwater (OECD 203)
Duration: 96 hr.
Species: Zebra Fish (Brachydanio rerio)
>100 mg/l LC50

INVERTEBRATE TEST RESULTS

Test: Acute Immobilization (OECD 202)
Duration: 48 hr
Species: Water Flea (Daphnia magna)
>100 mg/l EC50

DEGRADATION

Test: CO2 Evolution: Modified Sturm (OECD 301B)
Duration: 28 day **Procedure:** Ready biodegradability
The large polymer size is incompatible with transport across biological membranes and diffusion; the bioconcentration factor is therefore considered to be zero. This material is not readily biodegradable (OECD 301B).

13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as supplied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA `listed hazardous waste`or has any of the four RCRA `hazardous waste characteristics.`Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA `listed hazardous waste`; information contained in Section 15 of this MSDS is not intended to indicate if the product is a `listed hazardous waste.`RCRA Hazardous Waste Characteristics: There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, see Section 9 of this MSDS (flash point). For Corrosivity, see Sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 2 (composition). Federal regulations are subject to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of the material if it is to be disposed. Kemira encourages the recycle, recovery and reuse of materials, where permitted, as an alternate to disposal as a waste. Kemira recommends that organic materials classified as RCRA hazardous wastes be disposed of by thermal treatment or incineration at EPA approved facilities. Kemira has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

US DOT

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Hazard Class: 9
Packing Group: III
UN/ID Number: UN3082
Transport Label Required: Miscellaneous
Technical Name (N.O.S.): Contains ammonium acetate
Hazardous Substances:

Component / CAS No.	Reportable Quantity of Product (lbs)
Ammonium acetate	50000

Comments: Hazardous Substances/Reportable Quantities - DOT requirements specific to Hazardous Substances only apply if the quantity in one package equals or exceeds the product reportable quantity.

TRANSPORT CANADA

Proper Shipping Name: Not applicable/Not regulated

ICAO / IATA

Proper Shipping Name: Not applicable/Not regulated
Packing Instructions/Maximum Net Quantity Per Package:
Passenger Aircraft: -
Cargo Aircraft: -

IMO

Proper Shipping Name: Not applicable/Not regulated

15. REGULATORY INFORMATION

INVENTORY INFORMATION

United States (USA): All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical Inventory.

Canada: All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL.

European Union (EU): All components of this product are included on the European Inventory of Existing Chemical Substances (EINECS) or are not required to be listed on EINECS.

Australia: All components of this product are included in the Australian Inventory of Chemical Substances (AICS) or have been assessed by NICNAS.

China: All components of this product are NOT included on the Chinese inventory. The Chinese State Environmental Protection Administration (SEPA) has granted a Polymer Exemption for the non-listed substance to Cytec and the product can be imported into China ONLY under specific conditions.

Japan: All components of this product are NOT included on the Japanese (ENCS) inventory.

Korea: All components of this product are NOT included on the Korean (ECL) inventory.

Philippines: All components of this product are NOT included on the Philippine (PICCS) inventory.

OTHER ENVIRONMENTAL INFORMATION

The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.) See Section 13 for information on waste classification and waste disposal of this product.

Component / CAS No.	%	TPQ (lbs)	RQ(lbs)	S313	TSCA 12B
Ammonium acetate 631-61-8	0.0 - 6.0	None	5000	No	No

PRODUCT HAZARD CLASSIFICATION UNDER SECTION 311 OF SARA

- Acute

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16. OTHER INFORMATION

NFPA Hazard Rating (National Fire Protection Association)

Health: 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

Fire: 1 - Materials that must be preheated before ignition can occur.

Reactivity: 0 - Materials that in themselves are normally stable, even under fire exposure conditions.

Reasons For Issue: New Product

Richard Moye, Product Regulatory, 1-251-662-1581
03/19/2010

«product»

PERSONAL PROTECTIVE EQUIPMENT ASSESSMENT

CHEMICAL NAME ON MSDS: KEMFLOW A-4251 TYPE: RAW MATERIAL

Location: HARAHAN

Date Assessed: MARCH 2014

Date Re-evaluate: MARCH 2015

Job: POURING / BLENDING / MIXING

Approved: LYNDON POUSSON

			Risks																									
			Mechanical					Thermal		Others																		
			Falling Objects	Blows, Cuts, Impact, Crushing	Stabs, cuts, grazes Penetrating	Vibration/Friction	Slipping, falling over	Scalds, heat, fire	Cold	Immersion	Non ionizing radiation (Light, RF, UV, IR)	Electrical	Noise	Ionizing radiation	Magnetic Fields	Dusts, fibers	Fumes	Gases, vapors	Splashes, spurts	Ergonomic Stress/Strains	Biological Pathogens (bacteria, virus, fungi body fluids)	Pressure	Vacuum	Non-microbiological agents	Poisonous/Toxic Plants or Animals
Parts of the Body	Head	Cranium																										
		Ears																										
		Eyes																	CGO									
		Respiratory Tract																										
		Face																	FS									
		Whole Head																										
	Upper / lower limbs	Hands																	CGL									
		Arms																	S									
		Feet																										
		Legs																										
	Various	Skin																										
		Trunk																	A									
		Abdomen																										

KEY:

EYES/FACE

Side Shields (SS)
Safety Glasses (SG)
Face Shield (FS)
Chemical Goggles (CGO)
Welding Helmet (WH)
Welding Glasses/Goggles (WGG)

HEAD/LUNGS

Hard Hat (HH)
Bump Cap (BC)
Ear Plugs (EP)
Ear Muffs (EM)
Respirator (R)
Particulate (RP)
Chemical Cartridge (RCC)
Supplied Air (RSA)
SCBA (R-SCBA)

LIMBS

Metatarsal Covers (MTC)
Aprons (A)
Sleeves (S)
Chemical Gloves (CGL)
Gloves (G)
Safety-Toed Shoes (STS)

TRUNK

Impervious Coverall (IC)
Body Harness (BH)
Positioning Belt (PB)
Safety Vest – Visibility (SVV)
Cooling Vest (CV)
Water Proof Clothing (WPC)
Insulated Clothing (INC)
Cotton Clothing (CC)
Non-Conductive Clothing (NCC)

SPECIFICS

FACE SHIELDS PROTECT FACIAL AREAS
GOGGLES PROTECT EYES FROM SPLASHES

SPECIFICS

SPECIFICS

LONG SLEEVE SHIRTS PROTECT ARMS
CHEMICAL GLOVES PROTECT HANDS

SPECIFICS

MSDS: 0090201
Print Date: 08/12/2011
Revision Date: 08/12/2011

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	**KemFlow C-4107**
Product Description:	Cationic polyacrylamide
Chemical Family:	Polyacrylamides
Molecular Formula:	Polymer
Intended/Recommended Use:	Stimulation / Cementing Additive

KEMIRA CHEMICALS, INC., 1000 PARKWOOD CIRCLE, SUITE 500, ATLANTA, GEORGIA 30339 USA 800-347-1542
For product information call 1-703-527-3887 or EMERGENCY PHONE: 1-800-424-9300 (CHEMTREC); 1-613-996-6666 (CANUTEC)
ProductSafety.US.Kennesaw@Kemira.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

OSHA REGULATED COMPONENTS

Component / CAS No.	% (w/w)	OSHA (PEL):	ACGIH (TLV)	Carcinogen
Petroleum distillate hydrotreated light 64742-47-8	10 - 30	500 ppm 1200 mg/m^3 (Supplier) 165 ppm (Supplier)	(hud)	- .

No Permissible Exposure Limits (PEL/TLV) have been established by OSHA or ACGIH.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

APPEARANCE AND ODOR:

Color:	opaque greenish to milky white
Appearance:	viscous liquid
Odor:	hydrocarbon

STATEMENTS OF HAZARD:

WARNING! CAUSES SKIN IRRITATION
MAY CAUSE EYE IRRITATION

POTENTIAL HEALTH EFFECTS

EFFECTS OF EXPOSURE:
Direct contact with this material can cause moderate skin and mild eye irritation. Refer to Section 11 for toxicology information on the regulated components of this product. Overexposure to vapor may cause respiratory tract irritation and central nervous system depression. Acute oral (rat) and dermal (rabbit) LD50 values are estimated to be greater than 5,000 mg/kg and greater than 2,000 mg/kg, respectively. The 4-hour inhalation LC50 (rat) value is estimated to be greater than 20 mg/L.

4. FIRST AID MEASURES

Ingestion:
Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person. If swallowed, call a physician immediately.

