HEP SHALEWATER SOLUTIONS

FOR THE:

CENTRAL STATION FACILITY

NSR PERMIT APPLICATION
WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
45CSR13

DODDRIDGE COUNTY, WEST VIRGINIA

PREPARED BY:
HULL & ASSOCIATES, INC.
6397 EMERALD PARKWAY, SUITE 200
DUBLIN, OH 43016

APRIL 2016

HULL

TABLE OF CONTENTS

45CSR13 APPLICATION FORM

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):*
HEP Shalewater Solutions, LLC

2. Federal Employer ID No. ***(FEIN):***
45-3269957

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

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

5A. Applicant's mailing address:
37 Grande Meadows Drive, Ste 201, Bridgeport, WV 26330

5B. Facility's present physical address:
0.185 miles on WV county route 11, off US Route 50

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: **Lease**
- 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.): **Reclamation of water from Oil and Gas Exploration and Production**

10. North American Industry Classification System **(NAICS)** code for the facility:
213112

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):
none

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.**

0.185 miles on WV county route 11, off US Route 50

Map is attached as Attachment B

12.B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
County Road 11	**West Union**	**Doddridge**
12.E. UTM Northing (KM): **4347954.76**	12F. UTM Easting (KM): **516169.00**	12G. UTM Zone: **-17S**

13. Briefly describe the proposed change(s) at the facility:
New facility to reclaim waters generated from Oil and Gas exploration and production

14A. Provide the date of anticipated installation or change: 6/9/2016 – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: 1/18 – 3/1/2016– Construction is not complete and equipment is not in operation.	14B. Date of anticipated Start-Up if a permit is granted: 6/9/2016

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 **365**

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

17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known)*. A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known)*. Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

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

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

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

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

23. Provide a **Process Description** as **Attachment G.**
– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

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

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**

– For chemical processes, provide a MSDS for each compound emitted to the air.

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

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

28. Check all applicable **Emissions Unit Data Sheets** listed below:

☒ 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	
☐ Grey Iron and Steel Foundry	☐ Indirect Heat Exchanger	☒ Storage Tanks
☐ 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: 5/4/16

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

35B. Printed name of signee: Tony Gutta		35C. Title: President NEBU
35D. E-mail: tgutta@shalewater.com	36E. Phone: 304-592-2794	36F. FAX: N/A
36A. Printed name of contact person (if different from above): Ryan Hall		36B. Title: Technical Director
36C. E-mail: rhall@shalewater.com	36D. Phone: 855-303-9416	36E. FAX: N/A

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.

DISCUSSION OF NEARBY FACILITIES

NEARBY FACILITIES

There are no facilities owned or operated by HEP Shalewater within 5 miles of this location.

ATTACHMENT A

Business Certificate

WEST VIRGINIA
STATE TAX DEPARTMENT

BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
HEP SHALEWATER SOLUTIONS, LLC
193 TIFFCLAY LANE
WEST UNION, WV 26456-0000

BUSINESS REGISTRATION ACCOUNT NUMBER: **2323-2366**

This certificate is issued on: **02/4/2016**

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.

atL008 v.4
L0562883392

ATTACHMENT B

Area and Topographic Map

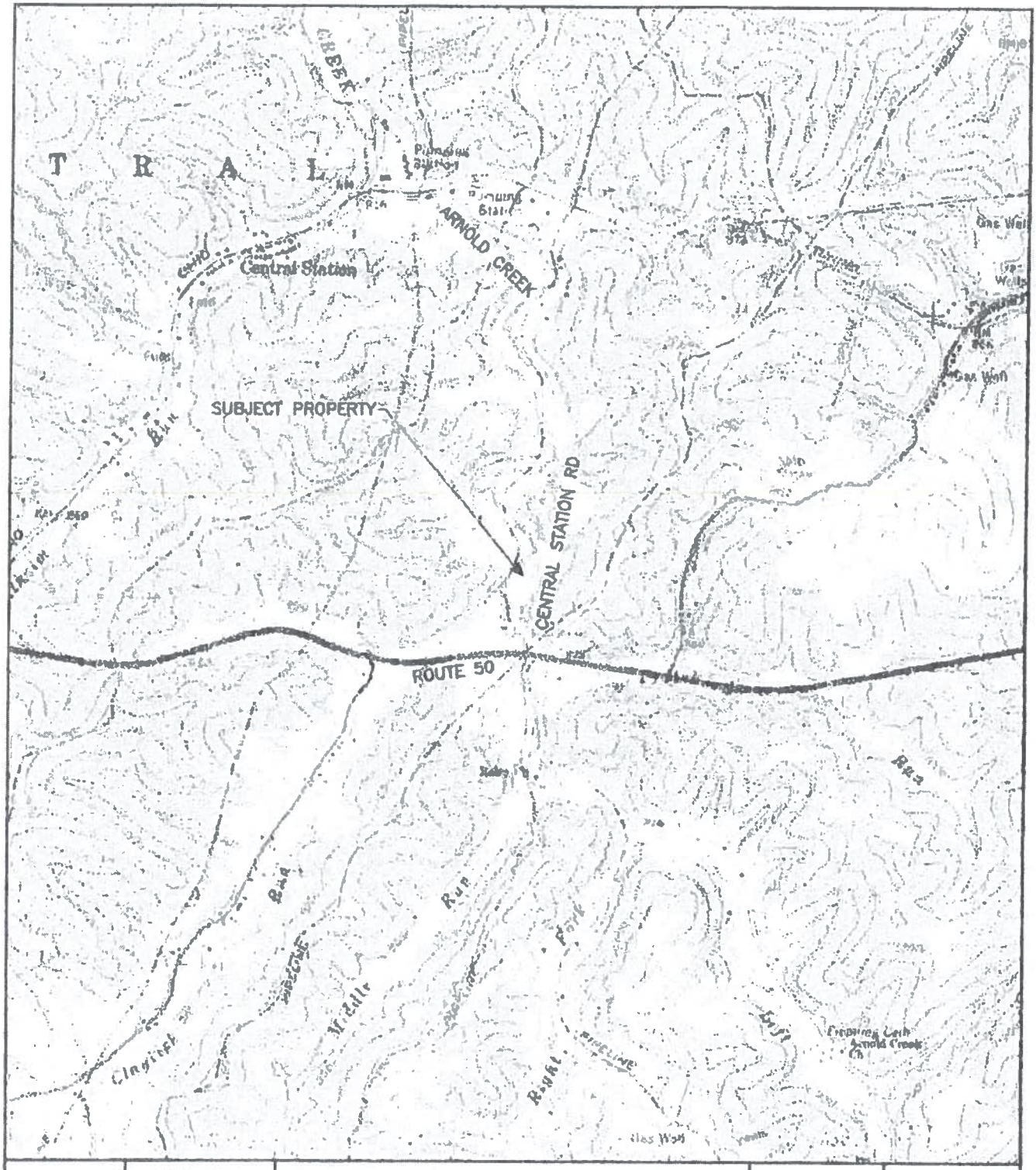


FIGURE 1
U.S.G.S. SITE LOCATION
CENTRAL STATION FACILITY

WEST UNION QUADRANGLE 1987, WEST VIRGINIA
DODDRIDGE COUNTY, WEST VIRGINIA

2000 1000 0 2000 FEET

DRAWN BY:	BP
APPROVED BY:	RAO
DATE:	11/13/2015
PAGE:	1 of 1

FILENAME: \\DAN-DATA\Projects\364111 - Shalewater Solutions - Central Station\DWG\CENTRAL STATION FACILITY.dwg PLOT DATE 11/13/2015 3:07 PM

ATTACHMENT C

Installation and Startup Schedule

Installation and Start-Up Schedule

Construction has already commenced; site is not operational. Operation will start upon authorization from West Virginia DEP.

ATTACHMENT D

Regulatory Discussion

REGULATORY DISCUSSION

There are no combustion sources such as flares, engines, boilers, or heaters at this location. Nor is this a refinery or crude oil and natural gas production, transmission, and distribution operation.

Federal Rules

40 CFR Part 60 – Standards of Performance for New Stationary Sources

A review of 40 CFR Part 60 concludes that only the following NSPS will have limited applicability to this operation.

Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

> Applicability: This location will have numerous tanks greater than 75 cubic meters, however, none of this tanks will store material with a Vapor Pressure greater than 2.18 psia at maximum storage temperature. Therefore these tanks would be exempt from this rule.
>
> The facility will review any changes in materials stored to determine if that change impacts the applicability of this rule.

40 CFR Part 61 – National Emission Standards for Hazardous Air Pollutants

A review of 40 CFR Part 61 concludes that none for the NESHAPs in section have applicability to this operation

40 CFR Part 63 – National Emission Standards for Hazardous Air Pollutants for Source Categories

A review of 40 CFR Part 63 concludes that none for the NESHAPs in section have applicability to this operation

West Virginia State Regulations

There are no combustion sources such as flares, engines, boilers, or heaters at this location. Nor is this a refinery or crude oil and natural gas production, transmission, and distribution operation.

Title 45 Legislative Rule – Division of Environmental Protection, Office of Air Quality

A review of 45CSR concludes the following rules may have applicability to this operation.

45CSR4 – To Prevent and Control the Discharge of Air Pollutants into the Open Air Which Causes or Contributes to an Objectionable Odor or Odors

45CSR8 – Ambient Air Quality Standards

45CSR11 – Prevention of Air Pollution Emergency Episodes

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

45CSR16 – Standards of Performance for New Stationary Sources Pursuant to 40 CFR, Part 60.

45CSR20 – Good Engineering Practice as Applicable to Stack Heights

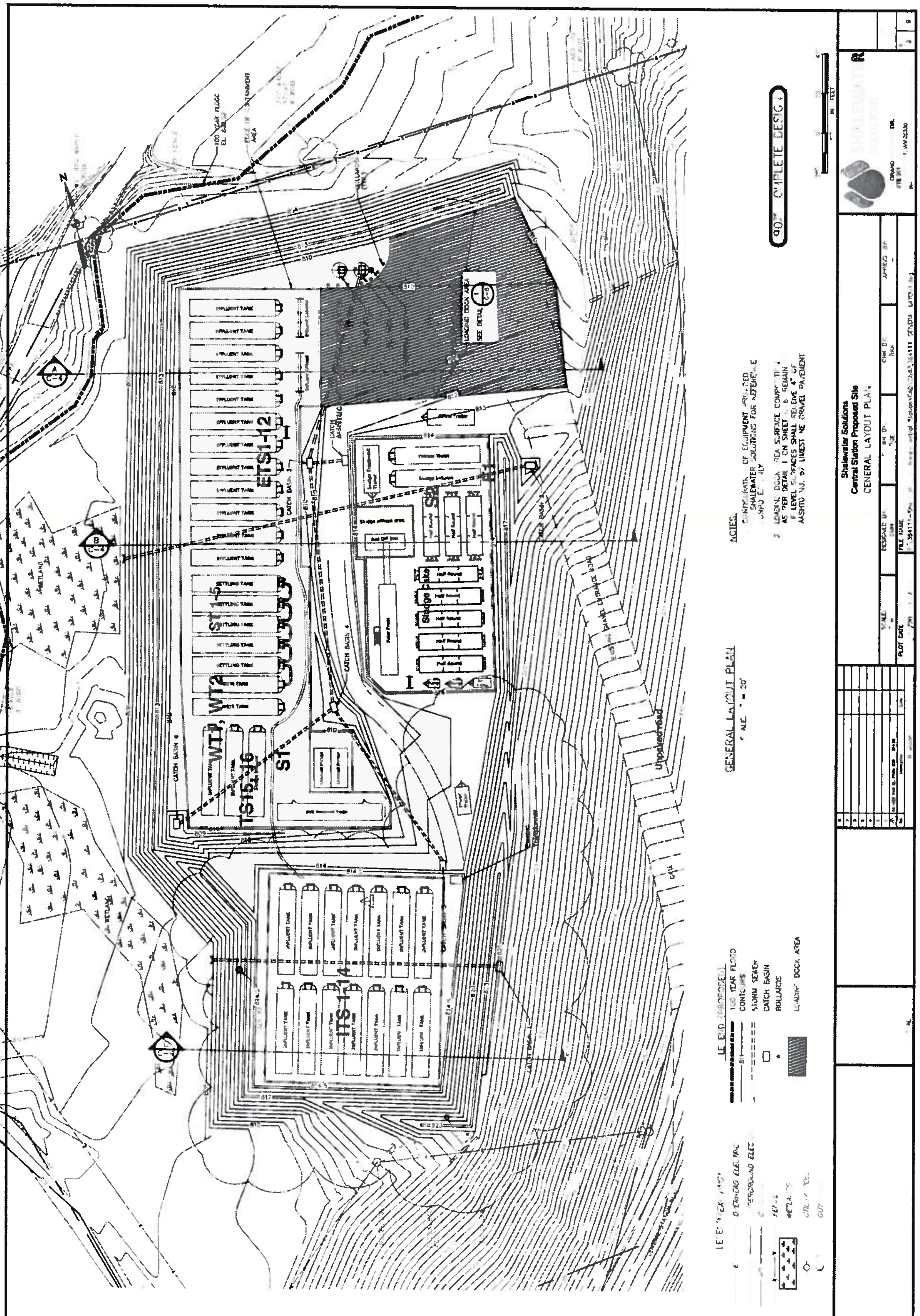
45CSR22 – Air Quality Management Fee Program

45CSR27 – To Prevent and Control the Emissions of Toxic Air Pollutants

45CSR38 - Provisions for Determination of Compliance with Air Quality Management Rules

ATTACHMENT E

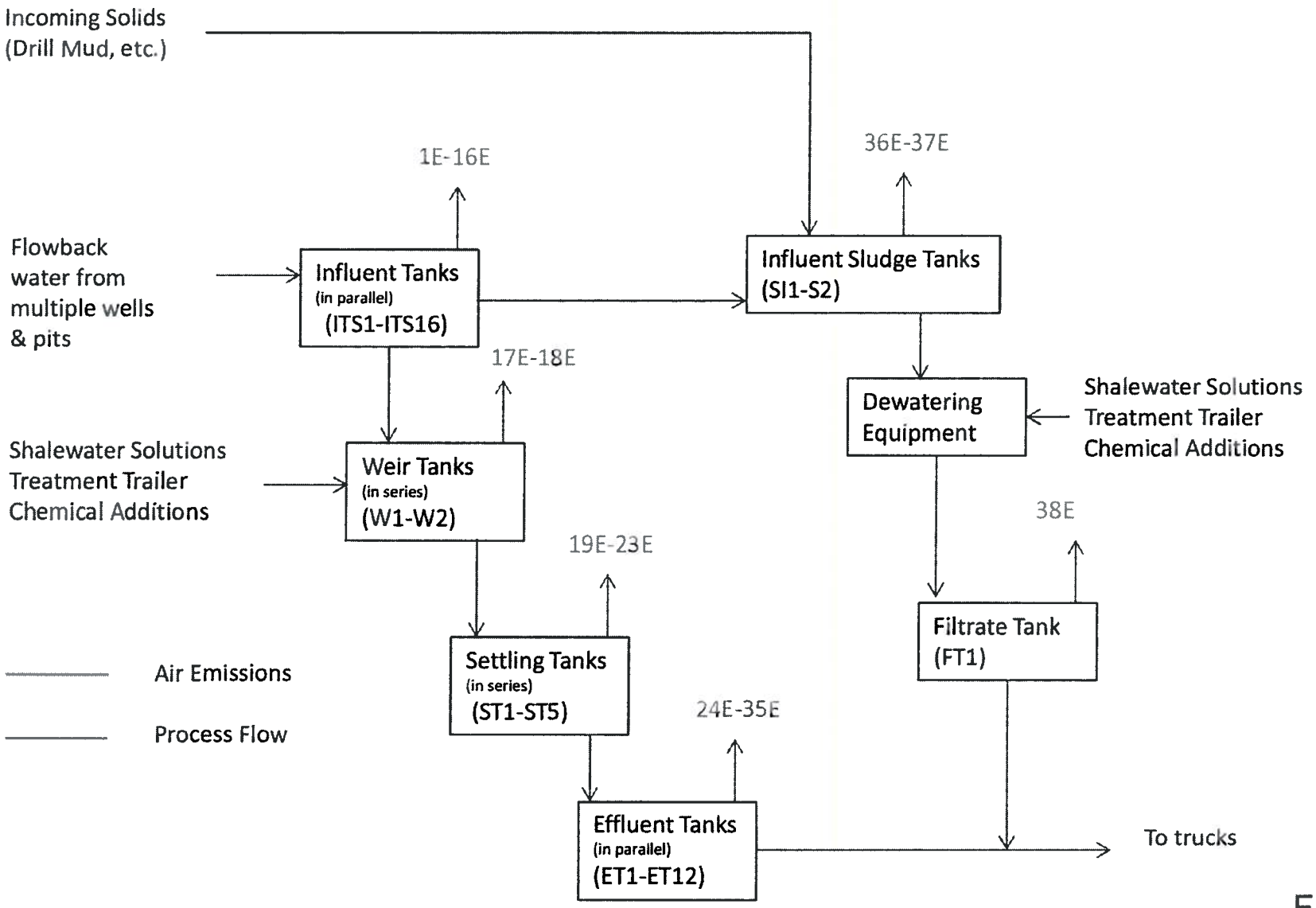
Site Plot Plan


Shalewater Solutions
Central Station Proposed Site
GENERAL LAYOUT PLAN
GENERAL LAYOUT PLAN
ETS1-12
ITS1-14
WT1, WT2
TS15-16
Sludge Cake
CATCH BASIN 3
CATCH BASIN 4
CATCH BASIN 6
WETLAND
LEGEND (PROPOSED)
100 YEAR FLOOD
CONTOURS
STORM SEWER
CATCH BASIN
BOLLARDS
LOADING DOCK AREA
NOTES:
Unpaved road

ATTACHMENT F

Process Flow Diagram

Process Flow Diagram



ATTACHMENT G

Process Description

Process Description

Waters, typically high in Total Suspended Solids (TSS), generated by Oil and Gas Exploration and Production activities will be collected in atmospheric tanker trucks at various client locations and sent to Central Station for recycle. Since all influent liquids have been subjected to significant weathering in an open atmosphere condition, flash emissions have occurred prior to shipping to Central Station.

When a truck enters the facility, a sample will be collected and reviewed to determine if the material is acceptable. Unacceptable materials will be immediately rejected. Acceptable material will be off-loaded via electrically operated pumps and sent to the influent storage tanks (ITS1-16; 1E-16E) via the influent header pipe system. If upon triage trucks are determined to have an influent with a TSS >50,000mg/L the client will have the option to bypass treatment and go directly to the filter press.

From the influent tanks the water will flow through a series of static mixers (WT1-2; 17E-18E) where treatment chemicals to adjust pH and flocculants to settle solids will be added. The water will then pass through a series of settling tanks (ST1-5; 19E-23E) allowing time for solids to settle. The post treatment water then flows to multiple effluent holding tanks (ET1-12; 24E-35E). From the holding tanks the water is pumped back into tanker trucks for reuse at oil and gas facilities. Additionally, a brine mixing tank may possibly be installed at the facility. A portion of effluent water would flow from the holding tanks to the 90 bbl open top brine mixing tank, which would employ two electrical pumps to mix salt and water up to a desired specific gravity. If installed, emissions from the brine mixing process would be de minimis.

Collected solids are pumped to several dewatering tanks where liquids are allowed settle (SI1-2; 36E-37E). The sludge is the processed through a filter press to render the material acceptable for landfilling (FT1; 38E). Any water decanted or pressed from the sludge is used for recycling purposes.

ATTACHMENT H

Material Safety Data Sheets

SAFETY DATA SHEET

1. Identification

Product identifier	**Sodium Hydroxide Solutions**
Other means of identification	Not available.
Synonyms	Caustic Soda, Caustic Alkali, Lye, Caustic Soda Liquid 50%, Soda Lye, Liquid Caustic, Sodium Hydrate
Recommended use	Pulping and bleaching, pH neutralizer, welding, detergent
Recommended restrictions	None known.

Distributed by:
SAL Chemical
3036 Birch Drive
Weirton, WV 26062
304-748-8200

Manufacturer / Importer / Supplier / Distributor information

Company name	KA Steel Chemicals, Inc	
Address	15185 Main Street Lemont, IL 60439	
Telephone	630-257-3900	
E-mail	http://www.kasteelchemicals.com/	
Contact person	SDS Review Group	
Emergency phone number	CHEMTREC	(US) 1-800-424-9300 (Canada) 1-800-567-7455

2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
OSHA defined hazards	Not classified.	

Label elements

Signal word	Danger
Hazard statement	May be corrosive to metals. Harmful if swallowed. Causes severe skin burns and eye damage.
Precautionary statement	
Prevention	Wear protective gloves/protective clothing/eye protection/face protection. Do not breathe mist or vapor. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Keep only in original container.
Response	If swallowed: Rinse mouth. Do NOT induce vomiting. If inhaled: Remove person to fresh air and keep comfortable for breathing. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.
Storage	Store in corrosive resistant container with a resistant inner liner. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	Not classified.
Environmental hazards	Hazardous to the aquatic environment, acute hazard Category 3

Supplemental information

Hazard statement	Harmful to aquatic life.
Precautionary statement	
Prevention	Avoid release to the environment.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Sodium hydroxide	1310-73-2	49 - 51
Sodium chloride	7647-14-5	< 1

4. First-aid measures

Inhalation

Move to fresh air. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately.

Skin contact

Take off immediately all contaminated clothing. Wash off IMMEDIATELY with plenty of water for at least 15-20 minutes. Get medical attention immediately! Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes.

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Ingestion

Call a physician or poison control center immediately. Do not induce vomiting. Immediately rinse mouth and drink plenty of water. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Never give anything by mouth to an unconscious person. Do not use mouth-to-mouth method if victim ingested the substance.

