February 26, 2015

Assistant Director for Permitting
West Virginia Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304

via FedEx 7730 0620 1943

Re: R-13 Permit Application
Sherwood Compressor Station
Smithburg, Doddridge County, West Virginia

To Whom It May Concern:

Rover Pipeline LCC (Rover) is submitting this R-13 Permit Application to the West Virginia Department of Environmental Protection (WVDEP) for authorization of the Sherwood Compressor Station (the Station) located near Smithburg in Doddridge County, West Virginia. This application has been prepared in accordance with requirements of the WVDEP 45 Code of State Rules (CSR) 13 for permits to construct and operate.

Enclosed please find one hard copy and 2 CDs containing electronic copies of the application and related documents.

We would like to thank you in advance for your review and concurrence with this R-13 Permit Application. If you have any questions regarding the information presented in this letter and attachments, please do not hesitate to contact Mr. Weston Threeton at (713) 989-7733 or via email at Weston.Threeton@EnergyTransfer.com.

Sincerely,
Apex TITAN, Inc.

Kathryn J. Donnell

Kathryn Donnell, P.E.
Senior Managing Engineer

Attachments

cc: Mr. Weston Threeton, Environmental Specialist, Energy Transfer Company, via FedEx 7730 0623 7613
Mr. Thomas Tucker, Senior Air Quality Engineer, Apex Companies LLC via e-mail

SHERWOOD COMPRESSOR STATION
R-13 PERMIT APPLICATION

Prepared for:

ROVER PIPELINE LLC

ROVER PIPELINE
An ENERGY TRANSFER Company

Sherwood Compressor Station

Smithburg, Doddridge County, West Virginia

February 2015

Apex TITAN Inc. Job No: 1200413.001

Prepared by:

Apex TITAN, Inc., a Subsidiary of Apex Companies, LLC
2801 Network Boulevard, Suite 200
Frisco, TX 75034
T 469.365.1100 · F 469.365.1199
apexcos.com

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Introduction

Rover Pipeline LLC (Rover) is submitting this R-13 Permit Application to the West Virginia Department of Environmental Protection (WVDEP) to authorize emissions from the installation of equipment at the Sherwood Compressor Station (the Station) located in Doddridge County, West Virginia. The Station will consist of the following:

- Three (3) compressor engines and associated startup and blowdown emissions;
- One (1) Catalytic Industrial Group (CIG) flameless gas infrared catalytic heater;
- One (1) emergency generator;
- One (1) slop storage tank and associated loading;
- Two (2) wastewater tanks and associated loading;
- One (1) new oil tank;
- One (1) used oil tank;
- One (1) new coolant tank;
- One (1) used coolant tank;
- Pigging operations;
- Fugitive components; and,
- Unpaved roads.

The proposed facility will emit carbon monoxide (CO), oxides of nitrogen (NO_X), particulate matter (PM), including PM with aerodynamic diameters of 10 and 2.5 microns or less (PM_{10} and $PM_{2.5}$, respectively), sulfur dioxide (SO_2), volatile organic compounds (VOC), hazardous air pollutants (HAPs), and Greenhouse Gases (GHG).

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):*
Rover Pipeline LLC

2. Federal Employer ID No. ***(FEIN):***
47-1958303

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

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

5A. Applicant's mailing address:
Energy Transfer Company
1300 Main Street
Houston, Texas 77002

5B. Facility's present physical address:
Sherwood Compressor Station

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: Energy Transfer Company

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: Applicant is owner of the site.
- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.): Compressor Station

10. North American Industry Classification System **(NAICS)** code for the facility:
486210

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):

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

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

From the intersection of US Hwy 50 and Snowbird Road in Smithburg, head South on Snowbird Road for 1.8 miles. Turn Left on WV-18 for 1.2 miles. Turn Left on Eibscamp Road for 1.0 mile. Site will be to the Right.

12.B. New site address (if applicable):	12C. Nearest city or town: Smithburg, WV	12D. County: Doddridge
12.E. UTM Northing (KM): 4346.439	12F. UTM Easting (KM): 526.395	12G. UTM Zone: 17S

13. Briefly describe the proposed change(s) at the facility:
The proposed station will included the installation of three new compressor engines, an emergency generator, atmospheric storage tanks, loading, heater, pigging operations, unpaved road emissions, and piping and fugitives components.

14A. Provide the date of anticipated installation or change: 01/01/2016 – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /	14B. Date of anticipated Start-Up if a permit is granted: 06/01/2017

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

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day 24 Days Per Week 7 Weeks Per Year 52

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

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

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

Section II. Additional attachments and supporting documents.

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

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

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

– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence). See Attachment B.

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

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

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

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

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

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

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

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

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

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

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

☒ General Emission Unit, specify Compressor Engines (3)

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 M E Ryan *(Please use blue ink)* DATE: 2-18-2015 *(Please use blue ink)*

35B. Printed name of signee: Mark Ryan		35C. Title: VP Operations, Midwest Division
35D. E-mail: mark.ryan@energytransfer.com	36E. Phone: 317-879-3011	36F. FAX:
36A. Printed name of contact person (if different from above):		36B. Title:
36C. E-mail:	36D. Phone:	36E. FAX:

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

☐ ***Forward 1 copy of the application to the Title V Permitting Group and:***
☐ ***For Title V Administrative Amendments:***
  ☐ ***NSR permit writer should notify Title V permit writer of draft permit,***
☐ ***For Title V Minor Modifications:***
  ☐ ***Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,***
  ☐ ***NSR permit writer should notify Title V permit writer of draft permit.***
☐ ***For Title V Significant Modifications processed in parallel with NSR Permit revision:***
  ☐ ***NSR permit writer should notify a Title V permit writer of draft permit,***
  ☐ ***Public notice should reference both 45CSR13 and Title V permits,***
  ☐ ***EPA has 45 day review period of a draft permit.***

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

CASH ONLY IF ALL *CheckLock*™ SECURITY FEATURES LISTED ON BACK INDICATE NO TAMPERING OR COPYING

APEX TITAN, INC.
2801 NETWORK BLVD, SUITE 200
FRISCO, TX 75034

BANK OF TEXAS, NA
DALLAS, TX
32-1432/1110

25972

2/17/2015

PAY TO THE ORDER OF WV DEP Division of Air Quality

$ **2,000.00

Two Thousand and 00/100********** DOLLARS

TAMPER RESISTANT TONER AREA

West VA Dept. of Environmental Protection
Division of Air Quality
601 57th Street SE
Charleston, WV 25304

VOID AFTER 90 DAYS

MEMO Agency Fee 1200413.001

⑈025972⑈ ⑆111014325⑆ ⑈8092671152⑈

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Details on Back

Intuit® *CheckLock*™ Secure Check

TITAN ENGINEERING, INC.