Skin Contact:
Do not reuse contaminated clothing without laundering. Wash immediately with plenty of water. Remove contaminated clothing and shoes without delay. Get medical attention if pain or irritation persists after washing or if signs and symptoms of overexposure appear.

Eye Contact:
Rinse immediately with plenty of water for at least 15 minutes.

Inhalation:
Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Use water spray, carbon dioxide or dry chemical.

Protective Equipment:
Wear full firefighting protective clothing. See MSDS Section 8 (Exposure Controls/Personal Protection). Firefighters, and others exposed, wear self-contained breathing apparatus.

Special Hazards:
Keep containers cool by spraying with water if exposed to fire.

Mechanical/Static Sensitivity Statements:
None

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Where exposure level is not known, wear approved, positive pressure, self-contained respirator. Where exposure level is known, wear approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8 (Exposure Controls/Personal Protection), wear impermeable boots.

Methods For Cleaning Up:
Spilled material should be absorbed onto an inert material and scooped up. Flush spill area with water. Product may cause a slip hazard. If slipperiness remains apply more dry-sweeping compound.

7. HANDLING AND STORAGE

HANDLING

Precautionary Measures: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Special Handling Statements: None

STORAGE
To avoid product degradation and equipment corrosion, do not use iron, copper or aluminum containers or equipment. Flashpoint determinations on materials of this type are required by certain regulations and scientific standards to be performed using a Pensky-Martens type closed cup test method. This method indicates a flash point greater than 93.3 C (200 F). Although there was no flashpoint detected below 93.3 C (200 F) by the Pensky-Martens Closed Tester method, some flammable vapors were evolved during the test as evidenced by the enlargement of the test flame; therefore, caution should be exercised during storage and handling.

Storage Temperature: Room temperature
Reason: Integrity.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:
Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure.

Respiratory Protection:
Where exposures are below the established exposure limit, no respiratory protection is required. Where exposures exceed the established exposure limit, use respiratory protection recommended for the material and level of exposure.

Eye Protection:
Eyewash equipment and safety shower should be provided in areas of potential exposure. Wear eye/face protection such as chemical splash proof goggles or face shield.

Skin Protection:
Wear impermeable gloves and suitable protective clothing. Avoid skin contact.

Additional Advice:
Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water. Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	opaque greenish to milky white
Appearance:	viscous liquid
Odor:	hydrocarbon
Boiling Point:	~100 °C 212 °F
Melting Point:	Not applicable
Vapor Pressure:	Similar to water
Specific Gravity/Density:	~1.02
Vapor Density:	Similar to water
Percent Volatile (% by wt.):	~57
pH:	3 - 6in water
Saturation In Air (% By Vol.):	Not available
Evaporation Rate:	Not available
Solubility In Water:	Limited by viscosity
Volatile Organic Content:	~19 - 22.6 % (g/g)
Flash Point:	>93 °C 200 °F Closed Cup
Flammable Limits (% By Vol):	Not available
Autoignition Temperature:	Not available
Decomposition Temperature:	Not available
Partition coefficient (n-octanol/water):	Not available
Odor Threshold:	Not available

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10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions To Avoid:	None known
Polymerization:	Will not occur
Conditions To Avoid:	None known
Materials To Avoid:	Strong oxidizing agents.
Hazardous Decomposition Products:	Ammonia (NH3) Carbon dioxide Carbon monoxide (CO) oxides of nitrogen hydrochloric acid

11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 3. HAZARDS IDENTIFICATION.
Toxicological information on the regulated components of this product is as follows:

Alcohols (C10-16), ethoxylated toxicological properties have not been fully investigated. Based on similar materials, the acute oral (rat) LD50 is estimated to range from 1600 - 2500 mg/kg and the acute dermal (rabbit) LD50 value is estimated to be >2000 mg/kg. Similar materials produced severe eye irritation and moderate skin irritation in studies with rabbits.

Alcohols (C12-16), ethoxylated toxicological properties have not been fully investigated. Based on similar materials, the acute oral (rat) LD50 is estimated to range from 1600 - 2500 mg/kg and the acute dermal (rabbit) LD50 value is estimated to be >2000 mg/kg. Similar materials produced severe eye irritation and moderate skin irritation in studies with rabbits.

C12-14 alcohol ethoxylated toxicological properties have not been fully investigated. The oral LD50 (rat) of this mixture is expected to be consistent with the chemical family of ethoxylated alcohol surfactants, and range from 1.6 to 2.5 g/kg. The acute dermal (rabbit) LD50 value is estimated to be > 2.0 g/kg. One expected component of this mixture was severely irritating to rabbit eyes (undiluted, Draize score = 60). This mixture is expected to be moderately irritating to skin, based on data reported for C9-C11 6EO: (primary irritation index) PII = 5.3/8.

Petroleum distillates, hydrotreated light (CAS# 64742-47-8) has acute oral (rat) and dermal (rabbit) LD50 values of >5 g/kg and >3.16 g/kg, respectively. Prolonged or repeated skin contact tends to remove skin oils, possibly leading to irritation and dermatitis. Direct contact may cause eye irritation. Overexposure to high vapor concentrations, >~700 ppm, are irritating to the eyes and respiratory tract and may cause headaches, dizziness, drowsiness, and other central nervous system effects, including death. Aspiration of minute amounts during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death. In a 90-day oral gavage (rats) study at 100, 500, or 1000 mg/kg, no treatment-related mortalities were observed. There were no significant changes in body weights or food consumption in any dose groups. Increased liver weights were observed in male and female rats a 500 and 1000 mg/kg. Increased kidney weights were observed only in male rats at 500 and 1000 mg/kg. Testes weights were significantly elevated in male rats at 1000 mg/kg. Kidney effects, indicative of light hydrocarbon nephropathy, occured in male rat kidneys at all dose levels. Histological findings of hepatocellular hypertrophy were seeen in the livers of male rats at 1000 mg/kg and in female rats at 500 and 1000 mg/kg. All treatment-related effects were reversible within the 4-week recovery period. Observed kidney effects (including light hydrocarbon nephropathy and increased kidney weight) are a unique response by male rats to chronic hydrocarbon exposure, which th U.S. EPA has declared `not relevant to humans`. High-dose liver effects (including hepatocellular hypertrophy, or enlarged liver cells) are a direct consequence of the sustained high-fat `hydrocarbon diet`. The No Observed Adverse Effect Level (NOAEL) for this study was 1000 mg/kg.

California Proposition 65 Warning (applicable in California only) - This product contains (a) chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm.

12. ECOLOGICAL INFORMATION

This material is not classified as dangerous for the environment.
The effects on aquatic organisms are due to an external (non-systemic) mode of action, and are significantly reduced (by a factor of 7-20) within 30 minutes due to binding of the product to dissolved organic carbon and inorganic sorbents such as clays and silts.
Acute toxicity tests conducted on the polymer using environmentally representative water gave the following results:

ALGAE TEST RESULTS

Test: Growth Inhibition (OECD 201)
Duration: 72 hr
Species: Marine Algae (Skeletonema costatum)
14.7 mg/l IC50

Test: Growth Inhibition (OECD 201)
Due to the cationicity of the polymer, an algae growth inhibition test is not appropriate.

FISH TEST RESULTS

Test: Acute toxicity, seawater (PARCOM)
Duration: 96 hr. **Procedure:** Semi-static.
Species: Juvenile Turbot (Scophthalmus maximus)
178.9 mg/l LC50

Test: Acute toxicity, freshwater (OECD 203)
Duration: 96 hr
Species: Zebra Fish (Brachydanio rerio)
>1 - 10 mg/l LC50 Information based on a structurally similar material

INVERTEBRATE TEST RESULTS

Test: Acute Invertebrate Toxicity, seawater (PARCOM)
Duration: 48 hr
Species: Marine Copepod (Acartia tonsa)
2.4 mg/l LC50

Test: Acute Immobilization (OECD 202)
Duration: 48 hr
Species: Water Flea (Daphnia magna)
>10 - 100 mg/l EC50 Information based on a structurally similar material

DEGRADATION

Test: CO2 Evolution: Modified Sturm (OECD 301B)

The large polymer size is incompatible with transport across biological membranes and diffusion; the bioconcentration factor is therefore considered to be zero. The polymeric ingredient is not readily biodegradable, but degradable by hydrolysis.