Most important symptoms/effects, acute and delayed

Burning pain and severe corrosive skin damage. Permanent eye damage including blindness could result. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Shortness of breath.

Indication of immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. Symptoms may be delayed. Keep victim under observation.

General information

In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media

Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2). Use extinguishing agent suitable for type of surrounding fire.

Unsuitable extinguishing media

Do not use a solid water stream as it may scatter and spread fire. Do not use halogenated extinguishing agents.

Specific hazards arising from the chemical

During fire, gases hazardous to health may be formed. The product itself does not burn. May decompose upon heating to produce corrosive and/or toxic fumes. Contact with metal may release flammable hydrogen gas.

Special protective equipment and precautions for firefighters

Fire fighters should enter the area only if they are protected from all contact with the material. Full protective clothing, including self-contained breathing apparatus, coat, pants, gloves, boots and bands around legs, arms, and waist, should be worn. No skin surface should be exposed. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire-fighting equipment/instructions

In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Ensure adequate ventilation. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container. Following product recovery, flush area with water.

Small Spills: Absorb spill with vermiculite or other inert material. Clean surface thoroughly to remove residual contamination.

Never return spills in original containers for re-use. For waste disposal, see Section 13 of the SDS.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Use caution when combining with water; DO NOT add water to caustic; ALWAYS add caustic to water while stirring to minimize heat generation. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Do not breathe mist or vapor. Use only with adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities	Keep container tightly closed. Store in a cool, dry, well-ventilated place. Store in corrosive resistant container with a resistant inner liner. Store away from incompatible materials (See Section 10). Do not allow material to freeze.

8. Exposure controls/personal protection

Occupational exposure limits

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

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	PEL	2 mg/m3

US. ACGIH Threshold Limit Values

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

US NIOSH Pocket Guide to Chemical Hazards: Ceiling Limit Value and Time Period (if specified)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear chemical goggles and face shield.
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves.
Other	Wear appropriate chemical resistant clothing.
Respiratory protection	If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: Chemical respirator with organic vapor cartridge and full facepiece.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state	Liquid.
Form	Viscous liquid.
Color	Clear to light grey.
Odor	Odorless.
Odor threshold	Not available.
pH	14
Melting point/freezing point	50 - 53 °F (10 - 11.67 °C) (50% solution)
Initial boiling point and boiling range	266 - 284 °F (130 - 140 °C) (50% solution)
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.

Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	23.76 mm Hg (25°C/77°F)
Vapor density	Not available.
Relative density	1.53
Relative density temperature	60 °F (15.56 °C)
Solubility(ies)	Completely miscible with water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	12.76 lb/gal (15.5°C / 60°F)
Molecular formula	NaOH
Molecular weight	40.1 g/mol

10. Stability and reactivity

Reactivity	Contact with metal may release flammable hydrogen gas.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Reacts violently with strong acids. This product may react with oxidizing agents. Do not mix with other chemicals. Corrosive to aluminum, tin, zinc, copper and most alloys in which they are present including brass and bronze. Corrosive to steels at elevated temperatures above 40°C (104°F).
Incompatible materials	Oxidizing agents. Acids. Phosphorus. Aluminum. Zinc. Tin. Initiates or catalyzes violent polymerization of acetaldehyde, acrolein or acrylonitrile.
Hazardous decomposition products	Contact with metals (aluminum, zinc, tin) and sodium tetrahydroborate liberates hydrogen gas.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Causes digestive tract burns. Harmful if swallowed.
Inhalation	May cause irritation to the respiratory system.
Skin contact	Causes severe skin burns.
Eye contact	Causes severe eye burns. Causes serious eye damage.
Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Permanent eye damage including blindness could result.

Information on toxicological effects

Acute toxicity Harmful if swallowed.

Product	Species	Test Results
Sodium Hydroxide Solutions (CAS Mixture)		
Acute		
Dermal		
LD50	Rabbit	1350 mg/kg, (Sodium hydroxide)
Oral		
LD50	Rat	140 - 340 mg/kg, (Sodium hydroxide)

Skin corrosion/irritation	Causes severe skin burns and eye damage.
Serious eye damage/eye irritation	Causes severe eye burns. Causes serious eye damage.
Respiratory sensitization	No data available.
Skin sensitization	No data available.

Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
Reproductive toxicity	No data available.
Specific target organ toxicity - single exposure	Not available.
Specific target organ toxicity - repeated exposure	Not available.
Aspiration hazard	Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.
Chronic effects	Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity Harmful to aquatic life.

Components		Species	Test Results
Sodium hydroxide (CAS 1310-73-2)			
Aquatic			
Crustacea	EC50	Water flea (Ceriodaphnia dubia)	34.59 - 47.13 mg/l, 48 hours
Fish	LC50	Bluegill (Lepomis macrochirus)	99 mg/l, 48 hours
		Western mosquitofish (Gambusia affinis)	125 mg/l, 96 hours

Persistence and degradability	Expected to degrade rapidly in air.
Bioaccumulative potential	The product is not expected to bioaccumulate.
Mobility in soil	Not available.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. This material and its container must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number	UN1824
UN proper shipping name	Sodium hydroxide solution
Transport hazard class(es)	8
Subsidiary class(es)	-
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	B2, IB2, N34, T7, TP2
Packaging exceptions	154
Packaging non bulk	202
Packaging bulk	242

IATA

UN number	UN1824
UN proper shipping name	Sodium hydroxide solution
Transport hazard class(es)	8
Subsidiary class(es)	-
Packaging group	II
Environmental hazards	No
Labels required	8
ERG Code	8L

Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1824
UN proper shipping name	SODIUM HYDROXIDE SOLUTION
Transport hazard class(es)	8
Subsidiary class(es)	-
Packaging group	II
Environmental hazards	
Marine pollutant	No
Labels required	8
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	This substance/mixture is not intended to be transported in bulk.

15. Regulatory information

US federal regulations

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

Not regulated.

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

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Sodium hydroxide (CAS 1310-73-2) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - Yes
SARA 302 Extremely hazardous substance	No
SARA 311/312 Hazardous chemical	Yes

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

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

Not regulated.

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

Not regulated.

Safe Drinking Water Act (SDWA)	Not regulated.
Food and Drug Administration (FDA)	Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Sodium hydroxide (CAS 1310-73-2)

US. New Jersey Worker and Community Right-to-Know Act

Not regulated.

US. Pennsylvania RTK - Hazardous Substances

Sodium hydroxide (CAS 1310-73-2)

US. Rhode Island RTK

Sodium hydroxide (CAS 1310-73-2)

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

International Inventories

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

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

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

Issue date 09-January-2014

Revision date -

Version # 01

NFPA Ratings

List of abbreviations

LD50: Lethal Dose, 50%.
LC50: Lethal Concentration, 50%.
EC50: Effective concentration, 50%.
TWA: Time weighted average.

References

EPA: AQUIRE database
HSDB® - Hazardous Substances Data Bank
US. IARC Monographs on Occupational Exposures to Chemical Agents
IARC Monographs. Overall Evaluation of Carcinogenicity
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer

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

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: ShaleBind

MANUFACTURER:
HEP Shalewater Solutions, LLC
37 Grande Meadows Drive
Suite 201
Bridgeport, WV 26330
Ph: (855) 463-7224
Website: www.hillstone-ep.com

24 HR. EMERGENCY TELEPHONE
Emergency Phone 800-535-5053

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

Classification according to paragraph (d) of Regulation 29 CFR 1910.1200:
Not classified.

Label elements
Labelling according to paragraph (f) of Regulation 29 CFR 1910.1200:
Hazard symbol(s): None.
Signal word: None.
Hazard statement(s): None.
Precautionary statement(s): None.

Other hazards
Spills produce extremely slippery surfaces.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances
Not applicable, this product is not a substance.

Mixtures
Hazardous components
Distillates (petroleum), hydrotreated light
Concentration/ gamme : 20- 30%
CAS Number: 64742-47-8
Classification according to paragraph (d) of Regulation 29 CFR 1910.1200:
Asp. Tox. 1;H304

Notes
Does not result in classification of the mixture if the kinematic viscosity is greater than 20.5 mm^2/s measured at 40°C.

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched
CAS Number: 69011-36-5
Classification according to paragraph (d) of Regulation 29 CFR 1910.1200:
Acute Tox. 4;H302, Eye Dam. 1;H318

Concentration/ gamme : < 3%
For explanation of abbreviations see section 16

4. FIRST AID MEASURES

Description of first aid measures
Inhalation:
Move to fresh air. No hazards which require special first aid measures.
Skin contact:
Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. In case of persistent skin irritation, consult a physician.
Eye contact:
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention immediately.
Ingestion:
Rinse mouth with water. Do NOT induce vomiting. Call a physician or poison control centre immediately.

Most important symptoms and effects, both acute and delayed
None under normal use.

Indication of any immediate medical attention and special treatment needed.
None reasonably foreseeable.

Other information:
None.

5. FIRE FIGHTING MEASURES

Extinguishing media
Suitable extinguishing media:
Water. Water spray. Foam. Carbon dioxide (CO2). Dry powder.
Unsuitable extinguishing media:
None.

Special hazards arising from the substance or mixture
Hazardous decomposition products:
Ammonia. Carbon oxides (COx). Nitrogen oxides (NOx). Hydrogen chloride. Hydrogen cyanide (hydrocyanic acid) may be produced in the event of combustion in an oxygen deficient atmosphere.

Advice for fire-fighters
Protective measures: Wear self-contained breathing apparatus and protective suit.
Other information: Spills produce extremely slippery surfaces.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Personal precautions: Do not touch or walk through spilled material. Spills produce extremely slippery surfaces.
Protective equipment: Wear adequate personal protective equipment (see Section 8 Exposure Controls/Personal Protection).
Emergency procedures: Keep people away from spill/leak.

Environmental precautions
Do not contaminate water.

Methods and material for containment and cleaning up
Small spills:
Do not flush with water. Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.
Large spills:
Do not flush with water. Dam up. Clean up promptly by scoop or vacuum.
Residues:
Soak up with inert absorbent material. After cleaning, flush away traces with water.

Reference to other sections
SECTION 7: Handling and storage; SECTION 8: Exposure controls/personal protection; SECTION 13: Disposal considerations;

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Renders surfaces extremely slippery when spilled. When using, do not eat, drink or smoke.

Conditions for safe storage, including any incompatibilities.
Keep away from heat and sources of ignition. Freezing will affect the physical condition and may damage the material.
Incompatible with oxidizing agents.

Specific end use(s)
None.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Occupational exposure limits:
Distillates (petroleum), hydrotreated light
ACGIH: 200 mg/m3 (8-hour)

Exposure controls
Appropriate engineering controls:
Ensure adequate ventilation, especially in confined areas. Use local exhaust if misting occurs. Natural ventilation is adequate in absence of mists.

Individual protection measures, such as personal protective equipment:
Eye/face protection:
Safety glasses with side-shields.
Skin protection:
Wear coveralls and/or chemical apron and rubber footwear where physical contact can occur.
Hand protection:
PVC or other plastic material gloves.
Respiratory protection:
No personal respiratory protective equipment normally required.
Additional advice:

Wash hands and face before breaks and immediately after handling the product. Wash hands before breaks and at the end of workday.

Environmental exposure controls:
Do not allow uncontrolled discharge of product into the environment.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties
Appearance: Viscous liquid, Milky.
Odor: Aliphatic.
Odor Threshold: No data available.
pH: 4 - 6 @ 5 g/L
Melting point/freezing point: < 5°C
Initial boiling point and boiling range: > 100°C
Flash point: Does not flash.
Evaporation rate: No data available.
Flammability (solid, gas): Not applicable.
Upper/lower flammability or explosive limits: Not expected to create explosive atmospheres.
Vapor pressure: 2.3 kPa @ 20°C
Relative density: 1.0 - 1.1
Solubility(ies): Completely miscible.
Partition coefficient: Not applicable.
Autoignition temperature: Not applicable.
Decomposition temperature: > 150°C
Viscosity: > 20.5 mm^2/s @ 40°C
Explosive properties: Not expected to be explosive based on the chemical structure.
Oxidizing properties: Not expected to be oxidizing based on the chemical structure.

Other information
None.

10. STABILITY AND REACTIVITY

Reactivity
Stable under recommended storage conditions.

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
Oxidizing agents may cause exothermic reactions.

Conditions to avoid
Protect from frost, heat and sunlight.

Incompatible materials
Oxidizing agents.

Hazardous decomposition products

Thermal decomposition may produce: hydrogen chloride gas, nitrogen oxides (NOx), carbon oxides (COx). Ammonia.
Hydrogen cyanide (hydrocyanic acid).

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects
Information on the product as supplied:
Acute oral toxicity: LD50/oral/rat > 5000 mg/kg
Acute dermal toxicity: LD50/dermal/rat > 5000 mg/kg
Acute inhalation toxicity: The product is not expected to be toxic by inhalation.
Skin corrosion/irritation: Non-irritating to skin.
Serious eye damage/eye irritation: May cause eye irritation with susceptible persons.
Respiratory/skin sensitization: Not sensitizing.
Mutagenicity: Not mutagenic.
Carcinogenicity: Not carcinogenic.
Reproductive toxicity: Not toxic for reproduction.
STOT - single exposure: No known effects.
STOT - repeated exposure: No known effects.
Aspiration hazard: Due to the viscosity, this product does not present an aspiration hazard.
Relevant information on the hazardous components:

Distillates (petroleum), hydrotreated light
Acute oral toxicity: LD50/oral/rat > 5000 mg/kg (OECD 401)
Acute dermal toxicity: LD50/dermal/rabbit > 5000 mg/kg (OECD 402)
Acute inhalation toxicity: LC50/inhalation/4 h/rat = 4951 mg/m3 (OECD 403)
Skin corrosion/irritation: Not irritating. (OECD 404) Repeated exposure may cause skin dryness or cracking.
Serious eye damage/eye irritation: Not irritating. (OECD 405)
Respiratory/skin sensitization: By analogy with similar products, this product is not expected to be sensitizing.
(OECD 406)

Mutagenicity: Not mutagenic. (OECD 471, 473, 474, 476, 478, 479)
Carcinogenicity: Carcinogenicity study in rats (OECD 451): Negative
Reproductive toxicity: By analogy with similar substances, this substance is not expected to be toxic for reproduction. NOAEL/rat = 300 ppm (OECD 421)

STOT - single exposure:No known effects.
STOT - repeated exposure: NOAEL/oral/rat/90 days >= 3000 mg/kg/day (OECD 408) (Based on results obtained from tests on analogous products.).
Aspiration hazard: May be fatal if swallowed and enters airways.

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched
Acute oral toxicity: LD50/oral/rat = 200 - 300 mg/kg
Acute dermal toxicity: LD50/dermal/rabbit > 2000 mg/kg
Acute inhalation toxicity: No data available.
Skin corrosion/irritation: Not irritating.
Serious eye damage/eye irritation: Causes serious eye irritation.
Respiratory/skin sensitization: The results of testing on guinea pigs showed this material to be non-sensitizing.

Mutagenicity: Not mutagenic.
Carcinogenicity: Not carcinogenic.
Reproductive toxicity: Two-Generation Reproduction Toxicity (OECD 416)
NOAEL/rat > 250 mg/kg/day
Prenatal Development Toxicity Study (OECD 414) NOAEL/Maternal toxicity/rat > 50 mg/kg/day
NOAEL/Developmental toxicity/rat > 50 mg/kg/day

STOT - single exposure: No known effects.
STOT - repeated exposure: NOAEL/oral/rat/600 days = 50 mg/kg/day
Aspiration hazard: No known effects.

12. ECOLOGICAL INFORMATION

Toxicity
Information on the product as supplied:
Acute toxicity to fish: LC50/Fish/96 hours = 10 - 100 mg/L (Estimated)
Acute toxicity to invertebrates: EC50/Daphnia/48 hours = 10 - 100 mg/L (Estimated)
Acute toxicity to algae: Algal inhibition tests are not appropriate. The flocculation characteristics of the product interfere directly in the test medium preventing homogenous distribution which invalidates the test.
Chronic toxicity to fish: No data available.
Chronic toxicity to invertebrates: No data available.
Toxicity to microorganisms: No data available.
Effects on terrestrial organisms: No data available. Readily biodegradable, exposure to soil is unlikely.
Sediment toxicity: No data available. Readily biodegradable, exposure to sediment is unlikely.
Relevant information on the hazardous components:
Distillates (petroleum), hydrotreated light

Acute toxicity to fish: LC0/Oncorhynchus mykiss/96 hours > 1000 mg/L (OECD 203)
Acute toxicity to invertebrates: EC0/Daphnia magna/48 hours > 1000 mg/L (OECD 202)
Acute toxicity to algae: IC0/Pseudokirchneriella subcapitata/72 hours > 1000 mg/L (OECD 201)

Chronic toxicity to fish: NOEC/Oncorhynchus mykiss/28 days > 1000 mg/L
Chronic toxicity to invertebrates: NOEC/Daphnia magna/21 days > 1000 mg/L
Toxicity to microorganisms: EC50/Tetrahymena pyriformis/ 48h > 1000 mg/L
Effects on terrestrial organisms: No data available.
Sediment toxicity: No data available. Readily biodegradable, exposure to sediment is unlikely.

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched

Acute toxicity to fish: LC50/Cyprinus carpio/96 hours = 1 - 10 mg/L (OECD 203)
Acute toxicity to invertebrates: EC50/Daphnia/48 hours = 1 - 10 mg/L (OECD 202)
Acute toxicity to algae: IC50/Desmodesmus subspicatus/72 hours = 1 - 10 mg/L (OECD 201)

Chronic toxicity to fish: No data available.
Chronic toxicity to invertebrates: No data available.
Toxicity to microorganisms: EC10/activated sludge/17 h > 10000 mg/L (DIN 38412-8)
Effects on terrestrial organisms: No data available.
Sediment toxicity: No data available.

Persistence and degradability
Information on the product as supplied:
Degradation: Readily biodegradable.
Hydrolysis: At natural pHs (>6) the polymer degrades due to hydrolysis to more than 70% in 28 days. The hydrolysis products are not harmful to aquatic organisms.
Photolysis: No data available.

Relevant information on the hazardous components:
Distillates (petroleum), hydrotreated light
Degradation: Readily biodegradable.
Hydrolysis: Does not hydrolyse.
Photolysis: No data available.

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched
Degradation: Readily biodegradable. > 60% / 28 days (OECD 301 B)
Hydrolysis: Does not hydrolyse.
Photolysis: No data available.

Bioaccumulative potential
Information on the product as supplied:
The product is not expected to bioaccumulate.

Partition co-efficient (Log Pow): Not applicable. Bioconcentration factor (BCF): No data available.
Relevant information on the hazardous components:

Distillates (petroleum), hydrotreated light
Partition co-efficient (Log Pow): 3 - 6
Bioconcentration factor (BCF): No data available. Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched Partition co-efficient (Log Pow):> 3
Bioconcentration factor (BCF): No data available.

Mobility in soil
Information on the product as supplied:
No data available.

Relevant information on the hazardous components:
Distillates (petroleum), hydrotreated light
Koc: No data available.
Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched
Koc: > 5000

Other adverse effects
None

13. DISPOSAL CONSIDERATIONS

Waste treatment methods
Waste from residues / unused products:
Dispose of in accordance with local regulations.

Contaminated packaging: If recycling is not practicable, dispose of in compliance with local regulations.

Recycling: Store containers and offer for recycling of material when in accordance with the local regulations.

14. TRANSPORT INFORMATION

Land transport (DOT)
Not classified.
Sea transport (IMDG)
Not classified.
Air transport (IATA)
Not classified.

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
Information on the product as supplied:
TSCA Chemical Substances Inventory:
All components of this product are either listed on the inventory or are exempt from listing.

US SARA Reporting Requirements:
SARA (Section 311/312) hazard class:
Not concerned.
RCRA status: Not RCRA hazardous.

California Proposition 65 Information:
WARNING! This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm, Acrylamide.

16. OTHER INFORMATION

NFPA:
Health: 0
Flammability: 1
Instability: 0

HMIS:
Health: 0
Flammability: 1
Physical Hazard: 0
PPE Code: B

REVISION SUMMARY
New SDS

Key or legend to abbreviations and acronyms used in the safety data sheet:
Abbreviations
Acute Tox. 4 = Acute toxicity Category Code 4
Asp. Tox. 1 = Aspiration hazard Category Code 1
Eye Dam 1 = Serious eye damage/eye irritation Category Code 1
H-Phrases
H302 - Harmful if swallowed
H304 - May be fatal if swallowed and enters airways

H318 - Causes serious eye damage

MANUFACTURER DISCLAIMER:
This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of manufacturer. The data on this sheet relates only to the specific material designated herein. Manufacturer assumes no legal responsibility for use or reliance upon this data.

HILLSTONE ENVIRONMENTAL

SAFETY DATA SHEET

DATE PREPARED: 04/05/16
SDS No: ShaleClear Marcellus

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: Shaleclear Marcellus

MANUFACTURER:
HEP Shalewater Solutions, LLC
37 Grande Meadows Drive
Suite 201
Bridgeport, WV 26330
Ph: (855) 463-7224
Website: www.hillstone-ep.com

24 HR. EMERGENCY TELEPHONE
Emergency Phone 800-535-5053

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1
Corrosive to metals	Category 1

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Physical state	liquid
Color	colorless to yellow
Appearance	clear to slightly hazy
Odor	slight amine

Hazard statements
Causes severe skin burns and eye damage
May be corrosive to metals

Precautionary Statements - Prevention
Do not breathe dusts or mists
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Keep only in original container

Precautionary Statements - Response
Immediately call a POISON CENTER or doctor
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower
Wash contaminated clothing before reuse
IF INHALED: Remove person to fresh air and keep comfortable for breathing
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
Absorb spillage to prevent material damage

Precautionary Statements - Storage
Store locked up
Store in corrosive resistant container with a resistant inner liner
Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Other information
May be harmful if swallowed
Unknown acute toxicity
5% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	weight-%	TRADE SECRET
Trade Secret Ingredient	PROPRIETARY	40 - 50%	*

If CAS number is "proprietary", the specific chemical identity and percentage of composition has been withheld as a trade secret

*The exact percentage (concentration) of composition has been withheld as a trade secret

4. FIRST AID MEASURES

Eye contact
Remove contact lenses, if worn. Immediately flush with plenty of water for at least 15 minutes, holding eyelids apart to ensure flushing of the entire surface. Washing within one minute is essential to achieve maximum effectiveness. Seek medical attention immediately

Skin contact
Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse. If skin irritation occurs: Get medical advice/attention.