25972

WV DEP Division of Air Quality

2/17/2015

Date	Type	Reference	Original Amt.	Balance Due	Discount	Payment
2/17/2015	Bill	1200413.001	2,000.00	2,000.00		2,000.00
					Check Amount	2,000.00

Bank of Texas Operati Agency Fee 1200413.001 2,000.00

ATTACHMENT A: BUSINESS CERTIFICATE

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC

State of West Virginia

Certificate

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

ROVER PIPELINE LLC

Control Number: 9A6D4

a limited liability company, organized under the laws of the State of Delaware

has filed its "Application for Certificate of Authority" in my office according to the provisions of West Virginia Code §31B-10-1002. I hereby declare the organization to be registered as a foreign limited liability company from its effective date of July 10, 2014, until a certificate of cancellation is filed with our office.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORITY OF A FOREIGN LIMITED LIABILITY COMPANY

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

Given under my hand and the Great Seal of the State of West Virginia on this day of July 10, 2014

Natalie E Tennant

Secretary of State

FILED

JUL 10 2014

IN THE OFFICE OF
WV SECRETARY OF STATE

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

Penney Barker, Manager
Corporations Division
Tel: (304)558-8000
Fax: (304)558-8381
Website: www.wvsos.com
E-mail: business@wvsos.com

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

WV APPLICATION FOR CERTIFICATE OF AUTHORITY OF LIMITED LIABILITY COMPANY

Office Hours: Monday – Friday
8:30 a.m. – 5:00 p.m. ET

Control # GALeD4

1. The **name** of the company as registered in its **home state** is: Rover Pipeline LLC
   and the state or country of organization is: Delaware

☑ **CHECK HERE to indicate you have obtained and submitted with this application a CERTIFICATE OF EXISTENCE (GOOD STANDING), dated during the current tax year, from your home state of original organization as required to process your application. The certificate may be obtained by contacting the Secretary of State's Office in the home state of original organization.**

2. The **name** to be used in **West Virginia** will be: [The **name must contain one of the required terms** such as limited liability company" or abbreviations such as "LLC" or "PLLC". See instructions for complete list of acceptable terms and requirements for use of trade name.]
   ☑ **Home State name as listed above, if available in WV** (If name is not available, check DBA Name box below and follow special instructions in **Section 2.** attached.)
   ☐ **DBA name** _____ (See special instructions in **Section 2.** Regarding the **Letter of Resolution** attached to this application.)

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

4. The street address of the **principal office** is:
   No. & Street: 3738 Oak Lawn Ave.
   City/State/Zip: Dallas, TX 75219
   and the mailing address (if different) is:
   Street/Box: _____
   City/State/Zip: _____

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

6. **Agent of Process:** Properly designated person to whom notice of legal process may be sent, if any:
   Name: Corporation Service Company
   Address: 209 West Washington Street
   City/State/Zip: Charleston, WV 25302

RECEIVED
JUL 10 2014

7. **E-mail address** where business correspondence may be received: peggy.harrison@energytransfer.com

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

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

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

List the **Name(s) and Address(es) of the Member(s)/Manager(s)** of the company (attach additional pages if necessary).

Name	Street Address	City, State, Zip
ET Rover Pipeline LLC	3738 Oak Lawn Ave.	Dallas, TX 75219

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

12. The **purpose** for which this limited liability company is formed are as follows:
(Describe the type(s) of business activity which will be conducted, for example, "real estate," "construction of residential and commercial buildings," "commercial printing," "professional practice of architecture.")
Pipeline transportation services

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

14. The number of pages attached and included in this application is: 4

15. The requested effective date is: [Requested date *may not be earlier than filing nor later than 90 days after filing in our office.*]
☑ the date & time of filing in the Secretary of State's Office
☐ the following date _____ and time _____

16. Contact and Signature Information* (See below *Important Legal Notice Regarding Signature*):

a. Peggy J Harrison — (918) 794-4559
Contact Name — Phone Number

b. Peggy J Harrison — Manager Corporate Governance
Print or type name of signer — Title / Capacity of Signer

c. Peggy J. Harrison — 6/27/2014
Signature — Date

***Important Legal Notice Regarding Signature: Per West Virginia Code §31B-2-209. Liability for false statement in filed record.** If a record authorized or required to be filed under this chapter contains a false statement, one who suffers loss by reliance on the statement may recover damages for the loss from a person who signed the record or caused another to sign it on the person's behalf and knew the statement to be false at the time the record was signed.

Delaware

The First State

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY "ROVER PIPELINE LLC" IS DULY FORMED UNDER THE LAWS OF THE STATE OF DELAWARE AND IS IN GOOD STANDING AND HAS A LEGAL EXISTENCE SO FAR AS THE RECORDS OF THIS OFFICE SHOW, AS OF THE NINTH DAY OF JULY, A.D. 2014.

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

AND I DO HEREBY FURTHER CERTIFY THAT THE SAID "ROVER PIPELINE LLC" WAS FORMED ON THE TWENTY-SIXTH DAY OF JUNE, A.D. 2014.