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13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as supplied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA `listed hazardous waste`or has any of the four RCRA `hazardous waste characteristics.`Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA `listed hazardous waste`; information contained in Section 15 of this MSDS is not intended to indicate if the product is a `listed hazardous waste.`RCRA Hazardous Waste Characteristics: There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, see Section 9 of this MSDS (flash point). For Corrosivity, see Sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 2 (composition). Federal regulations are subject to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of the material if it is to be disposed. Kemira encourages the recycle, recovery and reuse of materials, where permitted, as an alternate to disposal as a waste. Kemira recommends that organic materials classified as RCRA hazardous wastes be disposed of by thermal treatment or incineration at EPA approved facilities. Kemira has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

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14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

US DOT

Proper Shipping Name: Not applicable/Not regulated
Hazardous Substances:
Not applicable

TRANSPORT CANADA

Proper Shipping Name: Not applicable/Not regulated

ICAO / IATA

Proper Shipping Name: Not applicable/Not regulated
Packing Instructions/Maximum Net Quantity Per Package:
Passenger Aircraft: -
Cargo Aircraft: -

IMO

Proper Shipping Name: Not applicable/Not regulated

15. REGULATORY INFORMATION

INVENTORY INFORMATION

United States (USA): All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical Inventory.

Canada: All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL.

European Union (EU): All components of this product are included on the European Inventory of Existing Chemical Substances (EINECS) or are not required to be listed on EINECS.

Australia: All components of this product are included in the Australian Inventory of Chemical Substances (AICS).

China: All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese inventory.

Japan: All components of this product are included on the Japanese (ENCS) inventory or are not required to be listed on the Japanese inventory.

Korea: All components of this product are included on the Korean (ECL) inventory or are not required to be listed on the Korean inventory.

Philippines: All components of this product are included on the Philippine (PICCS) inventory or are not required to be listed on the Philippine inventory.

OTHER ENVIRONMENTAL INFORMATION
The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.) See Section 13 for information on waste classification and waste disposal of this product.

This product does not contain any components regulated under these sections of the EPA

PRODUCT HAZARD CLASSIFICATION UNDER SECTION 311 OF SARA

- Acute

16. OTHER INFORMATION

NFPA Hazard Rating (National Fire Protection Association)

Health: 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

Fire: 1 - Materials that must be preheated before ignition can occur.

Reactivity: 0 - Materials that in themselves are normally stable, even under fire exposure conditions.

Reasons For Issue: New Product

Richard Moye, Product Safety/Regulatory 1-251-459-5532
08/12/2011

Attachment I
Emission Units Table

Attachment I: Emission Units Data Sheet

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID1	Emission Point ID2	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type3 and Date of Change	Control Device 4
TANK01-02	EP-TANK01-02	Methanol Tank	2016	8000 gallon each	New	N/A
L01	EP-L01	Loading (Methanol Tanks)	2016	4500 gallons per hour	New	N/A
L02	EP-L02	Loading (Totes)	2016	50 gallons per minute	New	N/A
L03	EP-L03	Loading (Anionic polyacrylamide)	2016	3600 gallons per hour	New	N/A
L04	EP-L04	Loading (Cationic polyacrylamide)	2016	3600 gallons per hour	New	N/A
HR01	EP-HR01	Haul Truck	2016	178 barrel Tanker truck; 70 barrel Totes delivery truck	New	N/A
HR02	EP-HR02	Haul Truck	2016	8000 gal tanker truck; 5500 gal isotank delivery truck	New	N/A
F001	EP-F001	Equipment Leak	2016	2 valves; 2 connectors	New	N/A

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

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)*		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]
		ID No.	Source	ID No.	Device Type		lb/hr	ton/yr	lb/hr	ton/yr		
EP-TANK01-02	n/a	EP-TANK01-02	Methanol Tank	N/A		Methanol (67561) (Total VOCs)	0.0618	0.2708	0.0618	0.2708	Gas	MB AP-42
EP-L01	n/a	L01	Loading (Methanol Tanks)	N/A		Methanol (67561) (Total VOCs)	7.1581	0.2863	7.1581	0.2863	Gas	MB AP-42
EP-L02	n/a	L02	Loading (Totes)	N/A		Methanol (67561) (Total VOCs)	4.7721	0.2863	4.7721	0.2863	Gas	MB AP-42
EP-L03	n/a	L03	Loading (Anionic polyacrylamide)	N/A		Anionic polyacrylamide (64742) (Total VOCs)	1.0093	0.1849	1.0093	0.1849	Gas	MB AP-42
EP-L04	n/a	L04	Loading (Cationic polyacrylamide)	N/A		Cationic polyacrylamide (64742) (Total VOCs)	1.0093	0.1849	1.0093	0.1849	Gas	MB AP-42
EP-HR01	n/a	HR01	Haul Truck	N/A		PM10, PM2.5	0.0720	0.0094	0.0720	0.0094	Solid	MB
EP-HR02	n/a	HR02	Haul Truck	N/A		PM10, PM2.5	0.3591	0.0350	0.3591	0.0350	Solid	MB
EP-F001	n/a	F001	Equipment Leak	N/A		Methanol (67561) (Total VOCs)	0.0119	0.0522	0.0119	0.0522	Gas	MB

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, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, 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/20minute 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/m_3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO , 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			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (oF)	Volumetric Flow [1] (acfm)	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
EP-TANK01-02	N/A	73.9	0.01	N/A	N/A	N/A	4321.0632	547.3182
EP-L01	N/A	N/A	N/A	N/A	N/A	N/A	4322.0632	547.3182
EP-L02	N/A	N/A	N/A	N/A	N/A	N/A	4323.0632	547.3182
EP-L03	N/A	N/A	N/A	N/A	N/A	N/A	4324.0632	547.3182
EP-L04	N/A	N/A	N/A	N/A	N/A	N/A	4325.0632	547.3182
EP-HR01	N/A	N/A	N/A	N/A	N/A	N/A	4326.0632	547.3182
EP-HR02	N/A	N/A	N/A	N/A	N/A	N/A	4327.0632	547.3182
EP-F001	N/A	N/A	N/A	N/A	N/A	N/A	4327.0632	547.3182

[1] Give at operating conditions. Include inerts.

[2] Release height of emissions above ground level.

Attachment K
Fugitive Emissions Data Summary

Attachment K

Description of Fugitive Emissions
X-Chem, LLC
Lewis County, West Virginia

Fugitive emissions at the facility are emitted when service vehicles enter the facility. The facility is flat and paved. Fugitive emissions were calculated using AP-42 factors. Detailed calculations are shown on Table 7 and Table 8. Fugitive emissions from equipment leaks were calculated using EPA Protocol for Equipment Leak Emission factors. Detailed calculations are shown on Table 9.

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? ☒ Yes ☐ No ☒ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☐ Yes ☒ No ☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☒ Yes ☐ No ☒ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? ☒ Yes ☐ No ☒ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

Attachment K
Fugitive Emissions Data Summary Sheet

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	PM	2.6931	0.2219	2.6931	0.2219	AP-42
Haul Road/Road Dust Emissions Paved Haul Roads	PM10	0.4311	0.0444	0.4311	0.0444	AP-42
Loading/Unloading Operations	Methanol (67561) (Total VOCs)	11.9302	0.5726	11.9302	0.5726	AP-42
Loading/Unloading Operations	Anionic polyacrylamide (64742) (Total VOCs)	1.0093	0.1849	1.0093	0.1849	AP-42
Loading/Unloading Operations	Cationic polyacrylamide (64742) (Total VOCs)	1.0093	0.1849	1.0093	0.1849	AP-42
Equipment Leaks (Components)	Methanol (67561) (Total VOCs)	0.0119	0.0522	0.0119	0.0522	MB

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. DO NOT LIST H_2, H_2O, N_2, O_2, 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 Sheet

Attachment L:

EMISSIONS UNIT DATA SHEET
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.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name: Methanol Tank	2. Tank Name: TANK01-02
3. Emission Unit ID number: TANK01-02	4. Emission Point ID number: EP-TANK01-02
5. Date Installed *(for existing tanks):* 2015	6. Type of change: New
7. Description of Tank Modification *(if applicable)*	
7A. Will more than one material be stored in this tank? No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.)	