Ingestion
Seek medical attention immediately. Give large amounts of water to drink. If vomiting should occur spontaneously, keep airway clear. Never give anything by mouth to an unconscious person.

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

Most important symptoms and effects, both acute and delayed

Acute effects
Possible eye, skin and respiratory tract irritation or burns

Chronic effects
May aggravate existing skin, eye, and lung conditions. Persons with kidney disorders have an increased risk from exposure based on general information found on aluminum salts.

Indication of any immediate medical attention and special treatment needed

Note to physicians

Treat symptomatically.

5. FIRE FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media
Water Spray, Carbon Dioxide, Foam, Dry Chemical.

Extinguishing media which must not be used for safety reasons
No information available

Special hazards arising from the substance or mixture

Special Hazard
Use water spray to cool fire exposed surfaces.

Firefighting measures
Product is a water solution and nonflammable. In a fire, this product may build up pressure and rupture a sealed container; cool exposed containers with water spray. Use self-contained breathing apparatus in confined areas; avoid breathing mist or spray.

Special protective equipment for firefighters
Full protective clothing and approved self-contained breathing apparatus required for firefighting personnel.

Sensitivity to Mechanical Impact
None.

Sensitivity to Static Discharge
None.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear adequate personal protective clothing and equipment. Approved breathing apparatus may be necessary.

Environmental precautions
Do not allow liquid to enter streams or waterways.

Methods and material for containment and cleaning up

Methods for containment
Prevent further leakage or spillage if safe to do so. Build dikes as necessary to contain flow of large spills.

Methods for cleaning up
Clear spills immediately. For small spills, use soda ash or lime to neutralize, an inert material to absorb, or wash product to a chemical sewer. Place contaminated materials into containers and store in a safe place to await proper disposal. Caution: Use of soda ash or lime may generate carbon dioxide gas. Provide adequate ventilation to spill area.

7. HANDLING AND STORAGE

Advice on safe handling
Keep away from heat and open flame.
Keep container closed when not in use
Avoid contact with eyes, skin and clothing
Wear chemical splash goggles, gloves, and protective clothing when handling.
Wash thoroughly after handling
Avoid breathing vapor or mist
Use with adequate ventilation and employ respiratory protection where mist or spray may be generated.
Do not take internally
FOR INDUSTRIAL USE ONLY.

Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions
Keep container tightly closed when not in use.
Product may slowly corrode iron, brass, copper, aluminum, mild steel, and stainless steel.
Do not store in unlined metal containers.
Store in a cool, dry place away from direct heat.

Incompatible products
Alkalis.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines
This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering controls
Local exhaust ventilation as necessary to maintain exposures to within applicable limits. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details. If there are no applicable or established exposure limit requirements or guidelines, general ventilation should be sufficient.

Individual protection measures, such as personal protective equipment

Eye/face Protection
Wear chemical splash goggles and face shield (when eye and face contact is possible due to splashing or spraying of material).

Hand Protection
Appropriate chemical resistant gloves should be worn.

Skin and body protection
Standard work clothing and work shoes.

Respiratory protection
If exposures exceed the PEL or TLV, use NIOSH/MSHA approved respirator in accordance with OSHA Respiratory Protection Requirements under 29 CFR 1910.134. If there are no applicable or established exposure limit requirements or guidelines, general ventilation should be sufficient.

Other personal protection data
Eyewash fountains and safety showers must be easily accessible.

Hygiene measures
Take off contaminated clothing and wash before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state liquid
Color colorless to yellow
Appearance clear to slightly hazy
Odor slight amine
Odor threshold No information available

Property	Values
pH	0.5 - 1.5
Melting / freezing point	No information available
Boiling point / boiling range	No information available
Flash point	Not applicable
Evaporation rate	No information available
Flammability (solid, gas)	Not applicable
Flammability Limit in Air	
Upper flammability limit	Not applicable
Lower flammability limit	Not applicable
Vapor pressure	No information available
Vapor density	No information available
Specific gravity	1.342 - 1.364
Solubility (water)	Soluble below pH 4
Solubility in other solvents	No information available
Partition coefficient: n-octanol/water	No information available
Autoignition temperature	Not applicable
Decomposition temperature	No information available
Kinematic viscosity	No information available
Dynamic viscosity	50 - 80 cps

Density	11.19 - 11.38 lb/gal
Bulk Density	No information available
Explosive properties	No information available.
Oxidizing properties	No information available
Softening point	No information available
Molecular weight	No information available
Volatile organic compounds (VOCs) content	No information available
Percent Volatile, wt.%	40 - 65 % (Water)

10. STABILITY AND REACTIVITY

Reactivity
No data available.

Chemical stability
Stable under normal conditions of handling, use and transportation.

Possibility of hazardous reactions
None under normal processing.

Hazardous polymerization
Not anticipated under normal or recommended handling and storage conditions.

Conditions to avoid
None known

Materials to avoid
Alkalis.

Hazardous decomposition products
Thermal decomposition may release toxic and/or hazardous gases such as Cl2 and HCl.

11. TOXICOLOGICAL INFORMATION

Eye contact
Based on pH, this product is expected to cause severe eye irritation, possibly resulting in burns and eye damage. Prolonged exposure to Aluminum salts may cause conjunctivitis

Skin contact
Prolonged and/or repeated contact will cause severe skin irritation and burns.

Ingestion
May be harmful if swallowed. May cause irritation of the mouth, throat and stomach. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Inhalation
Inhalation of mist or spray may irritate respiratory tract and may cause burns and difficulty breathing.

Acute toxicity - Product Information
Oral LD50 No information available
Dermal LD50 No information available
Inhalation LC50 No information available

Component	weight-%	Oral LD50	Dermal LD50	Inhalation LC50
Trade Secret Ingredient	40 - 50%	> 2000 mg/kg (Rat)	--	--

Delayed and immediate effects as well as chronic effects from short and long-term exposure
Skin corrosion/irritation
Causes severe burns

Serious eye damage/eye irritation
Risk of serious damage to eyes

Sensitization
No information available

Germ cell mutagenicity
No information available

Carcinogenicity
This product does not contain any components in concentrations greater than or equal to 0.1% that are listed as known or suspected carcinogens by NTP, IARC, ACGIH, or OSHA.

Reproductive toxicity
No information available

Specific target organ toxicity - Single exposure
No information available.

Specific target organ toxicity - Repeated exposure
No information available

Aspiration hazard
No information available.

Numerical measures of toxicity - Product Information
5% of the mixture consists of ingredient(s) of unknown toxicity
The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral) 4489 mg/kg

Other information
Data is based on a product of similar composition and conclusions are drawn from sources other than direct testing.

12. ECOLOGICAL INFORMATION

Acute aquatic toxicity - Product Information
Fish No information available
Crustacea No information available
Algae/aquatic plants No information available

Persistence and degradability
No information available

Bioaccumulative potential
No information available.

Mobility
No information available

PBT and vPvB assessment
No information available

Other information
No other ecological studies have been carried out on this product.

13. DISPOSAL CONSIDERATIONS

Disposal of wastes

Dispose of product in an approved chemical waste landfill or incinerate in accordance with applicable Federal, state and local regulations.

Contaminated packaging
Since empty containers retain product residue, follow label warnings even after container is emptied.

14. TRANSPORT INFORMATION

DOT Regulated

DOT UN/NA Number UN3264
Proper shipping name Corrosive Liquid, Acidic, Inorganic, N.O.S. (Polyaluminum Chloride Solution)
Hazard class 8
Packing group III
ERG Number 154

ICAO/IATA Regulated
UN number UN3264
Proper shipping name Corrosive Liquid, Acidic, Inorganic, N.O.S. (Polyaluminum Chloride Solution)
Hazard class 8
Packing group III
ERG Code 8L

IMDG Regulated

UN number UN3264
Proper shipping name Corrosive Liquid, Acidic, Inorganic, N.O.S. (Polyaluminum Chloride Solution)
Hazard class 8
Packing group III
EmS F-A; S-B

Harmonized Tariff Number 3824.90

15. REGULATORY INFORMATION

International Inventories

TSCA (United States)
All ingredients are on the inventory or exempt from listing
Australia (AICS)
All ingredients are on the inventory or exempt from listing
Canada (DSL)
All ingredients are on the inventory or exempt from listing
Canada (NDSL)
None of the ingredients are on the inventory.

China (IECSC)
All ingredients are on the inventory or exempt from listing
EINECS (European Inventory of Existing Chemical Substances)
All ingredients are on the inventory or exempt from listing
ELINCS (European List of Notified Chemical Substances)
None of the ingredients are on the inventory.

ENCS (Japan)
All ingredients are on the inventory or exempt from listing
South Korea (KECL)
All ingredients are on the inventory or exempt from listing
Philippines (PICCS)
All ingredients are on the inventory or exempt from listing

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
AICS - Australian Inventory of Chemical Substances
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
IECSC - China Inventory of Existing Chemical Substances
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances

U.S. Federal Regulations

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

SARA 311/312 Hazard Categories
Acute health hazard Yes
Chronic health hazard No
Fire hazard No
Sudden release of pressure hazard No
Reactive hazard No

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

U.S. State Regulations

California Proposition 65
This product may contain traces of a substance(s) known to the State of California to cause cancer and/or reproductive toxicity.

U.S. State Right-to-Know Regulations

Polyaluminum Chloride
1327-41-9

Minnesota Hazardous Substance List	Present
Pennsylvania Right to Know List	Present

16. OTHER INFORMATION

NFPA Rating
- Health - 2
- Flammability - 0
- Instability - 0
- Special Hazard -

HMIS Rating
- Health - 2
- Flammability - 0
- Physical hazard - 0
- Personal protection - B

REVISION SUMMARY

Revision date:4-5-16
Revisions number: 2

MANUFACTURER DISCLAIMER:
This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of manufacturer. The data on this sheet relates only to the specific material designated herein. Manufacturer assumes no legal responsibility for use or reliance upon this data.

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: ShaleFloc

MANUFACTURER:
HEP Shalewater Solutions, LLC
37 Grande Meadows Drive
Suite 201
Bridgeport, WV 26330
Ph: (855) 463-7224
Website: www.hillstone-ep.com

24 HR. EMERGENCY TELEPHONE
Emergency Phone 800-535-5053

2. HAZARDS IDENTIFICATION

Classification according to paragraph (d) of 29 CFR 1910.1200: Not classified.

Label Elements
Label hazard symbol(s): None.
Signal word: None
Hazard statement(s): Precautionary statement(s): None

Other Hazards: Spills produce extremely slippery surfaces.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances: not applicable, this product is not a substance.

Hazardous components:
Distillates (petroleum), hydrotreated light

Concentration	CAS#	Classification according to paragraph (d) of 29 CFR 1910.1200:
20-45%	64742-47-8	Asp.Tox. I ;H304

Notes
Does not result in classification of the mixture if the kinematic viscosity is greater than 20.5 mm^2/s measured at 40°C.

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched

Concentration	CAS#	Classification according to paragraph (d) of 29 CFR 1910.1200:
<3%	69011-36-5	Acute Tox. 4;H302, Eye Dam 1;H318

For explanation of abbreviations see section 16

4. FIRST AID MEASURES

Inhalation: Move to fresh air. No hazards which require special first aid measures.

Skin contact: Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. In case of Persistent skin irritation, consult a physician.

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Alternatively, rinse immediately with Diphoterine ®. Get prompt medical attention.

Ingestion: Rinse mouth with water. Do NOT induce vomiting. Call a physician or poison control center immediately.

Symptoms and effects, both acute and delayed: None under normal use.

Immediate medical attention and special treatment needed: None reasonably foreseeable

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:
Water. Water spray. Foam. Carbon dioxide (C02). Dry powder.

Unsuitable extinguishing media:
None.

Special hazards arising from the substance or mixture Hazardous decomposition products:
Carbon oxides (COx). Nitrogen oxides (NOx). Hydrogen cyanide (hydrocyanic acid) may be produced in the event of combustion in an oxygen deficient atmosphere.

Advice for fire-fighters Protective measures:
Wear self-contained breathing apparatus and protective suit.

Other information:
Spills produce extremely slippery surfaces.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Do not touch or walk through spilled material. Spills produce extremely slippery surfaces.

Protective equipment: Wear suitable protective clothing, gloves and eye/face protection.

Emergency procedures: Keep people away from spill/leak.

Environmental precautions: Do not contaminate water.

Methods and material for containment and cleaning up Small spills:
Do not flush with water. Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.

Large spills:
Do not flush with water. Dam up. Clean up promptly by scoop or vacuum.

Residues:
Soak up with inert absorbent material. After cleaning, flush away traces with water.

Reference to other sections
SECTION 8: Exposure controls/personal protection; SECTION 13: Disposal considerations; SECTION 7: Handling and storage;

7. HANDLING AND STORAGE

Precautions for safe handling: Avoid contact with skin and eyes. Renders surfaces extremely slippery when spilled. When using, do not eat, drink or smoke.
Conditions for safe storage, including any incompatibilities:
Keep away from heat and sources of ignition. Freezing will affect the physical condition and may damage the material. Incompatible with oxidizing agents.

Specific end use(s): None.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters Occupational exposure limits:

Distillates (petroleum). Hydrotreated light
ACG/H: 200 mg/ml (8-hour)

Appropriate engineering controls:
Use local exhaust if misting occurs. Natural ventilation is adequate in absence of mists.

Individual protection measures, such as personal protective equipment:

Eye/face protection: Safety glasses with side-shields.

Skin protection: Wear coveralls and/or chemical apron and rubber footwear where physical contact can occur.

Hand protection: PVC or other plastic material gloves.

Respiratory protection: No personal respiratory protective equipment normally required.

Additional advice: Wash hand s before breaks and at the end of workday. Handle in accordance with good industrial hygiene and safety practice. Wash hands and face before breaks and immediately after handling the product.

Environmental exposure controls: Do not allow uncontrolled discharge of product into the environment.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Viscous liquid. Milky
Odor: Aliphatic.
Odor Threshold: No data available.
pH: 5-8 @ 5g/L
Melting point/freezing point: <5 C
Initial boiling point and boiling range: >100 C
Flash point: Does not flash.
Evaporation rate: No data available.
Flammability (solid, gas): Not applicable.
Upper/Tower flammability or explosive limits: Not expected to create explosive atmospheres.
Vapor pressure: 2.3 kPa @ 20°C
Relative density: 1.0 - 1.1
Solubility(ies): Completely miscible.

Partition coefficient: Not applicable.
Autoignition temperature: No data available.
Decomposition temperature: >150 C
Viscosity: >20.5mm 2/s @ 40C
Explosive properties: Not expected to be explosive based on the chemical structure.
Oxidizing properties: Not expected to be oxidizing based on the chemical structure.

10. STABILITY AND REACTIVITY

Reactivity
Stable under recommended storage conditions.

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
None known.

Conditions to avoid
Protect from frost, heat and sunlight.

Incompatible materials
Incompatible with oxidizing agents.

Hazardous decomposition products
Thermal decomposition may produce: nitrogen oxides (NOx), carbon oxides (COx). Hydrogen cyanide (hydrocyanic acid) may be produced in the event of combustion in an oxygen deficient atmosphere.

11. TOXICOLOGICAL INFORMATION

Information on the product as supplied:

Acute oral toxicity: LD50/oral/rat > 5000 mg/kg

Acute dermal toxicity: LD50/dermal/rat > 5000 mg/kg

Acute inhalation toxicity: The product is not expected to be toxic by inhalation.
Skin corrosion/irritation: Non-irritating to skin.
Serious eye damage/eye irritation: Slightly irritating.
Respiratory/skin sensitization: Not sensitizing.
Mutagenicity: Not mutagenic.
Carcinogenicity: Not carcinogenic.
Reproductive toxicity: Not toxic for reproduction.
STOT- single exposure: No known effects.
STOT- repeated exposure: No known effects.
Aspiration hazard: Due to the viscosity, this product does not present an aspiration hazard.

Relevant information on the hazardous components:
Distillates (petroleum), hydrotreated light

Acute oral toxicity: LD50/oral/rat > 5000 mg/kg (OECD 401)

Acute dermal toxicity: LD50/derma/rabbit > 5000 mg/kg (OECD 402)
Acute inhalation toxicity: LC50/inhalation/4 h/rat 4951 mg/m3 (OECD 403)
Skin corrosion/irritation: Not irritating. (OECD 404) Repeated exposure may cause skin dryness or cracking.
Serious eye damage/eye irritation: Not irritating. (OECD 405)
Respiratory/skin sensitization: By analogy with similar products, this product is not expected to be sensitizing. (OECD406)

Mutagenicity: Not mutagenic. (OECD 471, 473, 474, 476, 478, 479)
Carcinogenicity: Carcinogenicity study in rats (OECD 451): Negative
Reproductive toxicity: By analogy with similar substances, this substance is not expected to be toxic for reproduction. NOAEL/rat=300 ppm (OECD 421)

STOT- single exposure: No known effects.
STOT- repeated exposure: NOAEL/oral/rat/90 days >= 3000 mg/kg/day (OECD 408) (Based on results obtained from tests on analogous products.).

Aspiration hazard: May be fatal if swallowed and enters airways.

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydraxy- , branched

Acute oral toxicity: LD50/oral/rat = 200 - 300 mg/kg
Acute dermal toxicity: LD50/dermal/rabbit > 2000 mg/kg
Acute inhalation toxicity: No data available.
Skin corrosion/irritation: Not irritating.
Serious eye damage/eye irritation: Causes serious eye irritation.

Respiratory/skin sensitization: The results of testing on guinea pigs showed this material to be non-sensitizing.

Mutagenicity: Not mutagenic.

Carcinogenicity: Not carcinogenic.

Reproductive toxicity: Two-Generation Reproduction Toxicity (OECD 416) NOAEL/rat > 250 mg/kg/day
Prenatal Development Toxicity Study (OECD 414) NOAEL/Maternal toxicity/rat > 50 mg/kg/day
NOAEL/Developmental toxicity/rat > 50 mg/kg/day

STOT- single exposure: No known effects.
STOT - repeated exposure: NOAEL/oral/rat/600 days - 50 mg/kg/day
Aspiration hazard: No known effects.

12. ECOLOGICAL INFORMATION

Toxicity
Acute toxicity to fish: LC50/Fish/96 hours > 100 mg/L
Acute toxicity to invertebrates: EC50/Daphnia/48 hours > 100 mg/L
Acute toxicity to algae: IC50/Algae/72 hours > 100 mg/L
Chronic toxicity to fish: No data available.

Chronic toxicity to invertebrates: No data available.
Toxicity to microorganisms: No data available.
Effects on terrestrial organisms: No data available.
Sediment toxicity: No data available.

Persistence and degradability
Information on the product as supplied:

Degradation: Not readily biodegradable.
Hydrolysis: Does not hydrolyse.
Photolysis: No data available.

Relevant information on the hazardous components:
Distillates (petroleum), hydrotreated light
Chronic toxicity to fish:
Acute toxicity to fish: LC50/Cyprinus carpio/96 hours = 1 - 10 mg/L (OECD 203)
NOEC/Oncorhynchus mykiss/28 days > 1000 mg/L

Degradation: Readily biodegradable.
Hydrolysis: Does not hydrolyse.
Acute toxicity to invertebrates: EC50/Daphnia/48 hours = 1 - 10 mg/L (OECD 202)
Photolysis: No data available.

Acute toxicity to fish: LC0/*Oncorhynchus mykiss*/96 hours> 1000 mg/L (OECD 203)

Acute toxicity to invertebrates: EC0/*Daphnia magna*/48 hours > 1000 mg/L (OECD 202)

Acute toxicity to algae: IC0/*Pseudokirchneriella subcapitata*/72 hours> 1000 mg/L (OECD 201)
Chronic toxicity to fish: NOEC/*Oncorhynchus mykiss*/28 days> 1000 mg/L

Chronic toxicity to invertebrates: NOEC/*Daphnia magna*/21 days > 1000 mg/L

Toxicity to microorganisms: EC50 *Tetrahymena pyriformis*/ 48h > 1000 mg/L

Effects on terrestrial organisms: No data available.

Sediment toxicity: No data available. Readily biodegradable, exposure to sediment is unlikely.

Bioaccumulative potential
Information on the product as supplied: The product is not expected to bioaccumulate.

Partition co-efficient (Log Pow): Not applicable.

Bioconcentration factor (BCF): No data available.

Relevant information on the hazardous components:
Distillates (petroleum), hydrotreated light
Partition co-efficient (Log Pow): 3-6

Bioconcentration factor (BCF): No data available

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched

Partition co-efficient (Log Pow): > 3
Bioconcentration factor (BCF): No data available.

Mobility in soil: no data available

Distillates (petroleum), hydrotreated light
Koc:No data available.

Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched
Koc:> 5000

Other adverse effects: None

13. DISPOSAL CONSIDERATIONS

Waste treatment methods: Waste from residues/unused products:
Dispose of in accordance with local regulations.

Contaminated packaging: If recycling is not practicable, dispose of in compliance with local regulations.

Recycling: The product and its packaging are not suitable for recycling.