5559285 8300

140934897

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

Jeffrey W. Bullock, Secretary of State

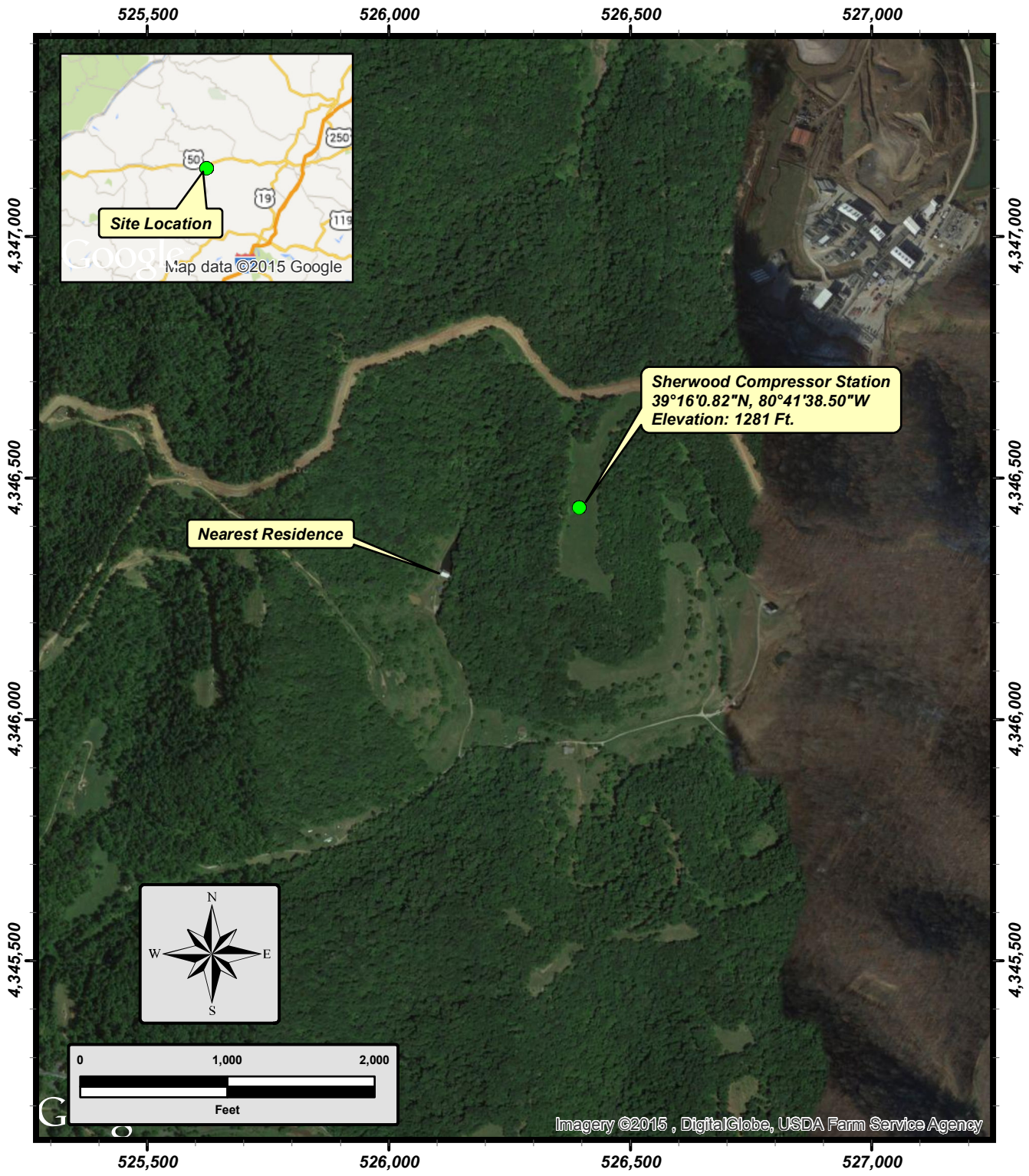
AUTHENTICATION: 1520626

DATE: 07-09-14

ATTACHMENT B: MAP

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC



Grid Presented is UTM Zone 17, NAD 1983

ATTACHMENT B-1 AREA MAP

Rover Pipeline LLC
Sherwood Compressor Station
Doddridge County, West Virginia
Apex-Project No. 1200413.001.00
February 2015
from USGS Quadrangle Smithburg, WV
Ground Condition Depicted June 2013
Digital Data Courtesy of Google Earth

Apex TTIAN, Inc.
2801 Network Boulevard, Suite 200
Frisco, Texas 75034
Phone: (469) 365-110 • Fax: (469) 365-1199
www.apexcos.com
A Subsidiary of Apex Companies, LLC

ATTACHMENT C: INTSTALLATION AND START-UP SCHEDULE

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC

INSTALLATION AND START-UP SCHEDULE

Upon permit submittal, Rover Pipeline LLC (Rover) intends to commence construction on those activities allowed by the WVDEP, at the sole risk of Rover. Rover anticipates that construction will require approximately eight to twelve months to complete, with operation commencing June 1, 2017.

ATTACHMENT D: REGULATORY DISCUSSION

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC

REGULATORY DISCUSSION

This Attachment D discusses the federal and state regulations that apply to the Rover Pipeline LLC (Rover) Sherwood Compressor Station (the Station).

45 CSR 2: To Prevent and Control Particulate Air Pollution From Combustion of Fuel in Indirect Heat Exchangers

45 CSR 2-3 limits opacity from fuel burning equipment to ten percent (10 %) opacity, based on a six minute block average, except during periods of startup, shutdown, or malfunction (SSM). At all times, including periods of start-ups, shutdowns and malfunctions, the Station will, to the extent practicable, maintain and operate the site's fuel burning unit in a manner consistent with good air pollution control practice for minimizing emissions. Attachment O presents the Station's monitoring methods for demonstrating compliance with this rule.

45 CSR 2-4 contains weight-based PM emissions standards for fuel burning units. The Station's heater is a type "b" unit, as defined in the rule. For type "b" fuel burning units, the PM emission limit is the product of 0.09 and the total design heat input for such units in million British thermal units per hour (MMBtu/hr), not to exceed 600 lb/hr PM from all such units. Per 45 CSR 2-11, Exemptions, fuel burning units with a heat input less than 10 MMBtu/hr are exempt from this rule. The proposed heater (Emission Unit ID: HTR-1) has a heat input below 10 MMBtu/hr; therefore, the heater is not subject to this rule. Per 45 CSR 2-11, the heater is also not subject to 45 CSR 2-5, 2-6, 2-8, or 2-9.

45 CSR 4: To Prevent and Control the Discharge of Air Pollutants into the Open Air Which Causes or Contributes to an Objectionable Odor or Odors

This rule prohibits the discharge of air contaminants that cause or contribute to an objectionable odor. The Station will be operated to comply with this requirement.

45 CSR 6: Control of Air Pollution from Combustion of Refuse

This rule also prohibits (with limited exception) open burning and sets forth the registration, permitting, reporting, testing, emergency, natural disaster and exemption provisions for activities involving the combustion of refuse and land clearing debris. The Station will comply with the open burning provisions of this rule.

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

This rule establishes weight-based emission standards for SO_2 from fuel burning units. Per 45 CSR 10-10, Exemptions, since the heater at the Station is fired on sweet natural gas and has a design heat input less than 10 MMBtu/hr, it is exempt from 45 CSR 10-2 and 10-6 through 10-8. Therefore, this rule does not apply.

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

Rover Pipeline is applying for the installation and operation of a new station that is not a major source and is subject to, and will comply with, the permitting requirements of this rule. Detailed emission rate calculations are included in Attachment N to this application.

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

The Station is a minor source. As mentioned above, detailed emission rate calculations are included in Attachment N to this application.

45 CSR 16: Standards of Performance for New Stationary Sources

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

NSPS JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engine. According to 40 CFR §60.4230(a)(4)(i), spark ignition internal combustion engines with a maximum engine power greater than or equal to 500 horsepower (HP) and manufactured after January 1, 2007 are subject to these standards. The Station's compressor engines (Emission Unit IDs: CE-1S, CE-2S, and CE-3S) are subject to, and will comply with, these emission standards, testing, and reporting requirements, since they were manufactured after the applicable date.

NSPS IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. According to 40 CFR §60.4200(a)(2)(i), stationary CI ICE manufactured after April 1, 2006 are subject to these standards. The Station's new emergency diesel generator (Emission Unit ID: GE-1) is subject to, and will comply with, these standards, since the engine was manufactured after the applicable date.

NSPS OOOO – Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution.

The emission sources affected by this subpart include well completions, pneumatic controllers, equipment leaks from natural gas processing plants, sweetening units at natural gas processing plants, reciprocating compressors, centrifugal compressors and storage vessels which are constructed, modified or reconstructed after August 23, 2011.

For natural gas transmission compressor stations, standards apply to storage vessels constructed, modified or reconstructed after August 23, 2011, with VOC emissions equal to or greater than 6 tons per year (T/yr). The proposed storage tanks have an uncontrolled potential to emit less than 6 T/yr of VOC; therefore, this section does not apply.

The Station is not currently planned to have natural gas processing, sweetening units, or centrifugal compressors with wet gas seals and will not be subject to the requirements of NSPS OOOO for those affected facilities.

45 CSR 17: To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage, and Other Sources of Fugitive Particulate Matter

Rover Pipeline will utilize dust control measures to prevent fugitive PM from being emitted beyond the property line during the construction of the Station. Rover will maintain the Station's roads in a manner consistent with this rule.

45 CSR 19: Permits for Construction and Major Modification of Major Stationary Sources Which Cause or Contributes to Nonattainment Areas

The Station is located in Doddridge County, West Virginia, which is designated as attainment. Therefore, this rule does not apply.

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

The Station does not include any proposed stacks that exceed the Good Engineering Practice height.

40 CSR 21: Regulation to Prevent and Control Air Pollution from the Emission of Volatile Organic Compounds

The Station is not located in Putnam County, Kanawha County, Cabell County, Wayne County, or Wood County; therefore, this rule does not apply.

45 CSR 22: Air Quality Management Fee Program

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

- 45 CSR 13 Application Fee: $ 1,000
- NSPS Source: $ 1,000

$ 2,000

45 CSR 27: To Prevent and Control the Emissions of Toxic Air Pollutants

Per 45 CSR 27-2.4, this rule does not apply because the equipment used in the production and/or distribution of petroleum products is exempt, provided that the equipment does not produce or contact materials containing more than 5% benzene by weight.

45 CSR 29: Rule Requiring the Submission of Emissions Statements for Volatile Organic Compound Emissions and Oxides of Nitrogen Emissions

The Station is not located in Putnam County, Kanawha County, Cabell County, Wayne County, Wood County, or Greenbrier County; therefore, this rule does not apply.