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 8000 gallons	
9A. Tank Internal Diameter (ft.) 8	9B. Tank Internal Height (ft.) 21
10A. Maximum Liquid Height (ft.) 7.2	10B. Average Liquid Height (ft.) 4
11A. Maximum Vapor Space Height (ft.) 7.2	11B. Average Vapor Space Height (ft.) 4
12. Nominal Capacity *(specify barrels or gallons)* . This is also known as "working volume." 8000 gallons	
13A. Maximum annual throughput (gal/yr) 360,000	13B. Maximum daily throughput (gal/day) 986
14. Number of tank turnovers per year 23	15. Maximum tank fill rate (gal/min) 4500
16. Tank fill method: Submerge	
17. Is the tank system a variable vapor space system? No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): X Fixed Roof vertical X horizontal flat roof cone roof dome roof other (describe) External Floating Roof pontoon roof double deck roof Domed External (or Covered) Floating Roof Internal Floating Roof vertical column support self-supporting Variable Vapor Space lifter roof diaphragm Pressurized spherical cylindrical Underground Other (describe)	

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

Refer to enclosed TANKS Summary Sheets

X Refer to the responses to items 34 – 39 in section VII

Attachment L:
EMISSIONS UNIT DATA SHEET
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.

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): X 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 and CAS No.	Breathing Loss		Working Loss		Total Emissions Loss				
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy			
	Please see Table 4								

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 and other modeling summary sheets if applicable.

SECTION VII (required if did not provide TANKS Summary Sheets)

TANK CONSTRUCTION AND OPERATION INFORMATION		
19. Tank Shell Construction: Steel		
20A. Shell Color: White	20B. Roof Color: White	20C. Year Last Painted: 2016
21. Shell Condition (if metal and unlined): No Rust		
22A. Is the tank heated? No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?
23. Operating Pressure Range (psig): 0		
24. Is the tank a **Vertical Fixed Roof Tank**? Yes	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):
25. Complete item 25 for **Floating Roof Tanks** Does not apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type *(check one):* Metallic (mechanical) shoe seal Liquid mounted resilient seal		
25C. Is the Floating Roof equipped with a secondary seal? Yes No		
25D. If yes, how is the secondary seal mounted? *(check one)* Shoe Rim Other (describe):		
25E. Is the floating roof equipped with a weather shield? Yes No		
25F. Describe deck fittings:		
26. Complete the following section for **Internal Floating Roof Tanks** Does not apply		
26A. Deck Type: Bolted Welded	26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction:		
26D. Deck seam length (ft.):	26E. Area of deck (ft2):	26F. For column supported	26G. For column supported

Attachment L:

EMISSIONS UNIT DATA SHEET

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.

SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: Charleston, WV			
28. Daily Avg. Ambient Temperature (°F): 55.3		29. Annual Avg. Maximum Temperature (°F): 65.5	
30. Annual Avg. Minimum Temperature (°F): 44.6		31. Avg. Wind Speed (mph): 5.9	
32. Annual Avg. Solar Insulation Factor (BTU/ft2-day): 1030.235999		33. Atmospheric Pressure (psia): 14.8	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.7	34A. Minimum (°F): 39.5	34B. Maximum (°F): 61.48	
35. Avg. operating pressure range of tank (psig): 0	35A. Minimum (psig): 0	35B. Maximum (psig): 0	
36A. Minimum liquid surface temperature (°F): 39.5		36B. Corresponding vapor pressure (psia):	1.7737
37A. Avg. liquid surface temperature (°F): 56.27		37B. Corresponding vapor pressure (psia):	2.7891
38A. Maximum liquid surface temperature (°F):61.48		38B. Corresponding vapor pressure (psia):	2.5141

39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.

39A. Material name and composition:	Methanol		
39B. CAS number:	67561		
39C. Liquid density (lb/gal):	6.72		
39D. Liquid molecular weight (lb/lb-mole):	32.0		
39E. Vapor molecular weight (lb/lb-mole):	32.04		
39F. Maximum true vapor pressure (psia):	3.5432		
39G. Max Reid vapor pressure (psi):	4.79320		
39H. Months Storage per year. From: To:	year round		

Attachment L

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 Numbe	Description	Mean Vehicle Weight (tons)	Miles per Trip	Maximum Trips per	Maximum Trips per Year	Control Device ID	Control Efficiency (%)
1	Tanker Trucks	40	0.16	1	65		
2	Totes Delivery Truck	27	0.16	1	163		
3	Anionic Polyacrylamide Tanker Truck	40	0.16	1	165		
4	Cationic Polyacrylamide Tanker Truck	40	0.16	1	165		
5	Isotank Delivery Truck (Anionic Polyacrylamide)	27	0.16	1	240		
6	Isotank Delivery Truck (Cationic Polyacrylamide)	27	0.16	1	240		

Source: *AP-42 Fifth Edition – 11.2.6 Industrial Paved Roads*

E = 0.077 × I × (4 ÷ n) × (s ÷ 10) × (L ÷ 1000) × (W ÷ 3)0.7 = 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: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr

For TPY: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] × [Ton ÷ 2000 lb] = Tons/year

SUMMARY OF PAVED HAULROAD EMISSIONS

	PM				PM-10			
	Uncontrolled		Controlled		Uncontrolled		Controlled	
Item No.	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
1	0.5376	0.0175			0.0000	0.0035		
2	0.3601	0.0294			0.0720	0.0059		
3	0.5376	0.0444			0.1075	0.0089		
4	0.5376	0.0444			0.1075	0.0089		
5	0.3601	0.0432			0.0720	0.0086		
6	0.3601	0.0432			0.0720	0.0086		
TOTALS	2.6931	0.2219			0.4311	0.0444		

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 *Equipment List Form*):	EP-L01
1. Loading Area Name:	Methanol Tank Loading

2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):
Tank Trucks
Totes Delivery Trucks

3. Loading Rack or Transfer Point Data: Tanks to Hauling Trucks; Totes to Hauling Trucks

Number of pumps	1
Number of liquids loaded	1
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1

4. Does ballasting of marine vessels occur at this loading area?
Does not apply

5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: N/A

6. Are cargo vessels pressure tested for leaks at this or any other location?
No

7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	2	2	2	2
days/week	2	2	2	2
weeks/quarter	13	13	13	13

8. Bulk Liquid Data *(add pages as necessary):*

Pump ID No.	P1					
Liquid Name	Methanol					
Max. daily throughput (1000 gal/day)	5.6070					
Max. annual throughput (1000 gal/yr)	360.00					
Loading Method [1]	SUB					
Max. Fill Rate (gal/min)	75.00					
Average Fill Time (min/loading)	106.67					
Max. Bulk Liquid Temperature (^{o}F)	73.9					
True Vapor Pressure [2]	3.54					
Cargo Vessel Condition [3]	U					
Control Equipment or Method [4]	None					
Minimum control efficiency (%)	0					

Attachment L

EMISSIONS UNIT DATA SHEET BULK LIQUID TRANSFER OPERATIONS

Maximum Emission Rate	Loading (lb/hr)	7.16					
	Annual (lb/yr)	0.29					
Estimation Method [5]		AP-42					

[1] BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill

[2] At maximum bulk liquid temperature: 72.1F

[3] B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

[4] List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets*):CA = Carbon Adsorption LOA = Lean Oil Adsorption CO = Condensation SC = Scrubber (Absorption)CRA = Compressor- Refrigeration-Absorption TO = Thermal Oxidation or Incineration CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system) O = other (describe)

[5] EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance
TM = Test Measurement based upon test data submittal
MB, EFs

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	RECORDKEEPING
1) Visual inspection to ensure that loading connections during transfer from tanker trucks to storage tanks are leak-free.	1) Maintain records of chemical transferred from tanker trucks to storage tanks.
REPORTING	**TESTING**
N/A	N/A

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 *Equipment List Form*):	EP-L02
1. Loading Area Name:	Tote Loading
2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply): Tank Trucks Totes Delivery Trucks	
3. Loading Rack or Transfer Point Data: Tanks to Hauling Trucks; Totes to Hauling Trucks	
Number of pumps	1
Number of liquids loaded	1
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1
4. Does ballasting of marine vessels occur at this loading area? Does not apply	
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: N/A	
6. Are cargo vessels pressure tested for leaks at this or any other location? No	

7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	1	1	1	1
days/week	4	4	4	4
weeks/quarter	13	13	13	13

8. Bulk Liquid Data *(add pages as necessary):*

Pump ID No.	P2					
Liquid Name	Methanol					
Max. daily throughput (1000 gal/day)	2.21					
Max. annual throughput (1000 gal/yr)	360.00					
Loading Method [1]	SUB					
Max. Fill Rate (gal/min)	50.00					
Average Fill Time (min/loading)	6.60					
Max. Bulk Liquid Temperature (^{o}F)	73.9					
True Vapor Pressure [2]	3.54					
Cargo Vessel Condition [3]	U					
Control Equipment or Method [4]	None					
Minimum control efficiency (%)	0					