14. TRANSPORT INFORMATION

Land transport (DOT)
Not classified.

Sea transport (IM>G)
Not classified.

Air transport (IATA)
Not classified.

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
Information on the product as supplied:

TSCA Chemical Substances Inventory:
All components of this product are either listed on the inventory or are exempt from listing.

US SARA Reporting Requirements: SARA (Section 311/312) hazard class:
Not concerned.

RCRA status:
Not RCRA hazardous.

California Proposition 651nformation:
WARNING! This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm, Acrylamide.

16. OTHER INFORMATION

NFPA and HMIS Ratings:

Health: 0
Flammability: 1
Instability: 0

Health: 0
Flammability: 1
Physical Hazard: 0
PPECode: B

This data sheet contains changes from the previous version in section(s):

SECTION 1. Identification of the substance/mixture and of the company/undertaking. SECTION 2. Hazards identification, SECTION 3. Composition of information on ingredients, SECTION 4. First aid measures, SECTION 5. Fir fighting measures, SECTION 6. Accidental release measures, SECTION 7. Handling and storage, SECTION 8. Exposure controls. Personal protection, SECTION 9. Physical and chemical properties, SECTION 10. Stability and reactivity, SECTION 11. Toxicological information, SECTION 12. Ecological information, SECTION 13. Disposal considerations, SECTION 14. Transport information, SECTION 15. Regulatory information, SECTION 16. Other Information.
Key or legend to abbreviations and acronyms used in the safety data sheet Abbreviations
Acute Tox. 4 "" Acute toxicity Category Code 4
Asp. Tox. 1 = Aspiration hazard Category Code 1
Eye Dam 1 = Serious eye damage/eye irritation Category Code 1

H-Phrases
H302 -Harmful if swallowed
H304 - May be fatal if swallowed and enters airways H318 - Causes serious eye damage

REVISION SUMMARY
New SDS

MANUFACTURER DISCLAIMER:
This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of manufacturer. The data on this sheet relates only to the specific material designated herein. Manufacturer assumes no legal responsibility for use or reliance upon this data.

ATTACHMENT I

Emission Unit Tables

Attachment I

Emission Units Table

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

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
ITS1	1E	Influent Storage Tank #1	2016	21,000 GAL	New	NA
ITS2	2E	Influent Storage Tank #2	2016	21,000 GAL	New	NA
ITS3	3E	Influent Storage Tank #3	2016	21,000 GAL	New	NA
ITS4	4E	Influent Storage Tank #4	2016	21,000 GAL	New	NA
ITS5	5E	Influent Storage Tank #5	2016	21,000 GAL	New	NA
ITS6	6E	Influent Storage Tank #6	2016	21,000 GAL	New	NA
ITS7	7E	Influent Storage Tank #7	2016	21,000 GAL	New	NA
ITS8	8E	Influent Storage Tank #8	2016	21,000 GAL	New	NA
ITS9	9E	Influent Storage Tank #9	2016	21,000 GAL	New	NA
ITS10	10E	Influent Storage Tank #10	2016	21,000 GAL	New	NA
ITS11	11E	Influent Storage Tank #11	2016	21,000 GAL	New	NA
ITS12	12E	Influent Storage Tank #12	2016	21,000 GAL	New	NA
ITS13	13E	Influent Storage Tank #13	2016	21,000 GAL	New	NA
ITS14	14E	Influent Storage Tank #14	2016	21,000 GAL	New	NA
ITS15	15E	Influent Storage Tank #15	2016	21,000 GAL	New	NA
ITS16	16E	Influent Storage Tank #16	2016	21,000 GAL	New	NA
W1	17E	Weir Tank #1	2016	21,000 GAL	New	NA
W2	18E	Weir Tank #2	2016	21,000 GAL	New	NA
ST1	19E	Settling Tank #1	2016	21,000 GAL	New	NA
ST2	20E	Settling Tank #2	2016	21,000 GAL	New	NA
ST3	21E	Settling Tank #3	2016	21,000 GAL	New	NA
ST4	22E	Settling Tank #4	2016	21,000 GAL	New	NA

ST5	23E	Settling Tank #5	2016	21,000 GAL	New	NA
ET1	24E	Effluent Tank #1	2016	21,000 GAL	New	NA
ET2	25E	Effluent Tank #2	2016	21,000 GAL	New	NA
ET3	26E	Effluent Tank #3	2016	21,000 GAL	New	NA
ET4	27E	Effluent Tank #4	2016	21,000 GAL	New	NA
ET5	28E	Effluent Tank #5	2016	21,000 GAL	New	NA
ET6	29E	Effluent Tank #6	2016	21,000 GAL	New	NA
ET7	30E	Effluent Tank #7	2016	21,000 GAL	New	NA
ET8	31E	Effluent Tank #8	2016	21,000 GAL	New	NA
ET9	32E	Effluent Tank #9	2016	21,000 GAL	New	NA
ET10	33E	Effluent Tank #10	2016	21,000 GAL	New	NA
ET11	34E	Effluent Tank #11	2016	21,000 GAL	New	NA
ET12	35E	Effluent Tank #12	2016	21,000 GAL	New	NA
SI1	36E	Sludge Influent Tank #1	2016	21,000 GAL	New	NA
SI2	37E	Sludge Influent Tank #2	2016	21,000 GAL	New	NA
FT1	38E	Filtrate Water #1	2016	21,000 GAL	New	NA
WL-1	39E	Water Loadout	2016	NA	New	NA
SL-1	40E	Sludge Loadout	2016	NA	New	NA
Unpaved Haul Road	41E	Unpaved Haul Road	2016	NA	New	NA

[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 Point Data Summary Sheets

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		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] (ppmv or mg/m^4)
		ID No.	Source			Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
1E	Pressurized Relief Vent	ITS1	Influent Storage Tank #1			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
2E	Pressurized Relief Vent	ITS2	Influent Storage Tank #2			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	

3E	Pressurized Relief Vent	ITS3	Influent Storage Tank #3			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
4E	Pressurized Relief Vent	ITS4	Influent Storage Tank #4			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
5E	Pressurized Relief Vent	ITS5	Influent Storage Tank #5			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
6E	Pressurized Relief Vent	ITS6	Influent Storage Tank #6			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	

7E	Pressurized Relief Vent	ITS7	Influent Storage Tank #7			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
8E	Pressurized Relief Vent	ITS8	Influent Storage Tank #8			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
9E	Pressurized Relief Vent	ITS9	Influent Storage Tank #9			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
10E	Pressurized Relief Vent	ITS10	Influent Storage Tank #10			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	

11E	Pressurized Relief Vent	ITS11	Influent Storage Tank #11			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
12E	Pressurized Relief Vent	ITS12	Influent Storage Tank #12			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
13E	Pressurized Relief Vent	ITS13	Influent Storage Tank #13			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
14E	Pressurized Relief Vent	ITS14	Influent Storage Tank #14			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	

15E	Pressurized Relief Vent	ITS15	Influent Storage Tank #15			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
16E	Pressurized Relief Vent	ITS16	Influent Storage Tank #16			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	0.027 <0.01 <0.01 <0.01 <0.01 <0.01	0.12 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
17E	Pressurized Relief Vent	W1	Weir Tank #1			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	Gas/Vapor	EE	
18E	Pressurized Relief Vent	W2	Weir Tank #2			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	Gas/Vapor	EE	

19E	Pressurized Relief Vent	ST1	Settling Tank #1			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	Gas/Vapor	EE	
20E	Pressurized Relief Vent	ST2	Settling Tank #2			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	Gas/Vapor	EE	
21E	Pressurized Relief Vent	ST3	Settling Tank #3			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	Gas/Vapor	EE	
22E	Pressurized Relief Vent	ST4	Settling Tank #4			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	Gas/Vapor	EE	

23E	Pressurized Relief Vent	ST5	Settling Tank #5			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	0.297 <0.01 <0.01 <0.01 <0.01 <0.01	1.303 0.019 <0.01 <0.01 <0.01 0.028	Gas/Vapor	EE	
24E	Pressurized Relief Vent	ET1	Effluent Tank #1			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
25E	Pressurized Relief Vent	ET2	Effluent Tank #2			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
26E	Pressurized Relief Vent	ET3	Effluent Tank #3			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	

27E	Pressurized Relief Vent	ET4	Effluent Tank #4			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
28E	Pressurized Relief Vent	ET5	Effluent Tank #5			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
29E	Pressurized Relief Vent	ET6	Effluent Tank #6			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
30E	Pressurized Relief Vent	ET7	Effluent Tank #7			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	

31E	Pressurized Relief Vent	ET8	Effluent Tank #8			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
32E	Pressurized Relief Vent	ET9	Effluent Tank #9			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
33E	Pressurized Relief Vent	ET10	Effluent Tank #10			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
34E	Pressurized Relief Vent	ET11	Effluent Tank #11			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	

35E	Pressurized Relief Vent	ET12	Effluent Tank #12			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	0.033 <0.01 <0.01 <0.01 <0.01 <0.01	0.146 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
36E	Pressurized Relief Vent	SI1	Sludge Influent Tank #1			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.038 <0.01 <0.01 <0.01 <0.01 <0.01	0.165 <0.01 <0.01 <0.01 <0.01 <0.01	0.038 <0.01 <0.01 <0.01 <0.01 <0.01	0.165 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
37E	Pressurized Relief Vent	SI2	Sludge Influent Tank #2			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.038 <0.01 <0.01 <0.01 <0.01 <0.01	0.165 <0.01 <0.01 <0.01 <0.01 <0.01	0.038 <0.01 <0.01 <0.01 <0.01 <0.01	0.165 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	
38E	Pressurized Relief Vent	F1	Filtrate Water #1			C	8760	VOC Benzene Toluene Ethylbenzene Xylene Total HAPS	0.026 <0.01 <0.01 <0.01 <0.01 <0.01	0.116 <0.01 <0.01 <0.01 <0.01 <0.01	0.026 <0.01 <0.01 <0.01 <0.01 <0.01	0.116 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	EE	

39E	Loading Loss	WL-1	Water Loadout			NA	8760	VOC Total HAPS	0.711 0.015	3.113 0.065	0.711 0.015	3.113 0.065	Gas/Vapor	EE	
40E	Loading Loss	SL-1	Sludge Loadout			NA	8760	VOC Total HAPS	0.050 0.001	0.220 0.006	0.050 0.001	0.220 0.006	Gas/Vapor	EE	
41E	Fugitive	Unpaved Haul Road	Unpaved Haul Road			NA	8760	VOC Total HAPS	0.761 0.016	3.333 0.072	0.761 0.016	3.333 0.072	Gas/Vapor	EE	

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/20 minute batch).

[6] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

[4] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[5] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[6] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Attachment J

EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No.	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
1E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
2E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
3E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
4E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
5E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
6E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
7E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
8E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
9E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
10E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
11E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
12E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
13E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169

14E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
15E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
16E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
17E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
18E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
19E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
20E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
21E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
22E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
23E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
24E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
25E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
26E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
27E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
28E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
29E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
30E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
31E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
32E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
33E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
34E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
35E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169

36E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
37E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
38E	0.34	Atmospheric	Unknown	Unknown	810	9	4347954	516169
39E	NA	Atmospheric	Unknown	Unknown	NA	NA	4347954	516169
40E	NA	Atmospheric	Unknown	Unknown	NA	NA	4347954	516169
41E	NA	Atmospheric	Unknown	Unknown	NA	NA	4347954	516169

[1] Give at operating conditions. Include inerts.

[2] Release height of emissions above ground level.

ATTACHMENT K

Fugitive Emission Data Summary Sheets

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."

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	N/A					
Unpaved Haul Roads	PM10	6.9	30.216	6.9	30.216	EE
Storage Pile Emissions	N/A					
Loading/Unloading Operations (Combined Water and Sludge)	VOC HAP	0.761 0.016	3.333 0.072	0.761 0.016	3.333 0.072	EE
Wastewater Treatment Evaporation & Operations	N/A					
Equipment Leaks	N/A	Does not apply		Does not apply		
General Clean-up VOC Emissions	N/A					
Other	N/A					

[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

Emission Unit Data Sheets

ATTACHMENT L -1

Storage Tanks

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.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/tnn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name N/A	2. Tank Name Influent Storage Tanks #1-#16
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) IST1 - IST16	4. Emission Point Identification No. (as assigned on *Equipment List Form*) 1E - 16E
5. Date of Commencement of Construction (for existing tanks) N/A	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable) N/A	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 21,000 gallons each	
9A. Tank Internal Diameter (ft) 8.5 (Height) x 8 (Width) - Rectangular Tank	9B. Tank Internal Height (or Length) (ft) Length: 45
10A. Maximum Liquid Height (ft) ~8	10B. Average Liquid Height (ft) ~6.5
11A. Maximum Vapor Space Height (ft) ~0.5	11B. Average Vapor Space Height (ft) ~2
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. ~17,000 gallons each	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
9581250 each	26250 each

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
564 each

15. Maximum tank fill rate (gal/min) 18.2 each

16. Tank fill method ☒ Submerged ☐ Splash ☒ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
☒ Fixed Roof ___ vertical X horizontal X 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 & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): atmospheric to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one)
☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal
☐ Vapor Mounted Resilient Seal ☐ Other (describe):

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; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply			
26A. Deck Type: ☐ Bolted ☐ Welded			
26B. For Bolted decks, provide deck construction:			
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)			
26D. Deck seam length (ft)		26E. Area of deck (ft^2)	
For column supported tanks: 26F. Number of columns:		26G. Diameter of each column:	

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:			
34A. Minimum (°F)		34B. Maximum (°F)	
35. Average operating pressure range of tank:			
35A. Minimum (psig)		35B. Maximum (psig)	
36A. Minimum Liquid Surface Temperature (°F)		36B. Corresponding Vapor Pressure (psia)	
37A. Average Liquid Surface Temperature (°F)		37B. Corresponding Vapor Pressure (psia)	
38A. Maximum Liquid Surface Temperature (°F)		38B. Corresponding Vapor Pressure (psia)	
39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☒ Conservation Vent (psig)
  - Vacuum Setting 0.03 Pressure Setting 0.03
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
VOCs as RVP				3760	O, TANKS (combined total for IST1-16)
Benzene				56.8	O, TANKS (combined total for IST1-16)
Toluene				16.2	O, TANKS (combined total for IST1-16)
Ethylbenzene				5.4	O, TANKS (combined total for IST1-16)
Xylene				4.5	O, TANKS (combined total for IST1-16)

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

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.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/tnn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name N/A	2. Tank Name Weir Tanks #1 & #2
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) WT 1 & WT2	4. Emission Point Identification No. (as assigned on *Equipment List Form*) 17E & 18E
5. Date of Commencement of Construction (for existing tanks) N/A	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable) N/A	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 21,000 gallons each	
9A. Tank Internal Diameter (ft) 8.5 (Height) x 8 (Width) - Rectangular Tank	9B. Tank Internal Height (or Length) (ft) Length: 45
10A. Maximum Liquid Height (ft) ~8	10B. Average Liquid Height (ft) ~6.5
11A. Maximum Vapor Space Height (ft) ~0.5	11B. Average Vapor Space Height (ft) ~2
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. ~17,000 gallons each	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
153300000 each	420000 each

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 9018 each

15. Maximum tank fill rate (gal/min): 292 each

16. Tank fill method: ☐ Submerged ☐ Splash ☒ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☒ Fixed Roof ___ vertical X horizontal X 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 & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction:

☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):

☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): atmospheric to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type (check one): ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):

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; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

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

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☒ Conservation Vent (psig)
  - Vacuum Setting 0.03 Pressure Setting 0.03
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
VOCs as RVP				5099	O, TANKS (combined total for WT1 & WT2)
Benzene				76.7	O, TANKS (combined total for WT1 & WT2)
Toluene				21.9	O, TANKS (combined total for WT1 & WT2)
Ethylbenzene				7.3	O, TANKS (combined total for WT1 & WT2)
Xylene				6.1	O, TANKS (combined total for WT1 & WT2)

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

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.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/tnn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name N/A	2. Tank Name Settling Tanks #1 - #5
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) ST1 - ST5	4. Emission Point Identification No. (as assigned on *Equipment List Form*) 19E - 23E
5. Date of Commencement of Construction (for existing tanks) N/A	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable) N/A	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 21,000 gallons each	
9A. Tank Internal Diameter (ft) 8.5 (Height) x 8 (Width) - Rectangular Tank	9B. Tank Internal Height (or Length) (ft) Length: 45
10A. Maximum Liquid Height (ft) ~8	10B. Average Liquid Height (ft) ~6.5
11A. Maximum Vapor Space Height (ft) ~0.5	11B. Average Vapor Space Height (ft) ~2
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. ~17,000 gallons each	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
153300000 each	420000 each

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 9018 each

15. Maximum tank fill rate (gal/min): 292 each

16. Tank fill method: ☐ Submerged ☐ Splash ☒ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☒ Fixed Roof ___ vertical X horizontal X 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 & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction:

☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):

☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): atmospheric to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):

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; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

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

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☒ Conservation Vent (psig)
  - Vacuum Setting 0.03 Pressure Setting 0.03
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
VOCs as RVP				12748	O, TANKS (combined total for ST1-ST5)
Benzene				191.9	O, TANKS (combined total for ST1-ST5)
Toluene				54.9	O, TANKS (combined total for ST1-ST5)
Ethylbenzene				18.3	O, TANKS (combined total for ST1-ST5)
Xylene				15.3	O, TANKS (combined total for ST1-ST5)

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

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.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/tnn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name N/A	2. Tank Name Effluent Tanks #1 - #12
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) ET1 - ET12	4. Emission Point Identification No. (as assigned on *Equipment List Form*) 24E - 35E
5. Date of Commencement of Construction (for existing tanks) N/A	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable) N/A	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 21,000 gallons each	
9A. Tank Internal Diameter (ft) 8.5 (Height) x 8 (Width) - Rectangular Tank	9B. Tank Internal Height (or Length) (ft) Length: 45
10A. Maximum Liquid Height (ft) ~8	10B. Average Liquid Height (ft) ~6.5
11A. Maximum Vapor Space Height (ft) ~0.5	11B. Average Vapor Space Height (ft) ~2
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. ~17,000 gallons each	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
12775000 each	35000 each

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
752 each

15. Maximum tank fill rate (gal/min) 24.3 each

16. Tank fill method ☒ Submerged ☐ Splash ☒ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
☒ Fixed Roof ___ vertical X horizontal X 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 & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): atmospheric to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one)
☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal
☐ Vapor Mounted Resilient Seal ☐ Other (describe):

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; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply			
26A. Deck Type: ☐ Bolted ☐ Welded			
26B. For Bolted decks, provide deck construction:			
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)			
26D. Deck seam length (ft)		26E. Area of deck (ft^2)	
For column supported tanks: 26F. Number of columns:		26G. Diameter of each column:	

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:			
34A. Minimum (°F)		34B. Maximum (°F)	
35. Average operating pressure range of tank:			
35A. Minimum (psig)		35B. Maximum (psig)	
36A. Minimum Liquid Surface Temperature (°F)		36B. Corresponding Vapor Pressure (psia)	
37A. Average Liquid Surface Temperature (°F)		37B. Corresponding Vapor Pressure (psia)	
38A. Maximum Liquid Surface Temperature (°F)		38B. Corresponding Vapor Pressure (psia)	
39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☒ Conservation Vent (psig)
  - Vacuum Setting 0.03 Pressure Setting 0.03
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
VOCs as RVP6				3437	O, TANKS (combined total for ET1-ET12)
Benzene				51.8	O, TANKS (combined total for ET1-ET12)
Toluene				14.8	O, TANKS (combined total for ET1-ET12)
Ethylbenzene				4.9	O, TANKS (combined total for ET1-ET12)
Xylene				4.1	O, TANKS (combined total for ET1-ET12)

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

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.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/tnn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name N/A	2. Tank Name Sludge Influent Tanks #1 & #2
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) SI1 & SI2	4. Emission Point Identification No. (as assigned on *Equipment List Form*) 36E & 37E
5. Date of Commencement of Construction (for existing tanks) N/A	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable) N/A	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 21,000 gallons each	
9A. Tank Internal Diameter (ft) 8.5 (Height) x 8 (Width) - Rectangular Tank	9B. Tank Internal Height (or Length) (ft) Length: 45
10A. Maximum Liquid Height (ft) ~8	10B. Average Liquid Height (ft) ~6.5
11A. Maximum Vapor Space Height (ft) ~0.5	11B. Average Vapor Space Height (ft) ~2
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. ~17,000 gallons each	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
15069390 each	41286 each

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 886 each

15. Maximum tank fill rate (gal/min): 28.7 each

16. Tank fill method: ☐ Submerged ☐ Splash ☒ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☒ Fixed Roof ___ vertical X horizontal X 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 & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction:

☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):

☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): atmospheric to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):

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; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply			
26A. Deck Type: ☐ Bolted ☐ Welded			
26B. For Bolted decks, provide deck construction.			
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)			
26D. Deck seam length (ft)		26E. Area of deck (ft^2)	
For column supported tanks: 26F. Number of columns:		26G. Diameter of each column:	

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:			
34A. Minimum (°F)		34B. Maximum (°F)	
35. Average operating pressure range of tank:			
35A. Minimum (psig)		35B. Maximum (psig)	
36A. Minimum Liquid Surface Temperature (°F)		36B. Corresponding Vapor Pressure (psia)	
37A. Average Liquid Surface Temperature (°F)		37B. Corresponding Vapor Pressure (psia)	
38A. Maximum Liquid Surface Temperature (°F)		38B. Corresponding Vapor Pressure (psia)	