45 CSR 30: Requirements for Operating Permits

The Station is not a major source with respect to Title V; therefore, this rule does not apply.

45 CSR 34: Emission Standards for Hazardous Air Pollutants

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

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

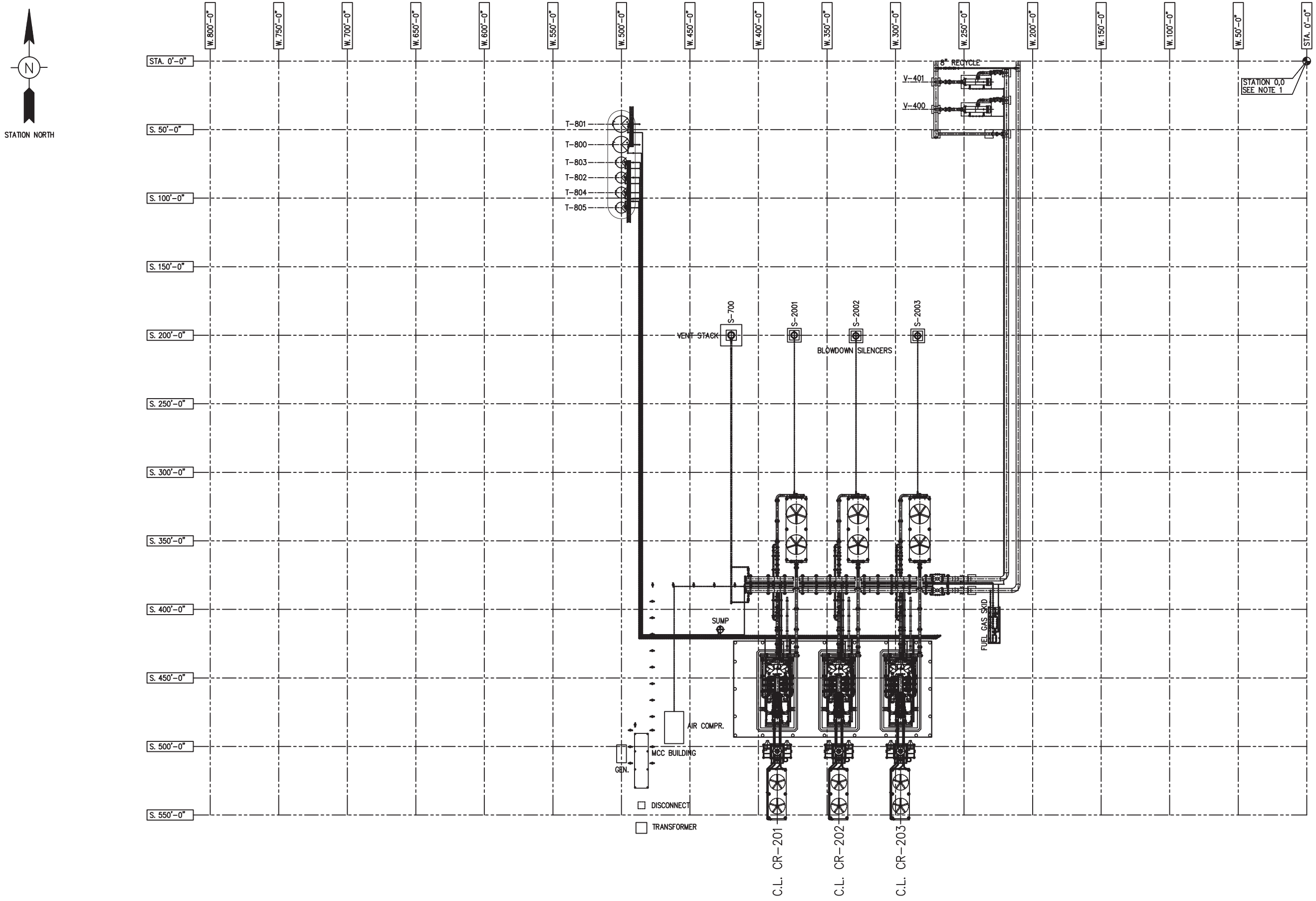
40 CFR Part 63 contains MACT standards for various source categories and/or industries. The Station is an area source of HAPs. The following sections address the MACT standards that potentially apply to the Station, including:

- MACT ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. The proposed engines (Unit Emissions IDs: CE-1S, CE-2S, CE-3S, and GE-1) are classified as new ICE at an area source because they were constructed after June 12, 2006, as that term is defined in MACT ZZZZ. According to §63.6590(c)(1), new Spark Ignited ICE must meet the requirements of this rule by complying with NSPS JJJJ or NSPS IIII.

ATTACHMENT E: PLOT PLAN

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC



E-1

DWG. NO.	REFERENCE DRAWING TITLE

NO.	REVISION – DESCRIPTION	BY	DATE	CHK'D	APP'D
A	ISSUED FOR REVIEW	JTA	8/21/14	TA	

DWG. STATUS	CHECKED BY	CHECKED DATE	APPROVED BY	APPROVED DATE	APPROVED BY	APPROVED DATE
PREL'Y						
BID						
CONSTR.						
CADDS	PLOT DATE: UPD FILE NAME: CAD					

P.I./STA. NO.
ACCOUNT NO.