Attachment L

EMISSIONS UNIT DATA SHEET BULK LIQUID TRANSFER OPERATIONS

Maximum Emission Rate	Loading (lb/hr)	4.77					
	Annual (lb/yr)	0.29					
Estimation Method [5]		AP-42					

[1] BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill

[2] At maximum bulk liquid temperature: 72.1F

[3] B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

[4] List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets*):CA = Carbon Adsorption LOA = Lean Oil Adsorption CO = Condensation SC = Scrubber (Absorption)CRA = Compressor- Refrigeration-Absorption TO = Thermal Oxidation or Incineration CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system) O = other (describe)

[5] EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance
TM = Test Measurement based upon test data submittal
MB, EFs

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	RECORDKEEPING
1) Visual inspection to ensure that loading connections during transfer from storage tanks to totes are leak-free.	1) Maintain records of chemical transferred from methanol tanks to 330-gal totes.
REPORTING	**TESTING**
N/A	N/A

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 *Equipment List Form*):	EP-L03
1. Loading Area Name:	Anionic Polyacrylamide Loading
2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply): Tank Trucks	
3. Loading Rack or Transfer Point Data: Tanks to Hauling Trucks; Totes to Hauling Trucks	
Number of pumps	1
Number of liquids loaded	1
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1
4. Does ballasting of marine vessels occur at this loading area? Does not apply	
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: N/A	
6. Are cargo vessels pressure tested for leaks at this or any other location? No	

7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	2	2	2	2
days/week	4	4	4	4
weeks/quarter	13	13	13	13

8. Bulk Liquid Data *(add pages as necessary):*

Pump ID No.	P3					
Liquid Name	Anionic Polyacrylamide					
Max. daily throughput (1000 gal/day)	8.000					
Max. annual throughput (1000 gal/yr)	1,318.72					
Loading Method [1]	SP					
Max. Fill Rate (gal/min)	60.00					
Average Fill Time (min/loading)	105.67					
Max. Bulk Liquid Temperature (^{o}F)	73.9					
True Vapor Pressure [2]	0.46					
Cargo Vessel Condition [3]	U					
Control Equipment or Method [4]	None					
Minimum control efficiency (%)	0					

Attachment L

EMISSIONS UNIT DATA SHEET BULK LIQUID TRANSFER OPERATIONS

Maximum Emission Rate	Loading (lb/hr)	1.01					
	Annual (lb/yr)	0.18					
Estimation Method [5]		AP-42					

[1] BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill

[2] At maximum bulk liquid temperature: 72.1F

[3] B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

[4] List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets*):CA = Carbon Adsorption LOA = Lean Oil Adsorption CO = Condensation SC = Scrubber (Absorption)CRA = Compressor- Refrigeration-Absorption TO = Thermal Oxidation or Incineration CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system) O = other (describe)

[5] EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance
TM = Test Measurement based upon test data submittal
MB, EFs

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	RECORDKEEPING
1) Visual inspection to ensure that loading connections during transfer from tanker trucks to storage tanks are leak-free.	1) Maintain records of chemical transferred from tanker trucks to storage tanks.
REPORTING	**TESTING**
N/A	N/A

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 *Equipment List Form*):	EP-L04
1. Loading Area Name:	Anionic Polyacrylamide Loading
2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply): Tank Trucks	
3. Loading Rack or Transfer Point Data: Tanks to Hauling Trucks; Totes to Hauling Trucks	
Number of pumps	1
Number of liquids loaded	1
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1
4. Does ballasting of marine vessels occur at this loading area? Does not apply	
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: N/A	
6. Are cargo vessels pressure tested for leaks at this or any other location? No	

7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	2	2	2	2
days/week	4	4	4	4
weeks/quarter	13	13	13	13

8. Bulk Liquid Data *(add pages as necessary):*

Pump ID No.	P3					
Liquid Name	Anionic Polyacrylamide					
Max. daily throughput (1000 gal/day)	8.0000					
Max. annual throughput (1000 gal/yr)	1,318.72					
Loading Method [1]	SP					
Max. Fill Rate (gal/min)	60.00					
Average Fill Time (min/loading)	105.67					
Max. Bulk Liquid Temperature (^{o}F)	73.9					
True Vapor Pressure [2]	0.46					
Cargo Vessel Condition [3]	U					
Control Equipment or Method [4]	None					
Minimum control efficiency (%)	0					

Attachment L

EMISSIONS UNIT DATA SHEET BULK LIQUID TRANSFER OPERATIONS

Maximum Emission Rate	Loading (lb/hr)	1.01					
	Annual (lb/yr)	0.18					
Estimation Method 5		AP-42					

1 BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill

2 At maximum bulk liquid temperature: 72.1F

3 B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

4 List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets*):CA = Carbon Adsorption LOA = Lean Oil Adsorption CO = Condensation SC = Scrubber (Absorption)CRA = Compressor- Refrigeration-Absorption TO = Thermal Oxidation or Incineration CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system) O = other (describe)

5 EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance
TM = Test Measurement based upon test data submittal
MB, EFs

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	RECORDKEEPING
1) Visual inspection to ensure that loading connections during transfer from tanker trucks to storage tanks are leak-free.	1) Maintain records of chemical transferred from tanker trucks to storage tanks.
REPORTING	**TESTING**
N/A	N/A

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

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]				
	heavy liquid VOC[8]				
	Non-VOC[9]				
Valves[10]	Gas VOC				
	Light Liquid VOC	2			96.3600
	Heavy Liquid VOC				
	Non-VOC				
Safety Relief Valves[11]	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 (Connectors)	VOC	2			8.0942
	Non-VOC				

[1 - 13] See notes on the following page.

Attachment N
Supporting Emissions Calculations

Table 1

Facility Information
X-Chem, LLC
Lewis County, West Virginia

Site General Information

Administrative Information	
Facility Name	X-Chem, LLC
Nearest City/Town	Weston
SIC Code	1311
Latitude/Longitude	39.037347, -80.453263
County	Lewis County

Technical Information	
Max Methanol Handling (gallon/yr):	360,000
Max Cationic polyacrylamide Handling (gallon/yr):	1,318,720
Max Anionic polyacrylamide Handling (gallon/yr):	1,318,720

Equipment/Processes at Site	
Equipment/Process Types	**How many for this site?**
Methanol Tanks	2
Loading Jobs	4

Table 2

Uncontrolled Emissions Summary
X-Chem, LLC
Lewis County, West Virginia

Emission Source	VOC		PM_{10}	
	(lbs/hr)	(ton/yr)	(lbs/hr)	(ton/yr)
UNCONTROLLED				
Methanol Tanks Working and Breathing (W/B) Losses[1]	0.0618	0.2708		
Tanker Truck to Methanol Tanks Loading Emissions[2]	7.1581	0.2863		
Methanol Tanks to Totes Loading Emissions[3]	4.7721	0.2863		
Anionic polyacrylamide Loading Emissions[4]	1.0093	0.1849		
Cationic polyacrylamide Loading Emissions[5]	1.0093	0.1849		
Fugitive Emissions (Traffic)[6]			0.4311	0.0444
Fugitive Emissions (Equipment Leaks)[7]	0.0119	0.0522		
TOTALS:	**14.0225**	**1.2654**	**0.4311**	**0.0444**

POTENTIAL TO EMIT	**14.0225**	**1.2654**	**0.4311**	**0.0444**

Enter any notes here:	1 - See Table 4 for methanol tanks W/B emission calculations. 2 - The maximum methanol tanks loading emission was calculated based on actual fill rate of 4500 gallons per hour per tank truck. See Table 5 for details. 3 - The maximum totes loading emission was calculated based on actual fill rate of 50 gallons per minute with one 330-gallon tote filled at a time. See Table 5 for details. 4- see Tables 6 for Anionic polyarylamide loading emission calculation 5- see Tables 6 for Cationic polyarylamide loading emission calculation 6- See Tables 7 and Table 8 PM emissions from delivery trucks. 7- See Table 7 for emissions from Equipment Leaks 8- The methanol tanks and totes loading do not occur at the same time.

Table 3

Permit Summary

X-Chem, LLC

Lewis County, West Virginia

Pollutant		Emissions		Threshold Exceeded?
		Uncontrolled	Threshold	Uncontrolled
VOC	lbs/hr	14.0225	6	**Yes**
	tons/yr	1.2654	10	
PM_{10}	lbs/hr	0.4311	6	
	tons/yr	0.0444	10	
Total HAPs (Methanol)	lbs/hr	14.0225	2	**Yes**
	tons/yr	1.2654	5	

Enter any notes here:	Permit threshold for HAPs is 2 lbs/hr OR 5 tons per year.