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☒ Conservation Vent (psig)
  - Vacuum Setting 0.03 Pressure Setting 0.03
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
VOCs as RVP				646.8	O, TANKS (combined total for SI1 & SI2)
Benzene				9.8	O, TANKS (combined total for SI1 & SI2)
Toluene				2.8	O, TANKS (combined total for SI1 & SI2)
Ethylbenzene				0.92	O, TANKS (combined total for SI1 & SI2)
Xylene				0.78	O, TANKS (combined total for SI1 & SI2)

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

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.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/tnn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name N/A	2. Tank Name Filtrate Water #1
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) FT1	4. Emission Point Identification No. (as assigned on *Equipment List Form*) 38E
5. Date of Commencement of Construction (for existing tanks) N/A	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable) N/A	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 21,000 gallons	
9A. Tank Internal Diameter (ft) 8.5 (Height) x 8 (Width) - Rectangular Tank	9B. Tank Internal Height (or Length) (ft) Length: 45
10A. Maximum Liquid Height (ft) ~8	10B. Average Liquid Height (ft) ~6.5
11A. Maximum Vapor Space Height (ft) ~0.5	11B. Average Vapor Space Height (ft) ~2
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. ~17,000 gallons	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
9041634	24772

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
532

15. Maximum tank fill rate (gal/min) 17.2

16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
☒ Fixed Roof ___ vertical X horizontal X 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 & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): atmospheric to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one)
☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal
☐ Vapor Mounted Resilient Seal ☐ Other (describe):

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; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply		
26A. Deck Type: ☐ Bolted ☐ Welded		
26B. For Bolted decks, provide deck construction:		
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)		
26D. Deck seam length (ft)	26E. Area of deck (ft^2)	
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:	

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:			
34A. Minimum (°F)		34B. Maximum (°F)	
35. Average operating pressure range of tank:			
35A. Minimum (psig)		35B. Maximum (psig)	
36A. Minimum Liquid Surface Temperature (°F)		36B. Corresponding Vapor Pressure (psia)	
37A. Average Liquid Surface Temperature (°F)		37B. Corresponding Vapor Pressure (psia)	
38A. Maximum Liquid Surface Temperature (°F)		38B. Corresponding Vapor Pressure (psia)	
39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☒ Conservation Vent (psig)
  - Vacuum Setting 0.03 Pressure Setting 0.03
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
VOCs as RVP				226.3	O, TANKS
Benzene				3.4	O, TANKS
Toluene				0.98	O, TANKS
Ethylbenzene				0.33	O, TANKS
Xylene				0.27	O, TANKS

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification		
User Identification:	ITS 1-16	
City:		
State:	West Virginia	
Company:	Shalewater Solutions LLC.	
Type of Tank:	Horizontal Tank	
Description:	16 - 21,000gal Influent Storage Tanks (closed-roof frac tanks)	
Tank Dimensions		
Shell Length (ft):		45.00
Diameter (ft):		8.50
Volume (gallons):		17,000.00
Turnovers:		563.60
Net Throughput(gal/yr):		9,581,250.00
Is Tank Heated (y/n):	N	
Is Tank Underground (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Light	
Shell Condition	Good	
Breather Vent Settings		
Vacuum Settings (psig):		-0.03
Pressure Settings (psig)		0.03

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

ITS 1-16 - Horizontal Tank
, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol Weight	Basis for Vapor Pressure Calculations
100,000ppm (10%) VOC HEP Shalewater	Jan	48.84	43.20	54.48	57.22	0.2111	0.1737	0.2555	28.9541			19.59	
Benzene						0.8499	0.7189	1.0001	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0728	0.0590	0.0893	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.3151	2.0453	2.6133	69.0000	0.0900	0.5010	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2310	0.1914	0.2774	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1696	0.1368	0.2090	18.0150	0.9000	0.4893	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0604	0.0488	0.0742	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm (10%) VOC HEP Shalewater	Feb	51.29	44.55	58.03	57.22	0.2294	0.1821	0.2877	28.6297			19.59	
Benzene						0.9127	0.7487	1.1056	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0796	0.0621	0.1013	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.4411	2.1076	2.8166	69.0000	0.0900	0.4914	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2503	0.2004	0.3104	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1858	0.1441	0.2378	18.0150	0.9000	0.4988	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0661	0.0514	0.0843	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm (10%) VOC HEP Shalewater	Mar	57.27	48.89	65.66	57.22	0.2805	0.2114	0.3693	27.8856			19.59	
Benzene						1.0823	0.8511	1.3634	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0986	0.0729	0.1318	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.7720	2.3176	3.2966	69.0000	0.0900	0.4686	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3031	0.2314	0.3928	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2314	0.1699	0.3115	18.0150	0.9000	0.5215	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0821	0.0605	0.1100	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm (10%) VOC HEP Shalewater	Apr	62.62	52.57	72.66	57.22	0.3348	0.2398	0.4619	27.2734			19.59	
Benzene						1.2553	0.9470	1.6425	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1188	0.0834	0.1665	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.0979	2.5091	3.7946	69.0000	0.0900	0.4490	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3580	0.2609	0.4842	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2801	0.1949	0.3962	18.0150	0.9000	0.5412	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0990	0.0693	0.1392	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm (10%) VOC HEP Shalewater	May	67.58	56.53	78.63	57.22	0.3929	0.2737	0.5565	26.7465			19.59	
Benzene						1.4358	1.0599	1.9158	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1406	0.0961	0.2018	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.4276	2.7290	4.2650	69.0000	0.0900	0.4314	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4163	0.2961	0.5755	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3330	0.2252	0.4833	18.0150	0.9000	0.5588	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1174	0.0799	0.1691	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm (10%) VOC HEP Shalewater	Jun	71.63	60.22	83.05	57.22	0.4471	0.3092	0.6373	26.3434			19.59	
Benzene						1.5988	1.1749	2.1416	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1609	0.1094	0.2321	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.7178	2.9479	4.6432	69.0000	0.0900	0.4174	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4697	0.3324	0.6521	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3826	0.2572	0.5583	18.0150	0.9000	0.5727	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1345	0.0911	0.1947	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm (10%) VOC HEP Shalewater	Jul	72.90	62.13	83.68	57.22	0.4654	0.3292	0.6497	26.2220			19.59	
Benzene						1.6529	1.2384	2.1756	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79

Ethylbenzene					0.1678	0.1168	0.2367	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)					3.8127	3.0666	4.6994	69.0000	0.0900	0.4131	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene					0.4876	0.3526	0.6637	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water					0.3994	0.2752	0.5698	18.0150	0.9000	0.5770	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)					0.1403	0.0974	0.1987	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm (10%) VOC HEP Shalewater	Aug	71.71	61.60	81.82	57.22	0.4482	0.3235	0.6139	26.3362			19.59	
Benzene						1.6019	1.2205	2.0768	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1613	0.1147	0.2233	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.7233	3.0332	4.5356	69.0000	0.0900	0.4172	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4707	0.3469	0.6300	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3836	0.2701	0.5385	18.0150	0.9000	0.5730	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1349	0.0956	0.1873	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm (10%) VOC HEP Shalewater	Sep	67.66	58.48	76.85	57.22	0.3938	0.2818	0.5268	26.7387			19.59	
Benzene						1.4387	1.1190	1.8306	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1410	0.1029	0.1907	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.4329	2.8420	4.1199	69.0000	0.0900	0.4311	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4172	0.3147	0.5468	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3339	0.2415	0.4557	18.0150	0.9000	0.5591	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1177	0.0856	0.1597	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm (10%) VOC HEP Shalewater	Oct	61.24	52.96	69.51	57.22	0.3197	0.2428	0.4179	27.4272			19.59	
Benzene						1.2085	0.9576	1.5116	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1133	0.0846	0.1500	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.0107	2.5300	3.5634	69.0000	0.0900	0.4540	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3431	0.2642	0.4410	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2667	0.1977	0.3559	18.0150	0.9000	0.5362	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0844	0.0703	0.1253	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm (10%) VOC HEP Shalewater	Nov	55.53	49.19	61.88	57.22	0.2647	0.2136	0.3266	28.0954			19.59	
Benzene						1.0304	0.8585	1.2301	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0927	0.0737	0.1158	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.6722	2.3328	3.0511	69.0000	0.0900	0.4752	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2868	0.2337	0.3500	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2172	0.1718	0.2728	18.0150	0.9000	0.5150	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0771	0.0612	0.0965	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm (10%) VOC HEP Shalewater	Dec	50.60	45.34	55.85	57.22	0.2241	0.1871	0.2675	28.7203			19.59	
Benzene						0.8945	0.7666	1.0398	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0776	0.0639	0.0938	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.4049	2.1448	2.6903	69.0000	0.0900	0.4941	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2447	0.2058	0.2898	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1811	0.1485	0.2198	18.0150	0.9000	0.4961	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0644	0.0530	0.0780	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

ITS 1-16 - Horizontal Tank
, West Virginia

Month	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb)	2.4760	2.9069	4.8065	6.5442	8.5942	9.6489	9.7294	8.7982	6.8674	5.2977	3.2866	2.4060
Vapor Space Volume (cu ft)	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495
Vapor Density (lb/cu ft)	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Space Expansion Factor	0.0459	0.0560	0.0719	0.0886	0.0999	0.1054	0.0998	0.0928	0.0823	0.0718	0.0531	0.0426
Vented Vapor Saturation Factor	0.9546	0.9509	0.9406	0.9299	0.9187	0.9085	0.9051	0.9083	0.9185	0.9328	0.9437	0.9519
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft)	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495
Tank Diameter (ft)	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Effective Diameter (ft)	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740
Vapor Space Outage (ft)	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Tank Shell Length (ft)	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000
Vapor Density												
Vapor Density (lb/cu ft)	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Molecular Weight (lb/lb-mole)	28.9541	28.6297	27.8856	27.2734	26.7465	26.3434	26.2220	26.3362	26.7387	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Daily Avg. Liquid Surface Temp. (deg. R)	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2689
Daily Average Ambient Temp. (deg. F)	32.1000	35.5000	45.8500	54.8000	63.5000	71.4500	75.0500	73.9000	67.6500	56.2000	46.8000	37.0000
Ideal Gas Constant R (psia cuft / (lb-mol-deg R))	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R)	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933
Tank Paint Solar Absorptance (Shell)	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day)	625.9737	850.2836	1,184.6862	1,514.6470	1,780.2020	1,910.5999	1,836.9933	1,675.5029	1,369.9719	1,046.0392	678.9578	533.0136
Vapor Space Expansion Factor												
Vapor Space Expansion Factor	0.0459	0.0560	0.0719	0.0886	0.0999	0.1054	0.0998	0.0928	0.0823	0.0718	0.0531	0.0426
Daily Vapor Temperature Range (deg. R)	22.5687	26.9683	33.5365	40.1815	44.1967	45.6643	43.1113	40.4536	36.7700	33.0961	25.3858	21.0192
Daily Vapor Pressure Range (psia)	0.0818	0.1056	0.1579	0.2223	0.2828	0.3281	0.3205	0.2903	0.2348	0.1751	0.1130	0.0804
Breather Vent Press. Setting Range(psia)	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia)	0.1737	0.1821	0.2114	0.2398	0.2737	0.3092	0.3292	0.3235	0.2918	0.2428	0.2136	0.1871
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia)	0.2555	0.2877	0.3693	0.4619	0.5565	0.6373	0.6497	0.6139	0.5266	0.4179	0.3266	0.2675
Daily Avg. Liquid Surface Temp. (deg R)	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2689
Daily Min. Liquid Surface Temp. (deg R)	502.8673	504.2203	508.5588	512.2432	516.2002	519.6876	521.7958	521.2654	518.1329	512.6314	508.8570	505.0141
Daily Max. Liquid Surface Temp. (deg R)	514.1517	517.7044	525.3271	532.3339	538.2986	542.7198	543.3515	541.4922	536.5179	529.1795	521.5500	515.5237
Daily Ambient Temp. Range (deg. R)	18.2000	19.6000	21.7000	24.0000	24.0000	23.3000	21.3000	21.0000	22.3000	24.0000	21.0000	18.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor	0.9548	0.9509	0.9406	0.9299	0.9187	0.9085	0.9051	0.9083	0.9185	0.9328	0.9437	0.9519
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Space Outage (ft)	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Working Losses (lb)	25.5452	27.4604	32.6984	38.1425	43.9259	49.2359	51.0158	49.3395	44.0204	36.6594	31.0872	26.9059
Vapor Molecular Weight (lb/lb-mole)	28.9541	28.6297	27.8856	27.2734	26.7465	26.3434	26.2220	26.3362	26.7387	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Net Throughput (gal/mo.)	798,437.5000	798,437.5000	798,437.5000	798,437.5000	798,437.5000	798,437.5000	798,437.5000	798,437.5000	798,437.5000	798,437.5000	798,437.5000	798,437.5000
Annual Turnovers	563.6029	563.6029	563.6029	563.6029	563.6029	563.6029	563.6029	563.6029	563.6029	563.6029	563.6029	563.6029
Turnover Factor	0.2199	0.2199	0.2199	0.2199	0.2199	0.2199	0.2199	0.2199	0.2199	0.2199	0.2199	0.2199

Tank Diameter (ft)	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Working Loss Product Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb)	28.0212	30.3672	37.5048	44.6867	52.5202	58.8848	60.7452	56.1378	50.8878	41.9571	34.3738	29.3119

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

ITS 1-16 - Horizontal Tank
, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
100,000ppm (10%) VOC HEP Shalewater	456.04	71.36	527.40
Benzene	3.06	0.48	3.54
Ethylbenzene	0.29	0.05	0.34
Gasoline (RVP 6)	203.59	31.40	234.99
Toluene	0.88	0.14	1.01
Water	247.97	39.26	287.23
Xylenes (mixed isomers)	0.24	0.04	0.28

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification		
User Identification:	WT 1-2	
City:		
State:	West Virginia	
Company:	HEP Shalewater Solutions LLC	
Type of Tank:	Horizontal Tank	
Description:	2 - 21,000gal Weir Tanks (closed-roof frac tanks)	
Tank Dimensions		
Shell Length (ft):		45.00
Diameter (ft):		8.50
Volume (gallons):		17,000.00
Turnovers:		9,017.65
Net Throughput(gal/yr):		153,300,000.00
Is Tank Heated (y/n):	N	
Is Tank Underground (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Light	
Shell Condition	Good	
Breather Vent Settings		
Vacuum Settings (psig):		-0.03
Pressure Settings (psig)		0.03

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

WT 1-2 - Horizontal Tank
, West Virginia

Mixture/Component	Month	Daily Liquid Surf Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol Weight	Basis for Vapor Pressure Calculations
100,000ppm VOC (10%) HEP Shalewater	Jan	48.84	43.20	54.48	57.22	0.2111	0.1737	0.2555	28.9541			19.59	
Benzene						0.8499	0.7189	1.0001	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0728	0.0590	0.0893	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.3151	2.0453	2.6133	69.0000	0.0900	0.5010	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2310	0.1914	0.2774	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1696	0.1368	0.2090	18.0150	0.9000	0.4893	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0804	0.0488	0.0742	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Feb	51.29	44.56	58.03	57.22	0.2294	0.1821	0.2877	28.6297			19.59	
Benzene						0.9127	0.7487	1.1056	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0796	0.0621	0.1013	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.4411	2.1076	2.8166	69.0000	0.0900	0.4914	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2503	0.2004	0.3104	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1858	0.1441	0.2378	18.0150	0.9000	0.4988	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0661	0.0514	0.0843	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Mar	57.27	48.89	65.66	57.22	0.2805	0.2114	0.3693	27.8856			19.59	
Benzene						1.0823	0.8511	1.3634	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0986	0.0729	0.1318	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.7720	2.3176	3.2966	69.0000	0.0900	0.4686	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3031	0.2314	0.3928	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2314	0.1699	0.3115	18.0150	0.9000	0.5215	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0821	0.0605	0.1100	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Apr	62.62	52.57	72.66	57.22	0.3346	0.2396	0.4619	27.2734			19.59	
Benzene						1.2553	0.9470	1.6425	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1188	0.0834	0.1665	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.0979	2.5091	3.7946	69.0000	0.0900	0.4490	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3580	0.2609	0.4842	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2801	0.1949	0.3962	18.0150	0.9000	0.5412	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0990	0.0693	0.1392	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	May	67.58	56.53	78.63	57.22	0.3929	0.2737	0.5565	26.7465			19.59	
Benzene						1.4358	1.0599	1.9158	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1408	0.0981	0.2018	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.4276	2.7290	4.2650	69.0000	0.0900	0.4314	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4163	0.2961	0.5755	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3330	0.2252	0.4833	18.0150	0.9000	0.5588	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1174	0.0799	0.1691	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Jun	71.63	60.22	83.05	57.22	0.4471	0.3092	0.6373	26.3434			19.59	
Benzene						1.5988	1.1749	2.1416	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1609	0.1094	0.2321	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.7178	2.9479	4.6432	69.0000	0.0900	0.4174	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4697	0.3324	0.6521	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3826	0.2572	0.5583	18.0150	0.9000	0.5727	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1345	0.0911	0.1947	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Jul	72.90	62.13	83.68	57.22	0.4654	0.3292	0.6497	26.2220			19.59	
Benzene						1.6529	1.2384	2.1758	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79

Ethylbenzene					0.1678	0.1168	0.2367	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)					3.8127	3.0666	4.6994	69.0000	0.0900	0.4131	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene					0.4876	0.3526	0.6637	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water					0.3994	0.2752	0.5698	18.0150	0.9000	0.5770	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)					0.1403	0.0974	0.1987	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Aug	71.71	61.60	81.82	57.22	0.4482	0.3235	0.6139	26.3362			19.59	
Benzene						1.6019	1.2205	2.0768	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1613	0.1147	0.2233	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.7233	3.0332	4.5356	69.0000	0.0900	0.4172	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4707	0.3469	0.6300	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3836	0.2701	0.5365	18.0150	0.9000	0.5730	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1349	0.0956	0.1873	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Sep	67.86	58.46	76.85	57.22	0.3938	0.2818	0.5266	26.7387			19.59	
Benzene						1.4387	1.1190	1.8306	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1410	0.1029	0.1907	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.4329	2.8420	4.1199	69.0000	0.0900	0.4311	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4172	0.3147	0.5468	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3339	0.2415	0.4557	18.0150	0.9000	0.5591	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1177	0.0856	0.1597	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Oct	61.24	52.96	69.51	57.22	0.3197	0.2428	0.4179	27.4272			19.59	
Benzene						1.2085	0.9576	1.5116	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1133	0.0846	0.1500	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.0107	2.5300	3.5634	69.0000	0.0900	0.4540	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3431	0.2642	0.4410	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2687	0.1977	0.3559	18.0150	0.9000	0.5362	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0944	0.0703	0.1253	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Nov	55.53	49.19	61.88	57.22	0.2647	0.2136	0.3266	28.0954			19.59	
Benzene						1.0304	0.8585	1.2301	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0927	0.0737	0.1158	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.6722	2.3326	3.0511	69.0000	0.0900	0.4752	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2868	0.2337	0.3500	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2172	0.1718	0.2728	18.0150	0.9000	0.5150	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0771	0.0612	0.0965	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Dec	50.80	45.34	55.85	57.22	0.2241	0.1871	0.2675	28.7203			19.59	
Benzene						0.8945	0.7666	1.0398	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0776	0.0639	0.0938	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.4049	2.1448	2.6903	69.0000	0.0900	0.4941	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2447	0.2058	0.2898	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1811	0.1485	0.2198	18.0150	0.9000	0.4961	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0644	0.0530	0.0780	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

WT 1-2 - Horizontal Tank
, West Virginia

Month	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb)	2.4760	2.9069	4.8065	6.5442	8.5942	9.6489	9.7294	8.7982	6.8674	5.2977	3.2866	2.4060
Vapor Space Volume (cu ft)	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495
Vapor Density (lb/cu ft)	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Space Expansion Factor	0.0459	0.0560	0.0719	0.0886	0.0999	0.1054	0.0998	0.0928	0.0823	0.0718	0.0531	0.0426
Vented Vapor Saturation Factor	0.9546	0.9509	0.9406	0.9299	0.9187	0.9085	0.9051	0.9083	0.9185	0.9328	0.9437	0.9519
Tank Vapor Space Volume												
Vapor Space Volume (cu ft)	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495
Tank Diameter (ft)	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Effective Diameter (ft)	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740
Vapor Space Outage (ft)	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Tank Shell Length (ft)	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000
Vapor Density												
Vapor Density (lb/cu ft)	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Molecular Weight (lb/lb-mole)	28.9541	28.6297	27.8856	27.2734	26.7465	26.3434	26.2220	26.3362	26.7387	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Daily Avg. Liquid Surface Temp. (deg. R)	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2689
Daily Average Ambient Temp. (deg. F)	32.1000	35.5000	45.8500	54.8000	63.5000	71.4500	75.0500	73.9000	67.6500	56.2000	46.8000	37.0000
Ideal Gas Constant R (psia cuft / (lb-mol-deg R))	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R)	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933
Tank Paint Solar Absorptance (Shell)	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day)	625.9737	850.2836	1,184.6862	1,514.6470	1,780.2020	1,910.5999	1,836.9933	1,675.5029	1,369.9719	1,046.0392	678.9578	533.0136
Vapor Space Expansion Factor												
Vapor Space Expansion Factor	0.0459	0.0560	0.0719	0.0886	0.0999	0.1054	0.0998	0.0928	0.0823	0.0718	0.0531	0.0426
Daily Vapor Temperature Range (deg. R)	22.5687	26.9683	33.5365	40.1815	44.1967	45.6643	43.1113	40.4536	36.7700	33.0961	25.3858	21.0192
Daily Vapor Pressure Range (psia)	0.0818	0.1056	0.1579	0.2223	0.2828	0.3281	0.3205	0.2903	0.2348	0.1751	0.1130	0.0804
Breather Vent Press. Setting Range(psia)	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia)	0.1737	0.1821	0.2114	0.2396	0.2737	0.3092	0.3292	0.3235	0.2918	0.2428	0.2136	0.1871
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia)	0.2555	0.2877	0.3693	0.4619	0.5565	0.6373	0.6497	0.6139	0.5266	0.4179	0.3266	0.2675
Daily Avg. Liquid Surface Temp. (deg R)	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2689
Daily Min. Liquid Surface Temp. (deg R)	502.8673	504.2203	508.5588	512.2432	516.2002	519.8876	521.7958	521.2654	518.1329	512.6314	508.8570	505.0141
Daily Max. Liquid Surface Temp. (deg R)	514.1517	517.7044	525.3271	532.3339	538.2986	542.7198	543.3515	541.4922	536.5179	529.1795	521.5500	515.5237
Daily Ambient Temp. Range (deg. R)	18.2000	19.6000	21.7000	24.0000	24.0000	23.3000	21.3000	21.0000	22.3000	24.0000	21.0000	18.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor	0.9546	0.9509	0.9406	0.9299	0.9187	0.9085	0.9051	0.9083	0.9185	0.9328	0.9437	0.9519
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Space Outage (ft)	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Working Losses (lb)	315.9693	339.6579	404.4469	471.7859	543.3213	609.0001	631.0160	610.2819	544.4899	453.4412	384.5182	332.7997
Vapor Molecular Weight (lb/lb-mole)	28.9541	28.6297	27.8856	27.2734	26.7465	26.3434	26.2220	26.3362	26.7387	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Net Throughput (gal/mo.)	12,775,000.000	12,775,000.000	12,775,000.000	12,775,000.000	12,775,000.000	12,775,000.000	12,775,000.000	12,775,000.000	12,775,000.000	12,775,000.000	12,775,000.000	12,775,000.0000
Annual Turnovers	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471
Turnover Factor	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700