CONSTRUCTION YEAR 2014	BY	DATE
DESIGN	JTA	8/21/14
DRAWN	JTA	8/21/14
ASBUILT		

FILE NO.
SCALE: NONE

ENERGY TRANSFER
Transwestern Pipeline Company

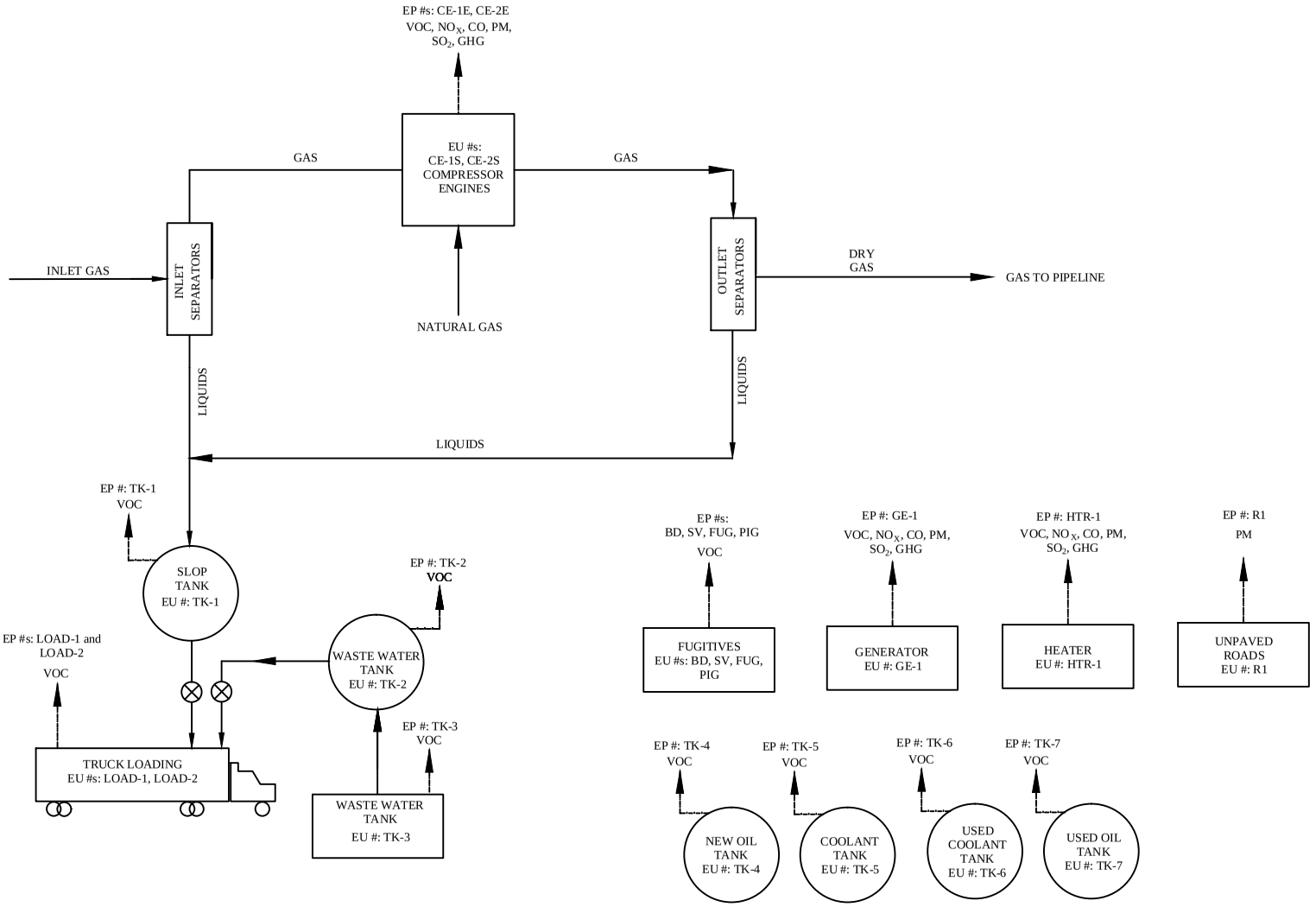
SHERWOOD COMPRESSOR STATION
COMPRESSOR STATION PLOT PLAN

PROJECT NO. TK????
PREVIOUS DWG. NO.
SHEET 1 OF 1
DWG. NO. TK????-200-01 A
SHEET 1 OF 1

ATTACHMENT F: PROCESS FLOW DIAGRAM

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC



F-1

ROVER PIPELINE
An ENERGY TRANSFER Company

FIGURE 2

PROCESS FLOW DIAGRAM

Rover Pipeline LLC
Sherwood Compressor Station
R-13 Permit Application

DESIGNED BY:	DETAILED BY:	CHECKED BY:
ETC	MCK	TNT/PH
FILE NAME: P:\CAD Projects\Office - Cincinnati\ETC-Rover		
DATE: 2/2015	PROJECT NO.: 1200413.001.00	PLOT SCALE: NTS
DRAWING NO.: ROVER-1	REVISION: 0	FIGURE: 2

ATTACHMENT G: PROCESS DESCRIPTION

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC

PROCESS DESCRIPTION

This R-13 permit application is being submitted to authorize three (3) compressor engines and associated blowdowns and start-ups, one (1) emergency diesel generator, one (1) atmospheric aboveground slop storage tank, two (2) waste water tanks, four (4) associated engine/miscellaneous equipment tanks, one (1) line heater, truck loading operations, fugitive emissions from unpaved roads, pigging operations, and fugitive emissions from piping components (the Project). These activities/equipment are located at the Sherwood Compressor Station (the Station) near Smithburg in Doddridge County, West Virginia.

The new compressor engines (Emission Unit IDs: CE-1S, CE-2S, and CE-3S) will be used to increase the pressure of the natural gas to transmission pipeline's pressure. The compressors are natural gas fired and have associated engine blowdowns (Emission Unit ID: BD) and start-ups (Emission Unit ID: SV). Pigging operations (Emission Unit ID: PIG) of the pipeline are conducted periodically to clean the pipeline. Liquids from the pipeline are purged into the slop tank (Emission Unit ID: TK-1). The slop tank contents are loaded via trucks (Emission Unit ID: LOAD-1) for off-site disposal.

The two waste water tanks (Emission Unit IDs: TK-2 and TK-3) operate in series. TK-3 is an underground storage tank (UST) which collects cleanup and sump water. TK-3 is pumped to TK-2. TK-2 contents are loaded via trucks (Emission Unit ID: LOAD-2)) for off-site disposal.

The station also has a small natural gas fired heater (Emission Unit ID: HTR-1), emergency generator (Emission Unit ID: GE-1), and associated engine/miscellaneous equipment tanks (Emission Unit IDs: TK-4, TK-5, TK-6, and TK-7). There are also emissions from equipment component leaks (Emission Unit ID: FUG), as well as fugitive emissions from unpaved roads (Emission Unit ID: R1).

ATTACHMENT I: EMISSION UNITS TABLE

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC

Attachment I

Emission Units Table

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

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
CE-1S	CE-1E	Caterpillar G3616 4SLB Catalyst	2016	4735 hp	New	CC-1
CE-2S	CE-2E	Caterpillar G3616 4SLB Catalyst	2016	4735 hp	New	CC-2
CE-3S	CE-3E	Caterpillar G3616 4SLB Catalyst	2016	4735 hp	New	CC-3
GE-1	GE-1	Caterpillar C15 ACERT	2016	957 hp	New	None
FUG	FUG	Site Fugitives	2016	N/A	New	None
TK-1	TK-1	Slop Tank 1 (300 bbl)	2016	300 bbl	New	None
TK-2	TK-2	Waste Water Tank 1 (300 bbl)	2016	300 bbl	New	None
TK-3	TK-3	Waste Water Tank 2 (2500 gal)	2016	2500 gal	New	None
TK-4	TK-4	New Oil Tank (100 bbl)	2016	100 bbl	New	None
TK-5	TK-5	Coolant Tank (100 bbl)	2016	100 bbl	New	None
TK-6	TK-6	Used Coolant Tank (100 bbl)	2016	100 bbl	New	None
TK-7	TK-7	Used Oil Tank (100 bbl)	2016	100 bbl	New	None
LOAD-1	LOAD-1	Slop Truck Loading	2016		New	None
LOAD-2	LOAD-2	Waste Water Truck Loading	2016		New	None
HTR-1	HTR-1	CIG Flameless Gas Infrared Heater	2016	0.51MMB/h	New	None
BD	BD	Compressor Blowdowns	2016	N/A	New	None
SV	SV	Engine Starter Vents	2016	N/A	New	None
PIG	PIG	Pigging Operations	2016	N/A	New	None
R1	R1	Unpaved Road Emissions	2016	N/A	New	None