Table 4

Uncontrolled Working and Breathing Losses

X-Chem, LLC

Lewis County, West Virginia

Methanol Tank Information	
Number of Tanks	2
Maximum Working Losses (lbs/hr)	0.0394
Maximum Breathing Losses (lbs/hr)	0.0225

	Methanol Tank W/B Losses						
	Vapor Mass Fraction	Working Losses		Breathing Losses		Max W/B Losses	
	wt%	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Total VOCs (Methanol)	100.0000	0.0394	0.1725	0.0225	0.0983	0.0618	0.2708
Enter any notes here:	1. VOC emissions are 100% methanol. 2. Vapor mass fractions, working losses and breathing losses from Promax output; There are no flashing emissions from transfer of liquids.						

Table 5

Methanol Loading Emissions

X-Chem, LLC

Lewis County, West Virginia

Annual Loading	Methanol Tank Loading	Methanol Tote Loading
Annual Average Temp (F)	73.9	73.9
S (saturation factor)	0.6	0.6
P (true vapor pressure)	3.54	3.54
M (MW of vapor)	32.04	32.04
Loading Loss (lb/10^3 gal)*	1.59	1.59
Maximum material handling (gallons/hr)	4,500	3,000
Average material handling (gallons/yr)	360,000	360,000
Loading Emissions (lbs/hr)	7.16	4.77
Loading Emissions (tpy)	0.29	0.29

	Methanol Tank Loading Losses			Methanol Tote Loading Losses		
	Vapor Mass Fraction	Loading Losses		Vapor Mass Fraction	Loading Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
Total VOCs (Methanol)	100.0000	7.1581	0.2863	100.0000	4.7721	0.2863

Enter any notes here
Vapor mass fractions and loading losses from Promax output
The equation L_L = 12.46 SPM/T from AP-42, Chapter 5, Section 5.2-4 was used to calculate emissions.
MW and RVP were obtained by Promax;
Annual Average Temp (F) obtained from Charleston, WV (preset in Promax)
S (saturation factor) is based on submerged loading, dedicated service.
True vapor pressure (TVP) equation from AP-42, Chapter 7, Figure 7.1-13b
Hourly loading emission is based on tank fill rate. Annual loading emission is based on annual material handling.
The maximum methanol tank hourly loading emission was calculated based on actual fill rate of 4500 gallons per hour.
The maximum tote bins hourly loading emission was calculated based on actual fill rate of 50 gallons per minute with 330-gallon totes filled one at a time
The maximum hourly emissions will occur during the methanol tank loading. The methanol tank and totes loading will not occur at the same time.
Loading emissions are vented to the atmosphere.

Table 6

ISO Tank Loading Emissions

X-Chem, LLC

Lewis County, West Virginia

Annual Loading	Anionic Polyacrylamide Tank Loading	Cationic Polyacrylamide Tank Loading
Annual Average Temp (F)	73.9	73.9
S (saturation factor)	1.45	1.45
P (true vapor pressure)	0.46	0.46
M (MW of vapor)	18.02	18.02
Loading Loss (lb/10^3 gal)*	0.28	0.28
Maximum material handling (gallons/hr)	3,600	3,600
Average material handling (gallons/yr)	1,318,720	1,318,720
Loading Emissions (lbs/hr)	1.01	1.01
Loading Emissions (tpy)	0.18	0.18

	Anionic Polyacrylamide Tank Loading Losses			Cationic Polyacrylamide Tank Loading Losses		
	Vapor Mass Fraction	Loading Losses		Vapor Mass Fraction	Loading Losses	
	wt%	lbs/hr	tpy	wt%	lbs/hr	tpy
VOC (Anionic Polyacrylamide)	100.0000	1.0093	0.1849	-	-	-
VOC (Cationic Polyacrylamide)	-	-	-	100.0000	1.0093	0.1849

Enter any notes here
Vapor mass fractions and loading losses from Promax output
The equation L_L = 12.46 SPM/T from AP-42, Chapter 5, Section 5.2-4 was used to calculate emissions.
MW and RVP were obtained by Promax;
Annual Average Temp (F) obtained from Charleston, WV (preset in Promax)
S (saturation factor) is based on splash loading, dedicated service.
Hourly loading emission is based on tank fill rate. Annual loading emission is based on annual material handling.
The maximum isotank hourly loading emission was calculated based on actual fill rate of 3600 gallons per hour.
Loading emissions are vented to the atmosphere.

Table 7

Paved Road Traffic Emissions (Methanol Related)
X-Chem, LLC
Lewis County, West Virginia

	PM	PM10
Particle Size Multiplier (k)[1]	0.011	0.0022
Road surface silt loading (sL) (g/m2)[2]	9.7	9.7
Days per Year with Precipitation > 0.01 in (P)	150	150

Tanker Truck Trip Calculation	
Methanol Loading (gal/year)	360000
Truck Capacity (bbl)	178
Truck Capacity (gal)	5607

Totes Delivery Truck Trip Calculation	
Methanol Loading (gal/year)	360000
Truck Capacity (bbl)	70
Truck Capacity (gal)	2205

	# of Wheels	Mean Vehicle Weight (W) (tons)	Mean Vehicle Speed (mph)	Miles Per Trip (miles)	Maximum Trips per Hour	Maximum Trips per Year	Vehicle Miles Travelled (miles/hr)	Vehicle Miles Travelled (miles/year)	PM (lbs/VMT)	PM10 (lbs/VMT)
Tanker Trucks	18	40	10	0.1600	1	65	0.1600	10.4000	3.3603	0.6721
Totes Delivery Truck	10	27	10	0.1600	1	163	0.1600	26.1224	2.2504	0.4501

	Uncontrolled Emissions					
	PM			PM10		
	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)
Tanker Trucks	0.5376	34.9468	0.0175		6.9894	0.0035
Totes Delivery Truck	0.3601	58.7866	0.0294	0.0720	11.7573	0.0059
Total Emissions	0.8977	93.7334	0.0469	0.0720	18.7467	0.0094

Enter any notes here:	Calculation Method: EPA, AP-42, Volume I, Section 13.2.1.3 Paved Roads, Equation (2). 1. Particle size multiplier (k) for PM10 used PM-30 value in Table 13.2.1-1 2. Silt Loading (sL) used mean sL value for Iron and Steel Production Facility in Table 13.2.1-3 as the conversative estimate 3. The equation: $=[k(sL)^{0.91}\times(W)^{1.02}](1-P/4N)$ from from AP-42, Chapter 13, Section 13.2.1.3 was used to calculate emissions.

Table 8

Paved Road Traffic Emissions (Isotanks related)
X-Chem, LLC
Lewis County, West Virginia

	PM	PM10
Particle Size Multiplier (k)[1]	0.011	0.0022
Road surface silt loading (sL) (g/m2)[2]	9.7	9.7
Days per Year with Precipitation > 0.01 in (P)	150	150

Anionic Polyacrylamide Tanker Truck Trip Calculation	
Anionic Polyacrylamide Loading (gal/year)	1318720
Truck Capacity (gal)	8000

Cationic Polyacrylamide Tanker Truck Trip Calculation	
Cationic Polyacrylamide Loading (gal/year)	1318720
Truck Capacity (gal)	8000

Isotank Delivery Truck (Anionic Polyacrylamide) Trip Calculation	
Anionic Polyacrylamide Loading (gal/year)	1318720
Truck Capacity (gal)	5500

Isotank Delivery Truck (Cationic Polyacrylamide) Trip Calculation	
Cationic Polyacrylamide Loading (gal/year)	1318720
Truck Capacity (gal)	5500

	# of Wheels	Mean Vehicle Weight (W) (tons)	Mean Vehicle Speed (mph)	Miles Per Trip (miles)	Maximum Trips per Hour	Maximum Trips per Year	Vehicle Miles Travelled (miles/hr)	Vehicle Miles Travelled (miles/year)	PM (lbs/VMT)	PM10 (lbs/VMT)
Anionic Polyacrylamide Tanker Truck	18	40	10	0.1600	1	165	0.1600	26.4000	3.3603	0.6721
Cationic Polyacrylamide Tanker Truck	18	40	10	0.1600	1	165	0.1600	26.4000	3.3603	0.6721
Isotank Delivery Truck (Anionic Polyacrylamide)	10	27	10	0.1600	1	240	0.1600	38.3628	2.2504	0.4501
Isotank Delivery Truck (Cationic Polyacrylamide)	10	27		0.1600	1	240	0.1600	38.3628	2.2504	0.4501