Tank Diameter (ft)	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Working Loss Product Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb)	318.4453	342.5648	409.2534	478.3301	551.9156	618.6490	640.7454	619.0801	551.3573	458.7389	387.8048	335.2057

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

WT 1-2 - Horizontal Tank
, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
100,000ppm VOC (10%) HEP Shalewater	5,640.73	71.36	5,712.09
Benzene	37.89	0.48	38.37
Ethylbenzene	3.61	0.05	3.66
Gasoline (RVP 6)	2,518.22	31.40	2,549.62
Toluene	10.84	0.14	10.97
Water	3,067.16	39.26	3,106.42
Xylenes (mixed isomers)	3.01	0.04	3.05

TANKS 4.0.9d

Emissions Report - Detail Format

Tank Indentification and Physical Characteristics

Identification		
User Identification:	ST 1-5	
City:		
State:	West Virginia	
Company:	HEP Shalewater Solutions LLC	
Type of Tank:	Horizontal Tank	
Description:	5 - 21,000gal Settling Tanks (closed-roof frac tanks)	
Tank Dimensions		
Shell Length (ft):		45.00
Diameter (ft):		8.50
Volume (gallons):		17,000.00
Turnovers:		9,017.65
Net Throughput(gal/yr):		153,300,000.00
Is Tank Heated (y/n):	N	
Is Tank Underground (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Light	
Shell Condition	Good	
Breather Vent Settings		
Vacuum Settings (psig):		-0.03
Pressure Settings (psig)		0.03

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

ST 1-5 - Horizontal Tank
, West Virginia

Mixture/Component	Month	Daily Liquid Surf Temperature (deg F) Avg	Min	Max	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg	Min	Max	Vapor Mol Weight	Liquid Mass Fract	Vapor Mass Fract	Mol Weight	Basis for Vapor Pressure Calculations
100,000ppm VOC (10%) HEP Shakewater	Jan	48.84	43.20	54.48	57.22	0.2111	0.1737	0.2555	28.9541			19.59	
Benzene						0.6489	0.7189	1.0001	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0729	0.0560	0.0893	106.1700	0.0025	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.3551	2.0453	2.8133	69.0000	0.0900	0.5810	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2310	0.1914	0.2774	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1696	0.1368	0.2060	18.0150	0.9000	0.4893	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0504	0.0408	0.0742	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shakewater	Feb	51.29	44.56	58.03	57.22	0.2214	0.1821	0.2877	28.9297			19.59	
Benzene						0.6127	0.7467	1.1058	78.1100	0.0025	0.0048	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0796	0.0621	0.1013	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.4411	2.1076	2.8166	69.0000	0.0900	0.4914	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2403	0.2004	0.3104	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1858	0.1441	0.2378	18.0150	0.9000	0.4388	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0561	0.0414	0.0843	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shakewater	Mar	57.77	48.89	65.86	57.22	0.2405	0.2114	0.2693	27.8858			19.59	
Benzene						1.0823	0.8511	1.3854	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0986	0.0729	0.1318	106.1700	0.0025	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.7720	2.3176	3.2966	69.0000	0.0900	0.4936	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3031	0.2314	0.3928	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2314	0.1809	0.3115	18.0150	0.9000	0.5215	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0821	0.0605	0.1100	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shakewater	Apr	62.62	52.57	73.66	57.22	0.3348	0.2398	0.4618	27.2734			19.59	
Benzene						1.2653	0.9470	1.8425	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1168	0.0834	0.1665	106.1700	0.0025	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.0970	2.5091	3.7048	69.0000	0.0900	0.4490	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3580	0.2609	0.4842	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2801	0.1949	0.3962	18.0150	0.9000	0.5412	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0990	0.0683	0.1392	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shakewater	May	67.58	58.53	78.63	57.22	0.3929	0.2717	0.5465	28.7445			19.59	
Benzene						1.4358	1.0000	1.9158	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1406	0.0981	0.2018	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.4276	2.7499	4.2650	69.0000	0.0900	0.4314	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4163	0.2981	0.5785	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3330	0.2252	0.4833	18.0150	0.9000	0.5588	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1174	0.0789	0.1691	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shakewater	Jun	71.63	60.72	83.05	57.22	0.4471	0.3062	0.6373	28.7434			19.59	
Benzene						1.5688	1.1749	2.1416	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1609	0.1094	0.2321	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.7178	2.8479	4.6432	69.0000	0.0900	0.4174	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4697	0.3324	0.6521	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3826	0.2572	0.5583	18.0150	0.9000	0.5727	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1345	0.0911	0.1947	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shakewater	Jul	72.00	62.13	81.68	57.22	0.4654	0.3292	0.6497	28.2120			19.59	
Benzene						1.6529	1.2384	2.1756	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1678	0.1168	0.2367	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.8127	3.0668	4.6694	69.0000	0.0900	0.4131	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4878	0.3528	0.6837	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3994	0.2752	0.5798	18.0150	0.9000	0.5770	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1403	0.0974	0.1967	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shakewater	Aug	71.71	61.60	81.82	57.22	0.4482	0.3235	0.6139	28.3012			19.59	
Benzene						1.6018	1.2205	2.0768	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1614	0.1117	0.2233	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.7233	3.0002	4.5156	69.0000	0.0900	0.4172	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4707	0.3449	0.6700	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3838	0.2701	0.5585	18.0150	0.9000	0.5730	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1349	0.0958	0.1873	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shakewater	Sep	67.66	58.48	76.85	57.22	0.3838	0.2918	0.5286	28.7187			19.59	
Benzene						1.4387	1.1160	1.8308	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1410	0.1029	0.1907	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.4129	2.8420	4.1189	69.0000	0.0900	0.4111	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4172	0.3147	0.5408	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3339	0.2415	0.4557	18.0150	0.9000	0.5591	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1177	0.0856	0.1567	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shakewater	Oct	61.24	52.30	69.51	57.22	0.3197	0.2428	0.4179	27.4272			19.59	
Benzene						1.2885	0.9576	1.5116	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1113	0.0846	0.1500	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.0107	2.5300	3.5434	69.0000	0.0900	0.4540	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3431	0.2642	0.4410	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2667	0.1977	0.3558	18.0150	0.9000	0.5162	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0944	0.0703	0.1253	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shakewater	Nov	55.53	49.19	61.88	57.22	0.2647	0.2130	0.3246	28.0964			19.59	
Benzene						1.0104	0.8585	1.2381	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0827	0.0737	0.1014	106.1700	0.0025	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.4724	2.1026	3.0511	69.0000	0.0900	0.4752	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2868	0.2337	0.3500	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2172	0.1718	0.2728	18.0150	0.9000	0.5110	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0771	0.0612	0.0965	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shakewater	Dec	50.80	45.34	55.85	57.22	0.2241	0.1871	0.2675	28.7203			19.59	
Benzene						0.8945	0.7648	1.0098	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0778	0.0639	0.0898	106.1700	0.0025	0.0009	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.4040	2.1448	2.8604	69.0000	0.0900	0.4441	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2447	0.2058	0.2898	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1811	0.1485	0.2106	18.0150	0.9000	0.4361	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0644	0.0530	0.0760	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

ST 1-5 - Horizontal Tank
, West Virginia

Month	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb)	2.4700	2.9069	4.8065	6.5442	8.5042	9.6489	9.7294	8.7682	6.8074	5.2977	3.2866	2.4060
Vapor Space Volume (cu ft):	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495
Vapor Density (lb/cu ft):	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Space Expansion Factor	0.0459	0.0560	0.0719	0.0886	0.0999	0.1054	0.0998	0.0928	0.0823	0.0718	0.0531	0.0426
Vented Vapor Saturation Factor	0.9546	0.9509	0.9408	0.9299	0.9187	0.9085	0.9051	0.9083	0.9165	0.9328	0.9437	0.9519
Tank Vapor Space Volume												
Vapor Space Volume (cu ft):	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495
Tank Diameter (ft):	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Effective Diameter (ft):	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740
Vapor Space Outage (ft):	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Tank Shell Length (ft):	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000
Vapor Density												
Vapor Density (lb/cu ft):	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Molecular Weight (lb/lb-mole):	28.9541	28.8297	27.8858	27.2734	26.7465	26.3434	26.2220	26.3362	26.7187	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Daily Avg. Liquid Surface Temp. (deg. R):	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9056	515.2035	510.2989
Daily Average Ambient Temp. (deg. F):	32.1000	35.5000	45.8500	54.8000	63.5000	71.4500	75.0500	73.9000	67.5500	56.2000	46.8000	37.0000
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933
Tank Paint Solar Absorptance (Shell):	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	875.9737	850.2838	1,184.6862	1,514.6470	1,780.2020	1,910.5089	1,836.0933	1,675.5020	1,369.9719	1,040.0392	678.9578	537.0138
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0459	0.0560	0.0719	0.0888	0.0999	0.1054	0.0998	0.0928	0.0823	0.0718	0.0531	0.0426
Daily Vapor Temperature Range (deg. R):	22.5987	26.9083	37.5365	40.1815	44.1967	45.5843	43.1113	40.4530	38.7700	33.0701	25.3858	21.0102
Daily Vapor Pressure Range (psia):	0.0818	0.1056	0.1570	0.2223	0.2828	0.3281	0.3205	0.2903	0.2348	0.1751	0.1130	0.0804
Breather Vent Press. Setting Range(psia):	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1737	0.1821	0.2114	0.2398	0.2737	0.3092	0.3292	0.3235	0.2918	0.2428	0.2138	0.1871
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.2555	0.2877	0.3693	0.4619	0.5565	0.6373	0.6497	0.6139	0.5266	0.4179	0.3268	0.2675
Daily Avg. Liquid Surface Temp. (deg R):	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2989
Daily Min. Liquid Surface Temp. (deg R):	502.6673	504.2203	508.5508	512.2432	516.2002	519.8878	521.7958	521.2854	518.1320	512.6314	508.8570	505.0141
Daily Max. Liquid Surface Temp. (deg R):	514.1517	517.7044	525.3271	532.3339	538.2986	542.7198	543.3515	541.4922	536.5178	529.1795	521.5500	515.5737
Daily Ambient Temp. Range (deg. R):	18.2000	19.8000	21.7000	24.0000	24.0000	21.3000	21.3000	21.0000	22.3000	24.0000	21.0000	18.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.9548	0.9509	0.9400	0.9299	0.9187	0.9085	0.9051	0.9083	0.9165	0.9328	0.9437	0.9519
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Space Outage (ft):	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Working Losses (lb):	315.9693	339.6579	404.4468	471.7859	543.0213	609.0001	631.0160	610.2819	544.4890	453.4412	384.5182	332.7097
Vapor Molecular Weight (lb/lb-mole):	28.9541	28.8297	27.8858	27.2734	26.7465	26.3434	26.2220	26.3362	26.7387	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Net Throughput (gal/mo.):	12,775,000.0000	12,775,000.0000	12,775,000.0000	12,775,000.0000	12,775,000.0000	12,775,000.0000	12,775,000.0000	12,775,000.0000	12,775,000.0000	12,775,000.0000	12,775,000.0000	12,775,000.0000
Annual Turnovers:	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471	9,017.6471
Turnover Factor:	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700
Tank Diameter (ft):	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	318.4453	342.5646	409.2534	478.3301	551.5256	618.6490	640.7454	619.0501	551.2973	458.7389	387.8048	335.2057

L-47

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

ST 1-5 - Horizontal Tank
, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
100,000ppm VOC (10%) HEP Shalewater	5,640.73	71.36	5,712.09
Benzene	37.89	0.48	38.37
Ethylbenzene	3.61	0.05	3.66
Gasoline (RVP 6)	2,518.22	31.40	2,549.62
Toluene	10.84	0.14	10.97
Water	3,067.16	39.26	3,106.42
Xylenes (mixed isomers)	3.01	0.04	3.05

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	ET 1-12
City:	
State:	West Virginia
Company:	HEP Shalewater Solutions LLC
Type of Tank:	Horizontal Tank
Description:	12 - 21,000gal Effluent Tanks (closed-roof frac tanks)

Tank Dimensions

Shell Length (ft):	45.00
Diameter (ft):	8.50
Volume (gallons):	17,000.00
Turnovers:	751.47
Net Throughput(gal/yr):	12,775,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

ET 1-12 - Horizontal Tank
, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg	Min	Max	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min	Max	Vapor Mol Weight	Liquid Mass Fract	Vapor Mass Fract	Mol Weight	Basis for Vapor Pressure Calculations
100,000ppm VOC (10%) HFP Shalewater	Jan	48.84	43.70	54.48	57.22	0.2111	0.1737	0.2565	28.9541			19.59	
Benzene						0.8499	0.7189	1.0001	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0728	0.0560	0.0893	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.3151	2.0453	2.6133	69.0000	0.0900	0.5410	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2330	0.1914	0.2774	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1499	0.1368	0.2060	18.0150	0.9000	0.4893	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0604	0.0488	0.0742	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HFP Shalewater	Feb	51.29	44.55	58.03	57.22	0.2214	0.1821	0.2877	28.6297			19.59	
Benzene						0.9127	0.7487	1.1866	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0796	0.0621	0.1013	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.4411	2.1078	2.8166	69.0000	0.0900	0.5414	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2503	0.2004	0.3104	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1658	0.1441	0.2378	18.0150	0.9000	0.4988	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0661	0.0514	0.0843	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HFP Shalewater	Mar	57.27	48.89	65.66	57.22	0.2805	0.2314	0.3693	27.8856			19.59	
Benzene						1.0423	0.8511	1.3634	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0988	0.0729	0.1318	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.7720	2.3176	3.2066	69.0000	0.0900	0.4686	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3031	0.2414	0.3928	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2314	0.1899	0.3115	18.0150	0.9000	0.5215	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0821	0.0605	0.1100	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HFP Shalewater	Apr	52.62	52.57	72.66	57.22	0.3348	0.2396	0.4618	27.2734			19.59	
Benzene						1.2563	0.9470	1.8425	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1188	0.0834	0.1685	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.0879	2.5091	3.7948	69.0000	0.0900	0.4490	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3588	0.2609	0.4842	92.1300	0.0025	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2801	0.1949	0.3962	18.0150	0.9000	0.5412	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0990	0.0663	0.1392	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HFP Shalewater	May	67.58	58.53	78.63	57.22	0.3929	0.2737	0.5465	26.7405			19.59	
Benzene						1.4358	1.0269	1.9918	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1406	0.0981	0.2018	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.4276	2.7290	4.2650	69.0000	0.0900	0.4314	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4163	0.2961	0.5755	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3330	0.2252	0.4833	18.0150	0.9000	0.5588	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1174	0.0779	0.1691	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HFP Shalewater	Jun	71.69	60.22	83.05	57.22	0.4471	0.3092	0.6373	26.3414			19.59	
Benzene						1.5988	1.1749	2.1416	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1600	0.1094	0.2321	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.7178	2.9479	4.6432	69.0000	0.0900	0.4174	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4697	0.3324	0.6521	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3826	0.2572	0.5583	18.0150	0.9000	0.5727	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1345	0.0911	0.1947	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HFP Shalewater	Jul	72.90	62.13	83.68	57.22	0.4864	0.3292	0.6497	26.2220			19.59	
Benzene						1.6529	1.2384	2.1756	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1678	0.1168	0.2367	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.8127	3.0668	4.6094	69.0000	0.0900	0.4131	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4878	0.3528	0.6637	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3994	0.2752	0.5698	18.0150	0.9000	0.5770	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1403	0.0974	0.1987	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HFP Shalewater	Aug	71.71	61.60	81.82	57.22	0.4482	0.3235	0.6139	26.3312			19.59	
Benzene						1.6010	1.2205	2.0768	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1613	0.1147	0.2233	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.7233	3.0002	4.5756	69.0000	0.0900	0.4172	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4707	0.3469	0.6399	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3838	0.2701	0.5565	18.0150	0.9000	0.5730	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1349	0.0956	0.1873	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HFP Shalewater	Sep	67.66	58.48	78.85	57.22	0.3938	0.2918	0.5286	26.7187			19.59	
Benzene						1.4367	1.1150	1.9306	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1410	0.1029	0.1997	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.4029	2.8420	4.1199	69.0000	0.0900	0.4131	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.4172	0.3147	0.5468	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.3339	0.2415	0.4557	18.0150	0.9000	0.5591	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.1177	0.0856	0.1587	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HFP Shalewater	Oct	61.24	52.08	69.51	57.22	0.3197	0.2428	0.4179	27.4272			19.59	
Benzene						1.2685	0.9576	1.5116	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1143	0.0846	0.1500	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						3.0107	2.5000	3.5134	69.0000	0.0900	0.4540	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.3431	0.2642	0.4410	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2867	0.1977	0.3959	18.0150	0.9000	0.5462	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0944	0.0701	0.1263	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HFP Shalewater	Nov	55.53	49.19	61.88	57.22	0.2947	0.2336	0.3846	28.0954			19.59	
Benzene						1.1304	0.8585	1.2361	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0927	0.0737	0.1316	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.8752	2.3326	3.0511	69.0000	0.0900	0.4752	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2808	0.2137	0.3590	92.1300	0.0025	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2172	0.1718	0.2728	18.0150	0.9000	0.5190	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0771	0.0612	0.0969	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HFP Shalewater	Dec	50.80	45.34	56.85	57.22	0.2241	0.1871	0.2975	28.8203			19.59	
Benzene						0.8945	0.7468	1.0398	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0778	0.0639	0.0938	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)						2.4043	2.1448	2.6603	69.0000	0.0900	0.4341	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene						0.2447	0.2058	0.2898	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.1811	0.1485	0.2108	18.0150	0.9000	0.4961	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)						0.0644	0.0530	0.0760	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

ET 1-12 - Horizontal Tank
, West Virginia

Month	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	2.4700	2.9060	4.8065	6.5442	8.5942	9.6489	9.7294	8.7982	6.8674	5.2977	3.2886	2.4060
Vapor Space Volume (cu ft):	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495
Vapor Density (lb/cu ft):	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Space Expansion Factor:	0.0459	0.0580	0.0719	0.0886	0.0999	0.1054	0.0998	0.0978	0.0823	0.0718	0.0531	0.0428
Vented Vapor Saturation Factor:	0.9546	0.9509	0.9406	0.9279	0.9187	0.9085	0.9051	0.9083	0.9165	0.9328	0.9437	0.9519
Tank Vapor Space Volume												
Vapor Space Volume (cu ft):	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495	1,628.4495
Tank Diameter (ft):	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Effective Diameter (ft):	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740
Vapor Space Outage (ft):	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Tank Shell Length (ft):	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000
Vapor Density												
Vapor Density (lb/cu ft):	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Molecular Weight (lb/lb-mole):	28.9541	28.8297	27.8858	27.2734	26.7465	26.3434	26.2220	26.3362	26.7387	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Daily Avg. Liquid Surface Temp. (deg. R):	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2689
Daily Average Ambient Temp. (deg. F):	32.1000	35.5000	45.8500	54.8000	63.5000	71.4500	75.0500	73.9000	67.8500	56.2000	45.8000	37.0000
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933
Tank Paint Solar Absorptance (Shell):	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	825.9737	850.2836	1,184.6862	1,514.6470	1,780.2020	1,910.5709	1,838.9033	1,675.5029	1,389.9710	1,048.0392	678.9578	533.9138
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0459	0.0580	0.0719	0.0886	0.0999	0.1054	0.0998	0.0978	0.0823	0.0718	0.0531	0.0426
Daily Vapor Temperature Range (deg. R):	22.5887	26.9643	37.5765	40.1815	44.1967	45.0643	43.1113	40.4536	36.7700	33.0061	25.3858	21.0182
Daily Vapor Pressure Range (psia):	0.0818	0.1056	0.1579	0.2223	0.2828	0.3281	0.3205	0.2903	0.2348	0.1751	0.1150	0.0804
Breather Vent Press. Setting Range(psia):	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1737	0.1821	0.2114	0.2396	0.2737	0.3012	0.3292	0.3235	0.2918	0.2428	0.2136	0.1871
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.2555	0.2877	0.3693	0.4619	0.5565	0.6373	0.6497	0.6139	0.5266	0.4179	0.3286	0.2875
Daily Avg. Liquid Surface Temp. (deg R):	508.5095	510.8624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2689
Daily Min. Liquid Surface Temp. (deg R):	502.8673	504.1203	508.5586	512.2432	516.2002	519.8876	521.7358	521.2554	518.1329	512.6314	508.8570	505.0141
Daily Max. Liquid Surface Temp. (deg R):	514.1517	517.7044	525.3271	532.3339	538.2986	542.7198	543.3515	541.4922	536.5179	529.1795	521.5500	515.5237
Daily Ambient Temp. Range (deg. R):	18.2000	19.6000	21.7000	24.0000	24.0000	23.3000	21.3000	21.0000	22.3000	24.0000	21.0000	18.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.9546	0.9509	0.9406	0.9219	0.9187	0.9085	0.9051	0.9083	0.9185	0.9328	0.9437	0.9519
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Space Outage (ft):	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Working Losses (lb):	31.9591	34.1981	40.9594	47.7700	55.0238	61.6751	64.5047	61.0049	55.1420	45.9212	38.9412	33.7035
Vapor Molecular Weight (lb/lb-mole):	28.9541	28.8297	27.8858	27.2734	26.7465	26.3434	26.2220	26.3362	26.7387	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Net Throughput (gal/mo.):	1,064,583.3330	1,064,583.3330	1,064,583.3330	1,064,583.3330	1,064,583.3330	1,064,583.3330	1,064,583.3330	1,064,583.3330	1,064,583.3330	1,064,583.3330	1,064,583.3330	1,064,583.3330
Annual Turnovers:	751.4706	751.4706	751.4706	751.4706	751.4706	751.4706	751.4706	751.4706	751.4706	751.4706	751.4706	751.4706
Turnover Factor:	0.2066	0.2066	0.2066	0.2066	0.2066	0.2066	0.2066	0.2066	0.2066	0.2066	0.2066	0.2066
Tank Diameter (ft):	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	34.4750	37.4049	45.7659	54.3232	63.6178	71.3240	73.6341	70.6031	62.0093	51.2190	42.2278	36.1095