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

ATTACHMENT J: EMISSION POINTS DATA SUMMARY SHEET

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
CE-1E	Vertical Stack	CE-1S	Compressor Engine 1	CC-1	Oxidation Catalyst	N/A	N/A	NO_x	5.74	22.86	5.74	22.86	Gas	Vendor Specification Sheets	N/A
								CO	31.58	125.75	2.21	8.80	Gas		
								VOC	7.23	28.81	3.62	14.40	Gas		
								PM	0.39	1.55	0.39	1.55	Gas		
								SO_2	0.02	0.09	0.02	0.09	Gas		
								CO_{2e} ([1])	--	18,178	--	18,178	Gas		
								HAPs([2])	3.67	14.90	1.06	4.36	Gas		
CE-2E	Vertical Stack	CE-2S	Compressor Engine 2	CC-2	Oxidation Catalyst	N/A	N/A	NO_x	5.74	22.86	5.74	22.86	Gas	Vendor Specification Sheets	N/A
								CO	31.58	125.75	2.21	8.80	Gas		
								VOC	7.23	28.81	3.62	14.40	Gas		
								PM	0.39	1.55	0.39	1.55	Gas		
								SO_2	0.02	0.09	0.02	0.09	Gas		
								CO_{2e} ([1])	--	18,178	--	18,178	Gas		
								HAPs([2])	3.67	14.90	1.06	4.36	Gas		
CE-3E	Vertical Stack	CE-3S	Compressor Engine 3	CC-3	Oxidation Catalyst	N/A	N/A	NO_x	5.74	22.86	5.74	22.86	Gas	Vendor Specification Sheets	N/A
								CO	31.58	125.75	2.21	8.80	Gas		
								VOC	7.23	28.81	3.62	14.40	Gas		
								PM	0.39	1.55	0.39	1.55	Gas		
								SO_2	0.02	0.09	0.02	0.09	Gas		
								CO_{2e} ([1])	--	18,178	--	18,178	Gas		
								HAPs([2])	3.67	14.90	1.06	4.36	Gas		
GE-1	Vertical Stack	GE-1	Emergency Generator	N/A	N/A	N/A	N/A	NO_x	13.32	3.03	13.32	3.03	Gas	Vendor Specification Sheets	N/A
								CO	0.93	0.21	0.93	0.21	Gas		
								VOC	0.02	0.01	0.02	0.01	Gas		
								PM	0.04	0.01	0.04	0.01	Gas		
								SO_2	0.43	0.10	0.43	0.10	Gas		
								CO_{2e} ([1])	--	146.68	--	146.68	Gas		
								HAPs([2])	0.01	0.001	0.01	0.001	Gas		

FUG	N/A	FUG	Fugitives	N/A	N/A	C	C	VOC CO_{2e} (1) HAPs(2)	0.35 -- 0.001	1.54 289 0.01	0.35 -- 0.001	1.54 289 0.01	Gas Gas Gas	TCEQ Guidance for equipment leak fugitives	N/A
TK-1	Vertical	TK-1	Slop Tank	N/A	N/A	N/A	N/A	VOC	0.32	0.001	0.32	0.001	Slop	Tanks 4.09d	N/A
TK-2	Vertical	TK-2	Waste Water Tank	N/A	N/A	N/A	N/A	VOC	0.31	0.001	0.31	0.001	Waste Water	Tanks 4.09d	N/A
TK-3	Vertical	TK-3	Waste Water Tank	N/A	N/A	N/A	N/A	VOC	0.07	0.001	0.07	0.001	Waste Water	Tanks 4.09d	N/A
TK-4	Vertical	TK-4	New Oil Tank	N/A	N/A	N/A	N/A	VOC	<0.01	<0.01	<0.01	<0.01	Lube Oil	Tanks 4.09d	N/A
TK-5	Vertical	TK-5	Coolant Tank	N/A	N/A	N/A	N/A	VOC	0.01	<0.01	0.01	<0.01	Coolant	Tanks 4.09d	N/A
TK-6	Vertical	TK-6	Used Coolant Tank	N/A	N/A	N/A	N/A	VOC	0.01	<0.01	0.01	<0.01	Coolant	Tanks 4.09d	N/A
TK-7	Vertical	TK-7	Used Oil Tank	N/A	N/A	N/A	N/A	VOC	<0.01	<0.01	<0.01	<0.01	Lube Oil	Tanks 4.09d	N/A
LOAD-1	Vertical	LOAD-1	Slop Truck Loading	N/A	N/A	N/A	N/A	VOC	0.67	0.001	0.67	0.001	Slop	AP-42	N/A
LOAD-2	Vertical	LOAD-2	Waste Water Truck Loading	N/A	N/A	N/A	N/A	VOC	0.67	0.001	0.67	0.001	Waste Water	AP-42	N/A
HTR-1	Vertical Stack	HTR-1	CIG Flameless Gas Infrared Catalytic Heater	N/A	N/A	N/A	N/A	NO_x CO VOC PM SO_2 CO_{2e} (1) HAPs(2)	0.05 0.04 0.003 0.004 0.0003 -- 0.001	0.22 0.19 0.01 0.02 0.001 264 0.004	0.05 0.04 0.003 0.004 0.0003 -- 0.001	0.22 0.19 0.01 0.02 0.001 264 0.004	Gas Gas Gas Gas Gas Gas Gas	AP-42	N/A

BD	Vertical Stack	BD	Compressor Blowdowns	N/A	N/A	N/A	N/A	VOC CO_{2e} (1) HAPs(2)	6.53 -- 0.16	0.12 132 0.003	6.53 -- 0.16	0.12 132 0.003	Gas Gas Gas	EE	N/A
SV	Vertical Stack	SV	Engine Starter Vents	N/A	N/A	N/A	N/A	VOC CO_{2e} (1) HAPs(2)	2.94 -- 0.07	0.15 174 0.004	2.94 -- 0.07	0.15 174 0.004	Gas Gas Gas	EE	N/A
PIG	Vertical Stack	PIG	Pigging	N/A	N/A	N/A	N/A	VOC CO_{2e} (1) HAPs(2)	45.68 -- 1.14	0.07 77.11 0.002	45.68 -- 1.14	0.07 77.11 0.002	Gas Gas Gas	EE	N/A
R1	Fugitive	R1	Unpaved Roads	N/A	N/A	N/A	N/A	PM PM_{10} $PM_{2.5}$	2.79 0.82 0.08	1.30 0.38 0.04	1.39 0.41 0.04	0.65 0.19 0.02	Solid Solid Solid	AP-42	N/A

Notes:
(1) Hourly emissions could not be quantified. CO_2e emissions include CO_2, CH_4, and N_2O.
(2) Individual HAPs are provided in Attachment N. This column shows the total amount of HAPs.

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).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°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
CE-1S	2.5	856	32027	108.74	1281 ft	54	4346.439	526.395
CE-2S	2.5	856	32027	108.74	1281 ft	54	4346.439	526.395
CE-3S	2.5	856	32027	108.74	1281 ft	54	4346.439	526.395
GE-1	1	910	3655	77.56	1281 ft	20	4346.439	526.395
FUG	N/A	N/A	Not Applicable		1281 ft		4346.439	526.395
TK-1					1281 ft		4346.439	526.395
TK-2					1281 ft		4346.439	526.395
TK-3					1281 ft		4346.439	526.395
TK-4					1281 ft		4346.439	526.395
TK-5					1281 ft		4346.439	526.395
TK-6					1281 ft		4346.439	526.395
TK-7					1281 ft		4346.439	526.395
LOAD-1					1281 ft		4346.439	526.395
LOAD-2					1281 ft		4346.439	526.395

HTR-1	0.5	800			1281 ft	20	4346.439	526.395
BD					1281 ft		4346.439	526.395
SV					1281 ft		4346.439	526.395
PIG					1281 ft		4346.439	526.395
R1	N/A	N/A	Not Applicable		1281 ft		4346.439	526.395

[1] Give at operating conditions. Include inserts.
[2] Release height of emissions above ground level.