	Uncontrolled Emissions					
	PM			PM10		
	(lbs/hr)	(lbs/year)	(tpy)	(lbs/hr)	(lbs/year)	(tpy)
Anionic Polyacrylamide Tanker Truck	0.5376	88.7112	0.0444	0.1075	17.7422	0.0089
Cationic Polyacrylamide Tanker Truck	0.5376	88.7112	0.0444	0.1075	17.7422	0.0089
Isotank Delivery Truck (Anionic Polyacrylamide)	0.3601	86.3325	0.0432	0.0720	17.2665	0.0086
Isotank Delivery Truck (Cationic Polyacrylamide)	0.3601	86.3325	0.0432	0.0720	17.2665	0.0086
Total Emissions	1.7954	350.0874	0.1750	0.3591	70.0175	0.0350

Enter any notes here:	Calculation Method: EPA, AP-42, Volume I, Section 13.2.1.3 Paved Roads, Equation (2). 1. Particle size multiplier (k) for PM10 used PM-30 value in Table 13.2.1-1 2. Silt Loading (sL) used mean sL value for Iron and Steel Production Facility in Table 13.2.1-3 as the conversative estimate 3. The equation: $=[k(sL)^{0.91}\times(W)^{1.02}](1-P/4N)$ from from AP-42, Chapter 13, Section 13.2.1.3 was used to calculate emissions.

Table 9

Fugitive Emissions (Equipment Leaks)
X-Chem, LLC
Lewis County, West Virginia

Light Liquid Weight Fraction From Analysis:	VOC (Methanol) fraction	1.000

Light Liquid							
Number	Component	Pollutant	Emission Factor (kg/hr of THC per component)	kg/hr	lb/yr	lb/hr	tpy
2	Valves	Light Liquid VOC	0.0025	0.0050	96.3600	0.0110	0.0482
2	Connectors	Light Liquid VOC	0.00021	0.0004	8.0942	0.0009	0.0040
			Total VOC:	0.0054	104.4542	0.0119	0.0522

Enter Notes Here:	Fugitive emissions based on an estimated component count Reference to Emission factors used: 1. Emission factors of Methanol storage is not available. Emission factors are for oil and gas production facilities (not refineries) come from the EPA's "Protocol for Equipment Leak Emission Estimates" November 1995, EPA 4531, R-95-017, Table 2-4.

Bryan Research & Engineering, Inc.

ProMax® 3.2

with

TSWEET® & PROSIM®

Simulation Report

Project: X-Chem-Methanol Tank.pmx

Licensed to Conestoga-Rovers & Associates, Inc. and Affiliates

Client Name: X-Chem, LLC
Location: Lewis County, WV
Job:

ProMax Filename: C:\Users\yichen\Documents\New Model\Non Petroleum Storage Tanks\X-Chem\X-Chem-Methanol Tank.pmx
ProMax Version: 3.2.13330.0
Simulation Initiated: 11/24/2015 8:14:04 AM

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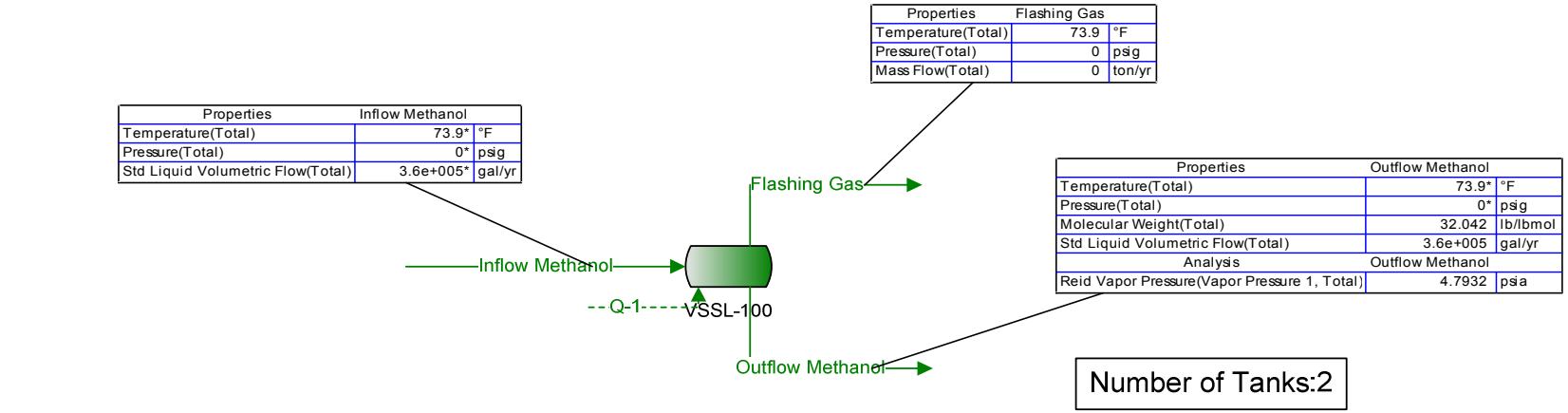
http://www.bre.com/

Report Navigator can be activated via the ProMax Navigator Toolbar.
An asterisk (*), throughout the report, denotes a user specified value.
A question mark (?) after a value, throughout the report, denotes an extrapolated or approximate value.



Annual tank loss calculations for "Outflow Methanol".
Total working and breathing losses from the Horizontal Cylinder are 0.2708 ton/yr.

Methanol Tank W/B Emissions

Methanol Tank W/B Annual Emissions

Stream Methanol Tank W/B Emissions C1+ Mass Flow =0.2708 ton/yr

Process Streams		Flashing Gas	Inflow Methanol	Methanol Tank W/B Emissions	Outflow Methanol
Composition	**Status:**	Solved	Solved	Solved	Solved
Phase: **Total**	**From Block:**	VSSL-100	--	--	VSSL-100
	To Block:	--	VSSL-100	--	--
Mole Fraction		%	%	%	%
Methanol			100*	100*	100
Water			0*	0*	0
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h
Methanol		0	8.51446*	0.00192959*	8.51446
Water		0	0*	0*	0
Mass Fraction		%	%	%	%
Methanol			100*	100*	100
Water			0*	0*	0
Mass Flow		lb/h	lb/h	lb/h	lb/h
Methanol		0	272.819*	0.0618278*	272.819
Water		0	0*	0*	0
Volumetric Flow		ft^3/h	gpm	ft^3/h	gpm
Methanol			0.676361	6.96392	0.676361
Water			0	0	0
Std. Vapor Volumetric Flow		MMSCFD	MMSCFD	MMSCFD	MMSCFD
Methanol		0	0.0775465*	1.75740E-05*	0.0775465
Water		0	0*	0*	0
Normal Vapor Volumetric Flow		MMCFD	MMCFD	MMCFD	MMCFD
Methanol		0	0.0733683*	1.66271E-05*	0.0733683
Water		0	0*	0*	0
Std. Liquid Volumetric Flow		sgpm	sgpm	sgpm	sgpm
Methanol		0	0.684932*	0.000155223*	0.684932
Water		0	0*	0*	0

Process Streams		Flashing Gas	Inflow Methanol	Methanol Tank W/B Emissions	Outflow Methanol
Properties	**Status:**	Solved	Solved	Solved	Solved
Phase: **Total**	**From Block:**	VSSL-100	--	--	VSSL-100
	To Block:	--	VSSL-100	--	--
Property	**Units**				
Temperature	°F	73.9	73.9*	61.4758*	73.9*
Pressure	psig	0	0*	-13.1508	0*
Mole Fraction Vapor	%		0	100*	0
Mole Fraction Light Liquid	%		100	0	100
Mole Fraction Heavy Liquid	%		0	0	0
Molecular Weight	lb/lbmol		32.0419	32.0419	32.0419
Mass Density	lb/ft^3		50.2894	0.00887831	50.2894
Molar Flow	lbmol/h	0	8.51446	0.00192959	8.51446
Mass Flow	lb/h	0	272.819	0.0618278*	272.819
Vapor Volumetric Flow	ft^3/h		5.42498	6.96392	5.42498
Liquid Volumetric Flow	gpm		0.676361	0.868229	0.676361
Std Vapor Volumetric Flow	MMSCFD	0	0.0775465	1.75740E-05	0.0775465
Std Liquid Volumetric Flow	sgpm	0	0.684932*	0.000155223	0.684932
Compressibility			0.00163525	0.997082	0.00163525
Specific Gravity			0.806321	1.10632	0.806321
API Gravity			42.0372		42.0372
Enthalpy	Btu/h	0	-877163	-167.024	-877163
Mass Enthalpy	Btu/lb		-3215.18	-2701.44	-3215.18
Mass Cp	Btu/(lb*°F)		0.688233	0.325177	0.688233
Ideal Gas CpCv Ratio			1.23319	1.23609	1.23319
Dynamic Viscosity	cP		0.550013	0.00942997	0.550013
Kinematic Viscosity	cSt		0.682772	66.3070	0.682772
Thermal Conductivity	Btu/(h*ft*°F)		0.115791	0.00867298	0.115791
Surface Tension	lbf/ft		0.00153203		0.00153203
Net Ideal Gas Heating Value	Btu/ft^3		766.2	766.2	766.2
Net Liquid Heating Value	Btu/lb		8561	8561	8561
Gross Ideal Gas Heating Value	Btu/ft^3		866.9	866.9	866.9
Gross Liquid Heating Value	Btu/lb		9753	9753	9753