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

ET 1-12 - Horizontal Tank
, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
100,000ppm VOC (10%) HEP Shalewater	571.25	71.36	642.61
Benzene	3.84	0.48	4.32
Ethylbenzene	0.37	0.05	0.41
Gasoline (RVP 6)	255.03	31.40	286.43
Toluene	1.10	0.14	1.23
Water	310.62	39.26	349.88
Xylenes (mixed isomers)	0.30	0.04	0.34

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	SI 1-2
City:	
State:	West Virginia
Company:	HEP Shalewater Solutions LLC
Type of Tank:	Horizontal Tank
Description:	2 - 21,000gal Influent Storage Tanks (closed-roof frac tanks)
Tank Dimensions	
Shell Length (ft):	45.00
Diameter (ft):	8.50
Volume (gallons):	17,000.00
Turnovers:	886.43
Net Throughput(gal/yr):	15,069,390.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N
Paint Characteristics	
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Breather Vent Settings	
Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

SI 1-2 - Horizontal Tank
, West Virginia

Mixture/Component	Month	Daily Liquid Surf Temperature (deg F) Avg	Min	Max	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min	Max	Vapor Mol Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol Weight	Basis for Vapor Pressure Calculations
100,000ppm VOC (10%) HEP Shakewater	Jan	46.84	43.29	54.48	57.22	0.2111	0.1737	0.2555	28.0541			19.59	
Benzene						0.6490	0.7189	1.0001	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0729	0.0660	0.0893	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		2.3151	2.0453	2.8133	69.0000	0.0900	0.4914	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.2310	0.1914	0.2774	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.1696	0.1368	0.2080	18.0150	0.9000	0.4891	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.0604	0.0488	0.0742	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11				
100,000ppm VOC (10%) HEP Shakewater	Feb	51.29	44.55	58.03	57.22	0.2284	0.1821	0.2877	28.0547			19.59	
Benzene						0.8127	0.7487	1.1056	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0796	0.0621	0.1013	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		2.4411	2.0076	2.8166	69.0000	0.0900	0.4914	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.2503	0.2004	0.3104	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.1358	0.1141	0.2378	18.0150	0.9000	0.4488	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.0661	0.0514	0.0843	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11				
100,000ppm VOC (10%) HEP Shakewater	Mar	57.27	48.89	66.86	57.22	0.2805	0.2114	0.3693	27.8858			19.59	
Benzene						1.0823	0.8511	1.3834	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0984	0.0729	0.1318	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		2.7720	2.3176	3.2969	69.0000	0.0900	0.4914	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.3001	0.2314	0.3928	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.2314	0.1699	0.3115	18.0150	0.9000	0.5215	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.0801	0.0605	0.1100	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11				
100,000ppm VOC (10%) HEP Shakewater	Apr	62.52	52.57	72.66	57.22	0.3348	0.2398	0.4619	27.2734			19.59	
Benzene						1.2553	0.9470	1.8425	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1168	0.0834	0.1685	106.1700	0.0025	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.0370	2.5061	3.7948	69.0000	0.0900	0.4490	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.3580	0.2609	0.4842	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.2401	0.1949	0.3962	18.0150	0.9000	0.5412	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.0990	0.0683	0.1392	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11				
100,000ppm VOC (10%) HEP Shakewater	May	67.58	58.53	76.63	57.22	0.3929	0.2737	0.5565	26.7465			19.59	
Benzene						1.4358	1.0589	1.9158	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1406	0.0981	0.2018	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.1276	2.7210	4.2850	69.0000	0.0900	0.4314	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.4003	0.2981	0.5755	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.3330	0.2252	0.4833	18.0150	0.9000	0.5588	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.1174	0.0799	0.1691	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11				
100,000ppm VOC (10%) HEP Shakewater	Jun	71.63	60.22	83.05	57.22	0.4471	0.3092	0.6373	26.3474			19.59	
Benzene						1.5988	1.1749	2.1418	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1601	0.1094	0.2321	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.7178	2.9479	4.8432	69.0000	0.0900	0.4174	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.4897	0.3324	0.6521	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.3826	0.2572	0.5583	18.0150	0.9000	0.5727	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.1345	0.0911	0.1947	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11				
100,000ppm VOC (10%) HEP Shakewater	Jul	72.90	62.13	83.68	57.22	0.4654	0.3202	0.6497	26.2220			19.59	
Benzene						1.6529	1.2384	2.1756	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1678	0.1168	0.2367	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.8127	3.0668	4.9694	69.0000	0.0900	0.4131	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.4870	0.3526	0.6677	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.3894	0.2752	0.5758	18.0150	0.9000	0.5770	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.1403	0.0974	0.1987	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11				
100,000ppm VOC (10%) HEP Shakewater	Aug	71.71	61.60	81.82	57.22	0.4582	0.3235	0.6339	26.3362			19.59	
Benzene						1.6019	1.2205	2.0768	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1614	0.1147	0.2233	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.7233	3.0132	4.9156	69.0000	0.0900	0.4172	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.4707	0.3468	0.6500	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.3818	0.2701	0.5685	18.0150	0.9000	0.5730	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.1349	0.0956	0.1973	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11				
100,000ppm VOC (10%) HEP Shakewater	Sep	57.86	48.98	70.85	57.22	0.3948	0.2918	0.5266	26.7387			19.59	
Benzene						1.4387	1.1160	1.8368	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1410	0.1029	0.1907	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.4329	2.8420	4.1190	69.0000	0.0900	0.4311	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.4172	0.3147	0.5818	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.3309	0.2415	0.4557	18.0150	0.9000	0.5591	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.1177	0.0856	0.1597	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11				
100,000ppm VOC (10%) HEP Shakewater	Oct	61.24	52.08	69.51	57.22	0.3197	0.2428	0.4179	27.4272			19.59	
Benzene						1.2085	0.9576	1.5116	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1133	0.0848	0.1500	106.1700	0.0025	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.0107	2.5300	3.5034	69.0000	0.0900	0.4390	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.3431	0.2642	0.4410	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.2667	0.1977	0.3558	18.0150	0.9000	0.5362	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.0944	0.0703	0.1253	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11				
100,000ppm VOC (10%) HEP Shakewater	Nov	55.53	49.19	61.88	57.22	0.2947	0.2336	0.3246	28.0954			19.59	
Benzene						1.0304	0.8585	1.2381	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0927	0.0737	0.1158	106.1700	0.0025	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		2.6722	2.3326	3.0911	69.0000	0.0900	0.4752	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.2808	0.2337	0.3500	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.2172	0.1718	0.2728	18.0150	0.9000	0.5150	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.0771	0.0612	0.0965	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11				
100,000ppm VOC (10%) HEP Shakewater	Dec	50.60	45.34	55.85	57.22	0.2241	0.1871	0.2475	28.1203			19.59	
Benzene						0.8945	0.7498	1.0098	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0776	0.0639	0.0958	106.1700	0.0025	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		2.4047	2.1348	2.6903	69.0000	0.0900	0.4841	92.00	Option 4: RVP=6, ASTM Slope=3				
Toluene		0.2447	0.2058	0.2898	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48				
Water		0.1811	0.1486	0.2196	18.0150	0.9000	0.4961	18.02	Option 2: A=8.07131, B=1730.63, C=233.426				
Xylenes (mixed isomers)		0.0644	0.0530	0.0780	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11				

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

SI 1-2 - Horizontal Tank
, West Virginia

Month	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	2.4700	[illegible]	4.8065	6.5442	8.5942	9.6489	9.7294	8.7982	6.8674	5.2977	3.2686	2.4060
Vapor Space Volume (cu ft):	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495
Vapor Density (lb/cu ft):	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Space Expansion Factor:	0.0459	0.0560	0.0719	0.0888	0.0999	0.1054	0.0998	0.0928	0.0823	0.0718	0.0531	0.0428
Vented Vapor Saturation Factor:	0.9546	0.9509	0.9408	0.9209	0.9187	0.9065	0.9051	0.9083	0.9165	0.9328	0.9437	0.9519
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495
Tank Diameter (ft):	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Effective Diameter (ft):	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740
Vapor Space Outage (ft):	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Tank Shell Length (ft):	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000
Vapor Density												
Vapor Density (lb/cu ft):	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Molecular Weight (lb/lb-mole):	28.8541	28.6297	27.8858	27.2734	26.7465	26.3434	26.2220	26.3382	26.7387	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Daily Avg. Liquid Surface Temp. (deg. R):	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2889
Daily Average Ambient Temp. (deg. F):	32.1000	35.5000	45.8500	54.8000	63.5000	71.4500	75.0500	73.9000	67.8500	56.2000	46.3000	37.9000
Ideal Gas Constant R (psia cuft / (lb-mol deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933
Tank Paint Solar Absorptance (Shell):	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	825.9737	850.2856	1,184.6862	1,514.8470	1,760.2020	1,910.5979	1,836.9033	1,875.5029	1,389.9710	1,048.0792	678.9578	543.0138
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0459	0.0560	0.0719	0.0888	0.0999	0.1054	0.0998	0.0928	0.0823	0.0718	0.0531	0.0428
Daily Vapor Temperature Range (deg. R):	22.5887	26.9683	33.5365	40.1815	44.1967	45.8643	43.1113	40.4536	36.7700	31.0961	25.3858	21.9102
Daily Vapor Pressure Range (psia):	0.0818	0.1056	0.1579	0.2273	0.2828	0.3281	0.3205	0.2903	0.2348	0.1751	0.1130	0.0804
Breather Vent Press. Setting Range(psia):	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1737	0.1821	0.2114	0.2378	0.2737	0.3092	0.3292	0.3235	0.2918	0.2428	0.2136	0.1871
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.2555	0.2877	0.3693	0.4619	0.5565	0.6373	0.6497	0.6139	0.5266	0.4179	0.3266	0.2675
Daily Avg. Liquid Surface Temp. (deg R):	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2889
Daily Min. Liquid Surface Temp. (deg R):	502.8673	504.2203	508.5688	512.2432	516.2002	519.8878	521.7958	521.2654	518.1329	512.8314	508.8570	505.0141
Daily Max. Liquid Surface Temp. (deg R):	514.1517	517.7044	525.3271	532.3339	538.2986	542.7198	543.3515	541.4922	536.5179	529.1795	521.5500	515.5237
Daily Ambient Temp. Range (deg. R):	18.2000	19.8000	21.7000	24.0000	24.0000	23.3000	21.3000	21.0000	22.3000	24.0000	21.0000	18.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.9546	0.9509	0.9408	0.9209	0.9187	0.9065	0.9051	0.9083	0.9185	0.9328	0.9437	0.9510
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Space Outage (ft):	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Working Losses (lb):	36.8356	39.3821	46.8942	54.7019	62.9962	70.6114	73.1641	70.7650	63.1317	52.5749	44.5035	38.5870
Vapor Molecular Weight (lb/lb-mole):	28.8541	28.6297	27.8858	27.2734	26.7465	26.3434	26.2220	26.3382	26.7387	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Net Throughput (gal/mo.):	1,255,782.5000	1,255,782.5000	1,255,782.5000	1,255,782.5000	1,255,782.5000	1,255,782.5000	1,255,782.5000	1,255,782.5000	1,255,782.5000	1,255,782.5000	1,255,782.5000	1,255,782.5000
Annual Turnovers:	886.4347	886.4347	886.4347	886.4347	886.4347	886.4347	886.4347	886.4347	886.4347	886.4347	886.4347	886.4347
Turnover Factor:	0.2005	0.2005	0.2005	0.2005	0.2005	0.2005	0.2005	0.2005	0.2005	0.2005	0.2005	0.2005
Tank Diameter (ft):	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	39.1115	42.2840	51.7007	61.2461	71.5904	80.2603	82.8924	79.5633	69.9991	57.8726	47.8701	40.9929

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

SI 1-2 - Horizontal Tank
, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
100.000ppm VOC (10%) HEP Shalewater	654.02	71.36	725.38
Benzene	4.39	0.48	4.87
Ethylbenzene	0.42	0.05	0.46
Gasoline (RVP 6)	291.98	31.40	323.38
Toluene	1.26	0.14	1.39
Water	355.63	39.26	394.89
Xylenes (mixed isomers)	0.35	0.04	0.39

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification		
User Identification:	FT 1	
City:	West Virginia	
State:	Ohio	
Company:	HEP Shalewater Solutions LLC	
Type of Tank:	Horizontal Tank	
Description:	1 - 21,000gal Filtrate Tank	
Tank Dimensions		
Shell Length (ft):		45.00
Diameter (ft):		8.50
Volume (gallons):		17,000.00
Turnovers:		531.86
Net Throughput(gal/yr):		9,041,634.00
Is Tank Heated (y/n):	N	
Is Tank Underground (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Light	
Shell Condition	Good	
Breather Vent Settings		
Vacuum Settings (psig):		0.03
Pressure Settings (psig)		0.03

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

FT 1 - Horizontal Tank
West Virginia, Ohio

Mixture/Component	Month	Daily Liquid Surf Temperature (deg F) Avg	Min	Max	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg	Min	Max	Vapor Mol Weight	Liquid Mass Fract	Vapor Mass Fract	Mol Weight	Basis for Vapor Pressure Calculations
100,000ppm VOC (10%) HEP Shalewater	Jan	48.84	43.20	54.48	57.22	0.2111	0.1737	0.2555	28.9541			19.59	
Benzene						0.8193	0.7189	1.0001	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0728	0.0590	0.0893	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		2.3151	2.0453	2.6133	69.0000	0.0900	0.5010	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.2110	0.1914	0.2274	92.1300	0.0025	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.1694	0.1368	0.2040	18.0150	0.0000	0.4893	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.0504	0.0488	0.0742	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Feb	51.29	44.55	58.03	57.22	0.2294	0.1821	0.2877	28.8297			19.59	
Benzene						0.8127	0.7487	1.1056	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene		0.0796	0.0621	0.1013	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		2.1411	2.1078	2.8166	69.0000	0.0900	0.4914	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.2503	0.2004	0.3104	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.1858	0.1441	0.2378	18.0150	0.0000	0.4988	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.0661	0.0514	0.0843	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Mar	57.27	48.89	65.66	57.22	0.2405	0.2114	0.2693	27.8656			19.59	
Benzene						1.0823	0.8511	1.3634	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene		0.0988	0.0729	0.1318	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		2.7720	2.3176	3.2968	69.0000	0.0900	0.4886	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.3031	0.2314	0.3926	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.2314	0.1809	0.3115	18.0150	0.0000	0.5215	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.0821	0.0605	0.1100	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Apr	62.62	52.57	72.66	57.22	0.3346	0.2936	0.4019	27.2734			19.59	
Benzene						1.2543	0.9470	1.6426	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene		0.1188	0.0834	0.1665	106.1700	0.0025	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.0475	2.5051	3.7946	69.0000	0.0900	0.4490	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.3580	0.2609	0.4842	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.2801	0.1949	0.3962	18.0150	0.0000	0.5412	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.0990	0.0693	0.1362	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	May	67.58	58.50	76.63	57.22	0.3929	0.3737	0.4065	26.7465			19.59	
Benzene						1.4508	1.0949	1.9158	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene		0.1406	0.0981	0.2018	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.4276	2.7290	4.2650	69.0000	0.0900	0.4314	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.4113	0.2981	0.5755	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.3330	0.2252	0.4833	18.0150	0.0000	0.5648	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.1174	0.0799	0.1691	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Jun	71.03	60.32	81.05	57.22	0.4471	0.3992	0.5373	26.3434			19.59	
Benzene						1.5088	1.1749	2.1416	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene		0.1609	0.1094	0.2321	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.7178	2.9479	4.7432	69.0000	0.0900	0.4174	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.4697	0.3324	0.6521	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.3826	0.2572	0.5583	18.0150	0.0000	0.5727	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.1345	0.0911	0.1947	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Jul	77.00	62.13	91.65	57.22	0.4654	0.3712	0.5497	26.2220			19.59	
Benzene						1.6529	1.2384	2.1756	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene		0.1878	0.1168	0.2367	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		4.1227	3.0668	4.6894	69.0000	0.0900	0.4131	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.4878	0.3528	0.6707	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.3994	0.2752	0.5798	18.0150	0.0000	0.5770	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.1403	0.0974	0.1987	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Aug	71.71	61.60	81.82	57.22	0.4482	0.3235	0.5139	26.3362			19.59	
Benzene						1.6018	1.2205	2.0768	78.1100	0.0025	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene		0.1613	0.1147	0.2233	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.7713	3.0332	4.5356	69.0000	0.0900	0.4172	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.4707	0.3469	0.6700	92.1300	0.0025	0.0020	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.3838	0.2701	0.5585	18.0150	0.0000	0.5730	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.1349	0.0956	0.1873	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Sep	67.56	58.48	76.85	57.22	0.3938	0.2918	0.5066	26.7387			19.59	
Benzene		1.4787	1.1160	1.8305	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene		0.1410	0.1029	0.1907	106.1700	0.0025	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.4129	2.8420	4.1199	69.0000	0.0900	0.4311	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.4173	0.3147	0.5818	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.3339	0.2415	0.4857	18.0150	0.0000	0.5691	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.1177	0.0856	0.1687	106.1700	0.0025	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Oct	61.21	52.30	69.51	57.22	0.3107	0.2478	0.4179	27.4272			19.59	
Benzene		1.2085	0.9576	1.5116	78.1100	0.0025	0.0067	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene		0.1183	0.0846	0.1600	106.1700	0.0025	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		3.0107	2.5300	3.5834	69.0000	0.0900	0.4540	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.3431	0.2642	0.4410	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.2667	0.1977	0.3649	18.0150	0.0000	0.5662	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.0944	0.0703	0.1253	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Nov	55.53	49.19	61.88	57.22	0.2647	0.2136	0.3268	28.0934			19.59	
Benzene		1.0304	0.8585	1.2301	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene		0.0927	0.0737	0.1156	106.1700	0.0025	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		2.6722	2.3326	3.0511	69.0000	0.0900	0.4752	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.2988	0.2337	0.3900	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.2172	0.1718	0.2729	18.0150	0.0000	0.5190	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.0771	0.0612	0.0985	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
100,000ppm VOC (10%) HEP Shalewater	Dec	50.80	45.34	56.85	57.22	0.2241	0.1871	0.2875	28.7703			19.59	
Benzene		0.8945	0.7648	1.0398	78.1100	0.0025	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene		0.0778	0.0639	0.0938	106.1700	0.0025	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Gasoline (RVP 6)		2.4049	2.1143	2.6603	69.0000	0.0900	0.4341	92.00	Option 4: RVP=6, ASTM Slope=3
Toluene		0.2447	0.2058	0.2998	92.1300	0.0025	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water		0.1811	0.1485	0.2198	18.0150	0.0000	0.4961	18.02	Option 2: A=8.07131, B=1730.63, C=233.426
Xylenes (mixed isomers)		0.0644	0.0530	0.0780	106.1700	0.0025	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