ATTACHMENT K: FUGITIVE EMISSIONS DATA SUMMARY SHEET

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

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

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

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? ☒ 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	Not Applicable					
Unpaved Haul Roads	PM PM_{10} $PM_{2.5}$	2.79 0.82 0.08	1.30 0.38 0.04	1.39 0.41 0.04	0.65 0.19 0.02	AP-42
Storage Pile Emissions	Not Applicable					
Loading/Unloading Operations	VOC	LOAD-1 0.67 LOAD-2 0.67	LOAD-1 0.001 LOAD-2 0.001	LOAD-1 0.67 LOAD-2 0.67	LOAD-1 0.001 LOAD-2 0.001	AP-42
Wastewater Treatment Evaporation & Operations	Not Applicable					
Equipment Leaks	VOC (Refer to Attachment N for emission speciation)	0.35	1.54	0.35	1.54	EPA
General Clean-up VOC Emissions	Not Applicable					
Other	Not Applicable					

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

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

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

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

ATTACHMENT L: EMISSIONS UNIT DATA SHEETS

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC

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*):LOAD-1, LOAD-2	
1. Loading Area Name: Slop and Waste Water Truck Loading	
2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply): Drums Marine Vessels Rail Tank Cars ✕ Tank Trucks	
3. Loading Rack or Transfer Point Data:	
Number of pumps	TBD
Number of liquids loaded	Slop and Waste Water
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	TBD
4. Does ballasting of marine vessels occur at this loading area? Yes No ✕Does not apply	
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point:	
6. Are cargo vessels pressure tested for leaks at this or any other location? Yes 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	1	1	1	1
days/week	7	7	7	7

weeks/quarter	2	2	2	2

8. Bulk Liquid Data *(add pages as necessary):*							
Pump ID No.		TBD	TBD				
Liquid Name		Slop	Waste Water				
Max. daily throughput (1000 gal/day)							
Max. annual throughput (1000 gal/yr)							
Loading Method [1]		BF	BF				
Max. Fill Rate (gal/min)							
Average Fill Time (min/loading)							
Max. Bulk Liquid Temperature (^{o}F)		55.86	55.86				
True Vapor Pressure [2]		0.20	0.20				
Cargo Vessel Condition [3]		U	U				
Control Equipment or Method [4]		None	None				
Minimum control efficiency (%)		0	0				
Maximum Emission Rate	Loading (lb/hr)	0.67	0.67				
	Annual (lb/yr)	1.90	1.90				
Estimation Method [5]		EPA	EPA				

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

[2] At maximum bulk liquid temperature

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

[4] List as many as apply (complete and submit appropriate *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)

9. **Proposed Monitoring, Recordkeeping, Reporting, and Testing** Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.	
MONITORING Refer to Regulatory Discussion in Attachment O	RECORDKEEPING Refer to Regulatory Discussion in Attachment O
REPORTING Refer to Regulatory Discussion in Attachment O	TESTING Refer to Regulatory Discussion in 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
RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.
REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.
TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.
10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty N/A

Attachment L
EMISSIONS UNIT DATA SHEET
CHEMICAL PROCESS

For chemical processes please fill out this sheet and all supplementary forms (see below) that apply. Please check all supplementary forms that have been completed.

☐ *Emergency Vent Summary Sheet*
☒ *Leak Sources Data Sheet*
☐ *Toxicology Data Sheet*
☐ *Reactor Data Sheet*
☐ *Distillation Column Data Sheet*

1. Chemical process area name and equipment ID number (as shown in *Equipment List Form*)
   Fugitives FUG

2. Standard Industrial Classification Codes (SICs) for process(es)
   4922

3. List raw materials and ☒ attach MSDSs
   Natural Gas

4. List Products and Maximum Production and ☐ attach MSDSs

Description and CAS Number	Maximum Hourly (lb/hr)	Maximum Annual (ton/year)

5. Complete the *Emergency Vent Summary Sheet* for all emergency relief devices.

6. Complete the *Leak Source Data Sheet* and describe below or attach to application the leak detection or maintenance program to minimize fugitive emissions. Include detection instruments, calibration gases or methods, planned inspection frequency, and record-keeping, and similar pertinent information. If subject to a rule requirement (e.g. 40CFR60, Subpart VV), please list those here.
   Refer to Attachment N for fugitive calculations. The equipment is subject to NSPS OOOO, and will comply with the requirements of this rule regarding monitoring, leak definitions, recordkeeping, and reporting.

7. Clearly describe below or attach to application Accident Procedures to be followed in the event of an accidental spill or release.

8A. Complete the *Toxicology Data Sheet* or attach to application a toxicology report (an up-to-date material safety data sheets (MSDS) may be used) outlining the currently known acute and chronic health effects of each compound or chemical entity emitted to the air. If these compounds have already been listed in Item 3, then a duplicate MSDS sheet is not required. Include data such as the OSHA time weighted average (TWA) or mutagenicity, teratogenicity, irritation, and other known or suspected effects should be addressed. Indicate where these are unknown, and provide references.

8B. Describe any health effects testing or epidemiological studies on these compounds that are being or may be conducted by the company or required under TSCA, RCRA or other federal regulations. Discuss the persistence in the environment of any emission (e.g. pesticides, etc.).

9. **Waste Products** - Waste products status: (If source is subject to RCRA or 45CSR25, please contact the Hazardous Waste Section of WVDEP, OAQ at (304) 926-3647.)

9A. Types and amounts of wastes to be disposed:

9B. Method of disposal and location of waste disposal facilities:

Carrier: Phone:

9C. Check here if approved USEPA/State Hazardous Waste Landfill will be used ☐

10. Maximum and Projected Typical Operating Schedule for process or project as a whole (circle appropriate units).

circle units:	(hrs/day) (hr/batch)	(days), (batches/day), (batches/week)	(days/yr), (weeks/year)
10A. Maximum	24 hrs/day	7 days/week	365 days/year
10B. Typical	24 hrs/day	7 days/week	365 days/year

11. Complete a *Reactor Data Sheet* for each reactor in this chemical process.

12. Complete a *Distillation Column Data Sheet* for each distillation column in this chemical process.

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

MONITORING	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 or air pollution control device.

RECORDKEEPING. Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING. Please describe the proposed frequency of reporting of the recordkeeping.

TESTING. Please describe any proposed emissions testing for this process equipment or air pollution control device.

14. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
N/A

INFORMATION REQUIRED FOR CHEMICAL PROCESSES

The notes listed below for chemical processes are intended to help the applicant submit a complete application to the OAQ; these notes are not intended to be all inclusive. The requirements for a complete application for a permit issued under 45CSR13 are designed to provided enough information for a permit reviewer to begin a technical review. Additional information beyond that identified may be required to complete the technical review of any individual application.

Process Description

Please keep these points in mind when completing your process description as part of this permit application.

1. Provide a general process overview. This brief, but complete, process description should include chemical or registered trademark names of chemical products, intermediates, and/or raw materials to be produced or consumed, and the ultimate use(s) of the product(s). A list of the various chemical compounds is helpful.
2. Describe each process step. Include the process chemistry and stoichiometrically balanced reaction equation or material mass balance on all components.
3. Describe the methods and equipment used to receive, store, handle, and charge raw materials.
4. Describe the methods and equipment used to handle, store, or package final products and intermediates.
5. Provide process flow diagrams or equipment layout drawings which clearly show the process flow relationships among all pieces of process and control equipment. Identify all air emission discharge points. Discuss instrumentation and controls for the process.
6. Discuss the possibilities of process upsets, the duration and frequency of upsets, and consequences (including air emissions) of these upsets. Include a description of rupture discs, pressure relief valves, and secondary containment systems.
7. Discuss any fugitive emissions and the methods used to minimize them.
8. Include the following plans for the process if available:
   a. preventative maintenance and malfunction abatement plan (recommended for all control equipment).
   b. continuous emissions (in-stack) monitoring plan
   c. ambient monitoring plan
   d. emergency response plan

Regulatory Discussion

The following state and federal air pollution control regulations may be applicable to your chemical process. You should review these regulations carefully to determine if they apply to your process. Please summarize the results of your review in your permit application along with any other regulations you believe are applicable.