Process Streams		Flashing Gas	Inflow Methanol	Methanol Tank W/B Emissions	Outflow Methanol
Composition	**Status:**	Solved	Solved	Solved	Solved
Phase: **Vapor**	**From Block:**	VSSL-100	--	--	VSSL-100
	To Block:	--	VSSL-100	--	--
Mole Fraction				%	
Methanol				100	
Water				0	
Molar Flow				lbmol/h	
Methanol				0.00192959	
Water				0	
Mass Fraction				%	
Methanol				100	
Water				0	
Mass Flow				lb/h	
Methanol				0.0618278	
Water				0	
Volumetric Flow				ft^3/h	
Methanol				6.96392	
Water				0	
Std. Vapor Volumetric Flow				MMSCFD	
Methanol				1.75740E-05	
Water				0	
Normal Vapor Volumetric Flow				MMCFD	
Methanol				1.66271E-05	
Water				0	
Std. Liquid Volumetric Flow				sgpm	
Methanol				0.000155223	
Water				0	

Process Streams		Flashing Gas	Inflow Methanol	Methanol Tank W/B Emissions	Outflow Methanol
Properties	**Status:**	Solved	Solved	Solved	Solved
Phase: **Vapor**	**From Block:**	VSSL-100	--	--	VSSL-100
	To Block:	--	VSSL-100	--	--
Property	**Units**				
Temperature	°F			61.4758	
Pressure	psig			-13.1508	
Mole Fraction Vapor	%			100	
Mole Fraction Light Liquid	%			0	
Mole Fraction Heavy Liquid	%			0	
Molecular Weight	lb/lbmol			32.0419	
Mass Density	lb/ft^3			0.00887831	
Molar Flow	lbmol/h			0.00192959	
Mass Flow	lb/h			0.0618278	
Vapor Volumetric Flow	ft^3/h			6.96392	
Liquid Volumetric Flow	gpm			0.868229	
Std Vapor Volumetric Flow	MMSCFD			1.75740E-05	
Std Liquid Volumetric Flow	sgpm			0.000155223	
Compressibility				0.997082	
Specific Gravity				1.10632	
API Gravity					
Enthalpy	Btu/h			-167.024	
Mass Enthalpy	Btu/lb			-2701.44	
Mass Cp	Btu/(lb*°F)			0.325177	
Ideal Gas CpCv Ratio				1.23609	
Dynamic Viscosity	cP			0.00942997	
Kinematic Viscosity	cSt			66.3070	
Thermal Conductivity	Btu/(h*ft*°F)			0.00867298	
Surface Tension	lbf/ft				
Net Ideal Gas Heating Value	Btu/ft^3			766.2	
Net Liquid Heating Value	Btu/lb			8561	
Gross Ideal Gas Heating Value	Btu/ft^3			866.9	
Gross Liquid Heating Value	Btu/lb			9753	

Process Streams		Flashing Gas	Inflow Methanol	Methanol Tank W/B Emissions	Outflow Methanol
Composition	**Status:**	Solved	Solved	Solved	Solved
Phase: Light Liquid	**From Block:**	VSSL-100	--	--	VSSL-100
	To Block:	--	VSSL-100	--	--
Mole Fraction			%		%
Methanol			100		100
Water			0		0
Molar Flow			lbmol/h		lbmol/h
Methanol			8.51446		8.51446
Water			0		0
Mass Fraction			%		%
Methanol			100		100
Water			0		0
Mass Flow			lb/h		lb/h
Methanol			272.819		272.819
Water			0		0
Volumetric Flow			gpm		gpm
Methanol			0.676361		0.676361
Water			0		0
Std. Vapor Volumetric Flow			MMSCFD		MMSCFD
Methanol			0.0775465		0.0775465
Water			0		0
Normal Vapor Volumetric Flow			MMCFD		MMCFD
Methanol			0.0733683		0.0733683
Water			0		0
Std. Liquid Volumetric Flow			sgpm		sgpm
Methanol			0.684932		0.684932
Water			0		0

Process Streams		Flashing Gas	Inflow Methanol	Methanol Tank W/B Emissions	Outflow Methanol
Properties	**Status:**	Solved	Solved	Solved	Solved
Phase: Light Liquid	**From Block:**	VSSL-100	--	--	VSSL-100
	To Block:	--	VSSL-100	--	--
Property	**Units**				
Temperature	°F		73.9		73.9
Pressure	psig		0		0
Mole Fraction Vapor	%		0		0
Mole Fraction Light Liquid	%		100		100
Mole Fraction Heavy Liquid	%		0		0
Molecular Weight	lb/lbmol		32.0419		32.0419
Mass Density	lb/ft^3		50.2894		50.2894
Molar Flow	lbmol/h		8.51446		8.51446
Mass Flow	lb/h		272.819		272.819
Vapor Volumetric Flow	ft^3/h		5.42498		5.42498
Liquid Volumetric Flow	gpm		0.676361		0.676361
Std Vapor Volumetric Flow	MMSCFD		0.0775465		0.0775465
Std Liquid Volumetric Flow	sgpm		0.684932		0.684932
Compressibility			0.00163525		0.00163525
Specific Gravity			0.806321		0.806321
API Gravity			42.0372		42.0372
Enthalpy	Btu/h		-877163		-877163
Mass Enthalpy	Btu/lb		-3215.18		-3215.18
Mass Cp	Btu/(lb*°F)		0.688233		0.688233
Ideal Gas CpCv Ratio			1.23319		1.23319
Dynamic Viscosity	cP		0.550013		0.550013
Kinematic Viscosity	cSt		0.682772		0.682772
Thermal Conductivity	Btu/(h*ft*°F)		0.115791		0.115791
Surface Tension	lbf/ft		0.00153203		0.00153203
Net Ideal Gas Heating Value	Btu/ft^3		766.2		766.2
Net Liquid Heating Value	Btu/lb		8561		8561
Gross Ideal Gas Heating Value	Btu/ft^3		866.9		866.9
Gross Liquid Heating Value	Btu/lb		9753		9753

Attachment O
Monitoring/Recordkeeping/Reporting/Testing Plans

Attachment O

Proposed Monitoring, Recordkeeping, Reporting, and Testing
X-Chem, LLC
Lewis County, West Virginia

The Facility will perform the following to monitor and demonstrate compliance with emission limits.

1) Visual inspection during loading activities to ensure that connections during liquid transfers are leak-free.
2) Maintain records of chemicals unloaded from tanker trucks and transferred to totes. Records will be maintained on site or in a readily available off-site location for a period of 5 years.

Attachment P
Public Notice

Attachment P

Air Quality Permit Notice
Notice of Application
X-Chem, LLC
Lewis County, West Virginia

Notice is given that X-Chem, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit (45CSR13) for a Chemical Handling and Storage facility located at 393 US HWY 33 East, Weston, WV 26452 in Lewis County, West Virginia.

The latitude and longitude coordinates are: 39.037347 degrees N and -80.453263 degrees W

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be:

Pollutants	TOTALS (tpy):
VOC	1.2654
PM_{10}	0.0444
Total HAPs	0.8957
Methanol	0.8957
Anionic Polyacrylamide	0.1849
Cationic Polyacrylamide	0.1849

Startup is planned to begin upon issuance of the permit. 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 1227, during normal business hours.
Dated this the __ day of _____, 2016

By: X-Chem, LLC
Kevin Wallace
VP Finance
2727 Chemsearch Blvd.
Irving, TX 75062

Attachment
Application Fee