FT 1 - Horizontal Tank
West Virginia, Ohio

Month	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	2.4780	2.9088	4.8065	6.5442	8.5942	9.6489	9.7294	8.7982	6.8674	5.2977	3.2868	2.4060
Vapor Space Volume (cu ft):	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495
Vapor Density (lb/cu ft):	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Space Expansion Factor:	0.0459	0.0560	0.0719	0.0886	0.0999	0.1054	0.0998	0.0928	0.0823	0.0718	0.0531	0.0426
Vented Vapor Saturation Factor:	0.9546	0.9509	0.9406	0.9298	0.9187	0.9085	0.9051	0.9083	0.9185	0.9328	0.9437	0.9519
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495	1,626.4495
Tank Diameter (ft):	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Effective Diameter (ft):	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740	22.0740
Vapor Space Outage (ft):	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Tank Shell Length (ft):	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000	45.0000
Vapor Density												
Vapor Density (lb/cu ft):	0.0011	0.0012	0.0014	0.0016	0.0019	0.0021	0.0021	0.0021	0.0019	0.0016	0.0013	0.0012
Vapor Molecular Weight (lb/lb-mole):	28.9541	28.6297	27.8858	27.2734	26.7465	26.3434	26.2220	26.3982	26.7387	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Daily Avg. Liquid Surface Temp. (deg. R):	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2489
Daily Average Ambient Temp. (deg. F):	32.1000	35.5000	45.8500	54.8000	63.5000	71.4500	75.6500	73.9000	67.8500	58.2000	46.8000	37.9000
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933
Tank Paint Solar Absorptance (Shell):	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	625.0737	850.2836	1,184.6862	1,514.8470	1,780.2020	1,910.5799	1,836.9830	1,675.5079	1,360.9719	1,048.0392	678.9578	533.0138
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0459	0.0560	0.0719	0.0886	0.0999	0.1054	0.0998	0.0928	0.0823	0.0718	0.0531	0.0426
Daily Vapor Temperature Range (deg. R):	22.5887	26.9683	33.5365	40.1815	44.1967	45.6643	43.1113	40.4536	36.7700	33.0961	25.3858	21.0162
Daily Vapor Pressure Range (psia):	0.0818	0.1054	0.1579	0.2223	0.2828	0.3281	0.3205	0.2903	0.2348	0.1751	0.1130	0.0804
Breather Vent Press. Setting Range(psia):	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1737	0.1821	0.2114	0.2596	0.2737	0.3092	0.3292	0.3235	0.2918	0.2428	0.2136	0.1871
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.2555	0.2877	0.3683	0.4619	0.5565	0.6373	0.6497	0.6139	0.5268	0.4179	0.3266	0.2675
Daily Avg. Liquid Surface Temp. (deg R):	508.5095	510.9624	516.9429	522.2886	527.2194	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2409
Daily Min. Liquid Surface Temp. (deg R):	502.8673	504.7203	508.5508	512.2432	516.2002	519.8876	521.7958	521.2654	518.1329	512.6314	508.8570	505.0141
Daily Max. Liquid Surface Temp. (deg R):	514.1517	517.7044	525.3371	532.3339	538.2386	542.7198	543.3515	541.4922	536.5179	529.1795	521.5500	515.5237
Daily Ambient Temp. Range (deg. R):	18.2000	19.6000	21.7000	24.0000	24.0000	23.3000	21.3000	21.0000	22.3000	21.0000	21.6000	18.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.9546	0.9509	0.9406	0.9209	0.9187	0.9085	0.9051	0.9093	0.9185	0.9328	0.9437	0.9519
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Vapor Space Outage (ft):	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
Working Losses (lb):	24.4548	26.2862	31.3025	36.5143	42.0509	47.1342	48.8381	47.2334	42.1413	35.0846	29.7602	25.7574
Vapor Molecular Weight (lb/lb-mole):	28.9541	28.6297	27.8858	27.2734	26.7465	26.3434	26.2220	26.3982	26.7387	27.4272	28.0954	28.7203
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2111	0.2294	0.2805	0.3346	0.3929	0.4471	0.4654	0.4482	0.3938	0.3197	0.2647	0.2241
Net Throughput (gal/mo.):	753,469.5000	753,469.5000	753,469.5000	753,469.5000	753,469.5000	753,469.5000	753,469.5000	753,469.5000	753,469.5000	753,469.5000	753,469.5000	753,469.5000
Annual Turnovers:	531.8608	531.8608	531.8608	531.8608	531.8608	531.8608	531.8608	531.8608	531.8608	531.8608	531.8608	531.8608
Turnover Factor:	0.2231	0.2231	0.2231	0.2231	0.2231	0.2231	0.2231	0.2231	0.2231	0.2231	0.2231	0.2231
Tank Diameter (ft):	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000	8.5000
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	26.9307	29.1950	36.1090	43.0585	50.6451	56.7831	58.5675	56.0316	49.0087	40.3823	33.0470	28.1634

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

FT 1 - Horizontal Tank
West Virginia, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
100,000ppm VOC (10%) HEP Shalewater	436.57	71.36	507.93
Benzene	2.93	0.48	3.41
Ethylbenzene	0.28	0.05	0.33
Gasoline (RVP 6)	194.90	31.40	226.30
Toluene	0.84	0.14	0.98
Water	237.39	39.26	276.65
Xylenes (mixed isomers)	0.23	0.04	0.27

ATTACHMENT L -2

Bulk Loading and Fugitive Sources

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*): WL-1

1. Loading Area Name: Water Loading

2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):
G Drums G Marine Vessels G Rail Tank Cars X Tank Trucks

3. Loading Rack or Transfer Point Data:

Number of pumps	Located on trucks - 4
Number of liquids loaded	1 – effluent water
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	4 tank trucks could load simultaneously

4. Does ballasting of marine vessels occur at this loading area?
G Yes G No X 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?
G Yes X No
If YES, describe:

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

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	24	24	24	24
days/week	7	7	7	7
weeks/quarter	all	all	all	all

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

Pump ID No.		N/A					
Liquid Name		Effluent Water					
Max. daily throughput (1000 gal/day)		420					
Max. annual throughput (1000 gal/yr)		153300					
Loading Method [1]		BF/SUB					
Max. Fill Rate (gal/min) [total of 4 pumps]		1600					
Average Fill Time (min/loading)		TBD					
Max. Bulk Liquid Temperature (°F) (TANKS4.09)		57.22					
True Vapor Pressure [2]		0.2805					
Cargo Vessel Condition [3]		U					
Control Equipment or Method [4]		None					
Minimum control efficiency (%)		0					
Maximum Emission Rate	Loading (lb/hr)	8.56					
	Annual (lb/yr)	6226					
Estimation Method [5]		EPA/O					

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

[2] At maximum bulk liquid temperature (from TANKS)

[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 AdsorptionCO = 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 (descibe)

[5] EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance
TM = Test Measurement based upon test data submittal
O = other (describe) speciated to exclude water from total since water has a vapor pressure and would appear in the total estimated by the Loading loss equation.

9. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to

demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.	
MONITORING See Attachment O	RECORDKEEPING See Attachment O
REPORTING See Attachment O	TESTING See Attachment O
MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.	
RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.	
REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.	
TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.	
10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty	

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): SL-1

1. Name or type and model of proposed affected source: Dewatered Sludge Disposal - Some emissions will volitilize before leaving the facility.
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of proposed process material(s) charged per hour:
4. Name(s) and maximum amount of proposed material(s) produced per hour: Dewatered Sludge - 29lb of sludge produced per hour
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: None

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: × 10^6 BTU/hr.

7. Projected operating schedule:

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

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ 40-80 °F and atmospheric psia

a.	NO_X		lb/hr	grains/ACF
b.	SO_2		lb/hr	grains/ACF
c.	CO		lb/hr	grains/ACF
d.	PM_{10}		lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	0.04	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	Total HAPs	<0.01	lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
See Attachment O	See Attachment O
REPORTING	**TESTING**
See Attachment O	See Attachment O

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
NONE

ATTACHMENT N

Supporting Emission Calculations

Emissions Summary - Shalewater Solutions Facility

Based on: 10,000 bbl/day | 153,300,000 gal/yr total throughput | 4/27/2016

Emission Point #	Source	Tank Characteristics: Volume (Gals)	Dimensions: Dia x Ht ft	Material	Throughput (Gals/Yr)	Emissions Results: VOC Emissions lbs/Hr	VOC Emissions Tons/Yr	Emissions Results: HAPS lbs/Hr	HAPS Tons/Yr	Comments	Assumptions	TANKS Results: Water (lbs/yr)	BTEX Total	VOCs Tot	Benz	Ethyl	Toluene	Xylenes	Gasoline	TOTAL
1E	Influent Storage Tank 1 (ITS 1)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003	Influent water storage, closed top frac tanks manifolded together for storage and equalization; 1/16 of influent material goes through each tank	Assuming 100,000ppm VOC (10%); RVP 6 plus BTEX	287.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	527.39
2E	Influent Storage Tank 2 (ITS 2)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			288.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	528.39
3E	Influent Storage Tank 3 (ITS 3)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			289.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	529.39
4E	Influent Storage Tank 4 (ITS 4)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			290.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	530.39
5E	Influent Storage Tank 5 (ITS 5)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			291.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	531.39
6E	Influent Storage Tank 6 (ITS 6)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			292.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	532.39
7E	Influent Storage Tank 7 (ITS 7)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			293.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	533.39
8E	Influent Storage Tank 8 (ITS 8)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			294.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	534.39
9E	Influent Storage Tank 9 (ITS 9)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			295.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	535.39
10E	Influent Storage Tank 10 (ITS 10)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			296.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	536.39
11E	Influent Storage Tank 11 (ITS 11)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			297.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	537.39
12E	Influent Storage Tank 12 (ITS 12)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			298.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	538.39
13E	Influent Storage Tank 13 (ITS 13)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			299.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	539.39
14E	Influent Storage Tank 14 (ITS 14)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			300.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	540.39
15E	Influent Storage Tank 15 (ITS 15)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			301.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	541.39
16E	Influent Storage Tank 16 (ITS 16)	21,000	8.5 x 45	Steel	9,581,250	0.027	0.120	0.001	0.003			302.23	5.17	240.16	3.54	0.34	1.01	0.28	234.99	542.39
17E	Weir Tank 1 (WT 1)	21,000	8.5 x 45	Steel	153,300,000	0.297	1.303	0.006	0.028	Closed top frac tank w/ internal weirs	Assuming 100,000ppm VOC (10%); RVP 6 plus BTEX	3106.42	56.05	2605.67	38.37	3.66	10.97	3.05	2549.62	5712.09
18E	Weir Tank 2 (WT 2)	21,000	8.5 x 45	Steel	153,300,000	0.297	1.303	0.006	0.028			3106.42	56.05	2605.67	38.37	3.66	10.97	3.05	2549.62	5712.09
19E	Settling Tank 1 (ST 1)	21,000	8.5 x 45	Steel	153,300,000	0.297	1.303	0.006	0.028	Closed top frac tanks used for settling	Assuming 100,000ppm VOC (10%), RVP 6 plus BTEX	3106.42	56.05	2605.67	38.37	3.66	10.97	3.05	2549.62	5712.09
20E	Settling Tank 2 (ST 2)	21,000	8.5 x 45	Steel	153,300,000	0.297	1.303	0.006	0.028			3106.42	56.05	2605.67	38.37	3.66	10.97	3.05	2549.62	5712.09
21E	Settling Tank 3 (ST 3)	21,000	8.5 x 45	Steel	153,300,000	0.297	1.303	0.006	0.028			3106.42	56.05	2605.67	38.37	3.66	10.97	3.05	2549.62	5712.09
22E	Settling Tank 4 (ST 4)	21,000	8.5 x 45	Steel	153,300,000	0.297	1.303	0.006	0.028			3106.42	56.05	2605.67	38.37	3.66	10.97	3.05	2549.62	5712.09
23E	Settling Tank 5 (ST 5)	21,000	8.5 x 45	Steel	153,300,000	0.297	1.303	0.006	0.028			3106.42	56.05	2605.67	38.37	3.66	10.97	3.05	2549.62	5712.09
24E	Effluent Tank 1 (ET 1)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003	Effluent water storage, closed top frac tanks manifolded together; 1/12 of material goes through each tank	Assuming 100,000ppm VOC (10%); RVP 6 plus BTEX	349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
25E	Effluent Tank 2 (ET 2)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003			349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
26E	Effluent Tank 3 (ET 3)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003			349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
27E	Effluent Tank 4 (ET 4)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003			349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
28E	Effluent Tank 5 (ET 5)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003			349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
29E	Effluent Tank 6 (ET6)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003			349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
30E	Effluent Tank 7 (ET 7)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003			349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
31E	Effluent Tank 8 (ET 8)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003			349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
32E	Effluent Tank 9 (ET 9)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003			349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
33E	Effluent Tank 10 (ET 10)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003			349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
34E	Effluent Tank 11 (ET 11)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003			349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
35E	Effluent Tank 12 (ET 12)	21,000	8.5 x 45	Steel	12,775,000	0.033	0.146	0.001	0.003			349.88	6.3	292.73	4.32	0.41	1.23	0.34	286.43	642.61
36E	Sludge Influent Tank 1 (SI1)	21,000	8.5 x 45	Steel	15,069,390	0.038	0.165	0.001	0.004	Closed top frac tank to feed press	Assuming 100,000ppm VOC (10%); RVP 6 plus BTEX	394.89	7.11	330.49	4.87	0.46	1.39	0.39	323.38	725.38
37E	Sludge Influent Tank 2 (SI2)	21,000	8.5 x 45	Steel	15,069,390	0.038	0.165	0.001	0.004			394.89	7.11	330.49	4.87	0.46	1.39	0.39	323.38	725.38
38E	FiltrateWater 1 (F1)	21,000	8.5 x 45	Steel	9,041,634	0.026	0.116	0.001	0.002	Closed top frac tank containing press filtrate	Assuming 100,000ppm VOC (10%), RVP 6 plus BTEX	276.65	4.99	231.29	3.41	0.33	0.98	0.27	226.3	507.94
39E	Water Loadout (W-1)					0.711	3.113	0.015	0.065	(see "Water Loadout" tab)										
40E	Sludge Loadout (SL-1)					0.050	0.220	0.001	0.006	(see "Sludge Loadout" tab)										

VOC emissions		HAP emissions	
lb/hr	ton/yr	lb/hr	ton/yr
3.784	16.576	0.081	0.357

	B	T	E	X
	3.54	0.34	1.01	0.28
lb/hr	0.00040411	3.88E-05	0.000115	3.2E-05
ton/yr	0.00177	0.00017	0.000505	0.00014

	B	T	E	X
	38.37	3.66	10.97	3.05
lb/hr	0.004380137	0.000418	0.001252	0.000348
ton/yr	0.019185	0.00183	0.005485	0.001525

	B	T	E	X
	4.32	0.41	1.23	0.34
lb/hr	0.000493151	4.68E-05	0.00014	3.88E-05
ton/yr	0.00216	0.000205	0.000615	0.00017

	B	T	E	X
	4.87	0.46	1.39	0.39
lb/hr	0.000555936	5.25E-05	0.000159	4.45E-05
ton/yr	0.002435	0.00023	0.000695	0.000195

	B	T	E	X
	3.41	0.33	0.98	0.27
lb/hr	0.000389269	3.77E-05	0.000112	3.08E-05
ton/yr	0.001705	0.000165	0.00049	0.000135

Water Loadout (W-1) Calculations

Assumptions: Based on January- 100,000 ppm (10%) mass fraction of emissions (lb)
Based on 420,000 gal/day
Used TANKS data for speciation

Equation: 12.46 SPM/T

4/27/2016

Emissions from ET - TANKS Calculation			W-1 Emissions based on Loadout		
lbs/year	%total		lb/day	ton/year	
642.61	1.0000	TOTAL	37.46	6.84	
4.32	0.0067	**Benzene**	0.25	0.05	
0.41	0.0006	**Ethylbenzene**	0.02	0.004	
286.43	0.4457	**Gasoline**	16.70	3.05	
1.23	0.0019	**Toluene**	0.07	0.01	
349.88	0.5445	**Water**	20.40	3.72	
0.34	0.0005	**Xylene**	0.02	0.002	
		HAPS	**0.367**	**0.065**	**HAPS Loadout Emissions in Tons/YR**
		VOCs	**17.065**	**3.113**	**VOCs Loadout Emissions in Tons/YR**

Variable	Value	Unit	
T	517.22	R	Liquid Bulk Temperature from TANKS
M	22	lb/lb - mole	Conservative Molecular Weight
P	0.2805	psia	Average at Liquid Bulk Temperature
S	0.6	saturation factor	

0.09 lb/10^3 gal

37.46 lb/day based on 10,000 bbl / day

6.84 ton/yr

Total Emissions

Sludge Loadout (SL-1) Calculations

4/27/2016

Assumptions: Based on January -100,000ppm mass fraction of emissions (lb); 700bbl/day of sludge
700 bbl of sludge per day @ 60% moisture. Liquid assumed to be 100,000ppm VOC.
700 bbl based on proposed process water balance of 70bbl of sludge per 1000bbl of influent.

Emissions from ET - TANKS Calculation			W-1 Emissions based on Loadout	
lbs/year	%total		lb/day	ton/year
642.61	1.0000	TOTAL	2.62	0.48
4.32	0.0067	**Benzene**	0.02	0.00
0.41	0.0006	**Ethylene**	0.00	0.000
286.43	0.4457	**Gasoline**	1.17	0.21
1.23	0.0019	**Toluene**	0.01	0.00
349.88	0.5445	**Water**	1.43	0.26
0.34	0.0005	**Xylene**	0.00	0.002
		HAPS	**0.026**	**0.006**
		VOCs	**1.195**	**0.220**

Equation: 12.46 SPM/T

Variable	Value	Unit	
T	517.22	R	Bulk Temperature from TANKS
M	22	lb/lb - mole	Conservative Molecular Weight
P	0.2805	psia	Average at Liquid Bulk Temperatur
S	0.6	saturation factor	

0.09 lb/10^3 gal
2.62 lb/day based on 700 bbl / day
0.48 ton/yr
Total Emissions

Fugitive Dust Emissions

Company Name HEP Shalewater, LLC
Facility Name Central Station
Facility Location Doddridge Co, WV

Gravel Access Road	Loaded Truck Weight[1] (tons)	Trips per year[2]	Trips per day[2]	Distance per round trip		VMT per year[3,4]
				Feet	Miles	
Frac Water Tank Truck	40	73,000	200	940	0.178	12996

Equation Parameter	PM-10/PM2.5	PM-Total
E, annual size-specific emission factor for PM_{10} & $PM_{2.5}$ (unpaved industrial roads) extrapolated for natural mitigations	see table below	see table below
k, Particle size multiplier for particle size range (PM_{10}), (lb/VMT) (Source: AP-42 Table 13.2.2-2)	1.5	4.9
k, Particle size multiplier for particle size range ($PM_{2.5}$), (lb/VMT) (Source: AP-42 Table 13.2.2-2)	0.15	
s, surface material silt content, (%) (Source: AP-42 Table 13.2.2-1)	4.8	4.8
W, mean weight (tons) of the vehicles traveling the road	40	40
a, constant for PM_{10} and $PM_{2.5}$ on industrial roads (Source: AP-42 Table 13.2.2-2)	0.9	0.7
b, constant for PM_{10} and $PM_{2.5}$ on industrial roads (Source: AP-42 Table 13.2.2-2)	0.45	0.45
P, number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period, based on AP-42 Figure 13.2.2-1.	160	160

$$E=[k(s/12)^a \times (w/3)^b] \times (365-P/365)$$

AP-42 Section 13.2.2

PM_{10} Emissions

lb/VMT	VMT/yr	Annual Uncontrolled PM10 Emissions (tpy)
1.18	12996.00	7.668

$PM_{2.5}$ Emissions

lb/VMT	VMT/yr	Annual Uncontrolled PM10 Emissions (tpy)
0.118	12996.00	0.767

PM- Total Emissions (tons/yr)

lb/VMT	VMT/yr	Annual Uncontrolled PM10 Emissions (tpy)
4.65	12996.00	30.216

ATTACHMENT O

Monitoring, Recordkeeping, Reporting, and Testing Plans

MONITORING, RECORDKEEPING, REPORTING AND TESTING PLANS

Monitoring

Daily visual monitoring will be conducted on the unpaved roadways and parking areas. If visual emissions are observed beyond the property line corrective measures will be implemented.

Recordkeeping

Samples of each load received are taken and results, acceptable or not acceptable are noted on the bill of laden or manifest. These records are maintained for a period of 90 days. A sample "Manifest" is attached.

Reporting

No periodic reporting is anticipated.

Testing Plans

Each inbound load will be sampled and visually assessed to determine if the material is acceptable. Additionally, inbound water will be tested randomly. The initial frequency will be at a rate of every 50,000 barrels received. After three months of operating, sample results will be evaluated, and provided the average VOC/HAP concentrations are at least 50% lower than values used in the permit application to determine potential emissions, the sampling frequency may be reduced to every 200,000 barrels.

The water sample will be collected at a sampling port installed on the header inlet piping system. Each water sample will be analyzed for VOC and SVOC per method 8260 and 8270.

ATTACHMENT
SAMPLE MANIFEST

HILLSTONE ENVIRONMENTAL

MANIFEST

Influent | Effluent

DATE	MANIFEST #
TIME	

Operator:	Well Name	Number
	TSS	Specific Gravity

Hauling Company	Truck #	Start Flow	#BBLS. Unloaded	End Flow
Designated Facility S.W.S. Water Precipitation	Location			

COMMENTS ☐ Flowback ☐ Greywater ☐ CSW ☐ Production ☐ Residual Waste ☐ Remedial

Transporter Acknowledgement of Delivery of Materials

Printed Name	Signature	Month	Day	Year

S.W.S. Intake Acknowledgement of Materials

Printed Name	Signature	Month	Day	Year

ATTACHMENT P

Public Notice

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that HEP Shalewater Solutions, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit for a facility to reclamation of water from Oil and Gas Exploration and Production located on County Road 11, near West Union, in Doddridge County, West Virginia. The latitude and longitude coordinates are: 39.280799 and -80.81253.

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be: Particulate Matter 10 (PM10) 7.668 tons per year, Volatile Organic Compounds (VOC) 16.576 tons per year, Total Hazardous Air Pollutants (HAP) 0.357 tons per year.

Startup of operation is planned to begin on or about the 9 day of June, 2016. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.
Dated this the 4th day of May, 2016.

By: HEP Shalewater Solutions, LLC
Tony Gutta
President
37 Grande Meadows Drive, Ste 201
Bridgeport, WV 26330