- Title 45 Legislative Rule Division of Environmental Protection, Office of Air Quality contains West Virginia's air pollution control regulations, including the following promulgated rules which may require emissions reductions or control technologies for your chemical process:
  a. 45CSR27 - Best Available Technology (BAT) for Toxic Air Pollutants (TAPs)
  b. 45CSR21 - VOC emissions controls for ozone maintenance in Kanawha, Cabell, Putnam, Wayne, and Wood counties.
  c. 45CSR13 (Table 45-13A) - plantwide emission thresholds for permitting for certain pollutants.
- Federal Guidelines for case-by-case MACT determinations under section 112(g) of the 1990 CAAA for individual and total HAPs greater than 10 and 25 tons per year, respectively.
- There are also subparts of the federal Standards of Performance for New Stationary Sources (NSPS), 40CFR60 60, and the National Emission Standards for Hazardous Air Pollutants (NESHAP) at 40CFR61 and 40CFR63, which apply to various chemical and nonchemical processes. These subparts are too numerous to list here, but these areas of the federal regulations should be consulted carefully to determine applicability to your process.

Emissions Summary and Calculations

Please keep these points in mind when submitting your emissions calculations as part of this permit application.

1. For each pollutant, provide the basis for the emissions estimate and for all emission reduction(s) or control efficiency(ies) claimed.
2. For all batch processes provide the following
   a. Emissions of each pollutant in pound(s) per batch, from each process step
   b. Annual emissions based on number of batches requested per year
   c. The total time for each process step and the duration of the emissions during the process step
   d. Total batch time, total emissions per batch (or per day), and annual emissions based on the number of batches requested per year.

EMERGENCY VENT SUMMARY SHEET

List below all emergency relief devices, rupture disks, safety relief valves, and similar openings that will vent only under abnormal conditions.

Emission Point ID[1]	Equipment to Relief Vent (type, ID if available)[2]	Relief Vents (type) & Set Pressure (psig)	Name of Chemical(s) or Pollutants Controlled	Worst Case Emission per Release Event (lbs)

All routine vents (non-emergency) should be listed on the *Emission Points Data Summary Sheet.*

[1] Indicate the emission point, if any, to which source equipment normally vents. Do not assign emission point ID numbers to each emergency relief vent or device.

[2] List all emergency relief devices next to the piece of equipment from which they control releases.

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components[1]	Number of Components Monitored by Frequency[2]	Average Time to Repair (days)[3]	Estimated Annual Emission Rate (lb/yr)[4]
Pumps[5]	light liquid VOC[6,7]	See Attachment N for approximate component counts and service.		.	See Attachment N for estimated emissions.
	heavy liquid VOC[8]				
	Non-VOC[9]				
Valves[10]	Gas VOC				
	Light Liquid VOC				
	Heavy Liquid VOC				
	Non-VOC				
Safety Relief Valves[11]	Gas VOC				
	Non VOC				
Open-ended Lines[12]	VOC				
	Non-VOC				
Sampling Connections[13]	VOC				
	Non-VOC				
Compressors	VOC				
	Non-VOC				
Flanges	VOC				
	Non-VOC				
Other	VOC				
	Non-VOC				

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

Notes for Leak Source Data Sheet

1. For VOC sources include components on streams and equipment that contain greater than 10% w/w VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.

2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in ppm. Do not include monitoring by visual or soap-bubble leak detection methods. "M/Q(M)/Q/SA/A/O" means the time period between inspections as follows:

   Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/Other (specify time period)

   If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with non checked at any other frequency, you would put in the category "valves, gas service:" 0/50/0/75/0/50 (bimonthly).

3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.

4. Note the method used: MB - material balance; EE - engineering estimate; EPA - emission factors established by EPA (cite document used); O - other method, such as in-house emission factor (specify).

5. Do not include in the equipment count sealless pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)

6. Volatile organic compounds (VOC) means the term as defined in 40 CFR □51.100 (s).

7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a light liquid.

8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a heavy liquid.

9. LIST CO, H_2S, mineral acids, NO, NO_2, SO_3, etc. DO NOT LIST CO_2, H_2, H_2O, N_2, O_2, and Noble Gases.

10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.

11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.

12 Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.

13. Do not include closed-purge sampling connections.

TOXICOLOGY DATA SHEET[1]

Descriptor Name/CAS Number	OSHA Limits[2]		Acute[3] TC_{LO} - Animal LC_{LO} - Animal LC_{50} - Animal	Chronic[4]	Irritation[5]	References
	TWA	CL				

[1] Indicate by "ND" where no data exists, in company's knowledge.
[2] Time Weighted Average, Ceiling Limit, or other, with units.
[3] If inhalation data is not available, provide other data as available.
[4] Relying on animal or human studies, indicate if any data suggests: C = carcinogenicity, M = mutagenicity, T = teratogenecity, O = oncogenicity.
[5] Indicate if there are dermal or eye irritation effects and whether they are considered to be low, moderate, or severe.

REACTOR DATA SHEET

Provide the following information for <u>each</u> piece of equipment that is a potential or actual source of emissions as shown on the *Equipment List Form* and other parts of application.

Identification Number (as shown on *Equipment List Form*):

1. Name and type of equipment (e.g. CSTR, plug flow, batch, etc.)

2. Type of operation ☐ Batch ☐ Continuous ☐ Semi-batch

3. Projected Actual Equipment Operating Schedule (complete appropriate lines):

hrs/day	days/week	weeks/year
hrs/batch	batches/day, weeks (Circle one)	day,weeks/yr (Circle one)

4. Feed Data Flow In = gal/hr, or gal/batch

Material Name & CAS No.	Phase[a]	Specific Gravity	Vapor Pressure[b]	Charge Rate			Fill Time (min/batch, run)[c]
				Normal	Max	Units	

a. S = Solid, L = Liquid, G = gas or vapor
b. At feed conditions
c. Total time that equipment is filling per batch or run (start-up), for tank or vessel-type equipment.

5. Provide all **chemical reactions** that will be involved (if applicable), including the residence time and any side reactions that may occur as well as gases that may be generated during these reactions. Indicate if the reaction(s) are exothermic or endothermic.

6. Maximum Temperature	7A. Maximum Pressure 7B. Max. Set Pressure for venting	
°C	mmHg	mmHg
°F	psig	psig

8. Output Data Flow Out = gal/hr or gal/batch

Material Name and CAS No.	Phase	Specific Gravity	Vapor Pressure	Hourly or Batch Output Rate		
				Normal	Maximum	Units

9. Complete the following emission data for equipment connected to a header exhaust system, giving emissions levels before entering header system (i.e. before control equipment).

☐ Check here if not applicable

Emission Point ID (exhaust point of header system):

Material Name and CAS No.	Maximum Potential Emission Rate (lb/hr)	Method **

** MB - material balance: EE - Engineering Estimate: TM - Test Measurement (submit test data): O - other (Explain)

10. Provide the following information pertaining to each condenser that may be attached to this reactor. Attach additional pages as necessary if more than one condenser is used for this reactor. Complete the Condenser Air Pollution Control Device Sheet if necessary.

☐ Check here if not applicable

10A. Cooling material

10B. Minimum and Maximum flowrate of cooling material (gal/hr)

10C. Inlet temperature of cooling material (°F)

10D. Outlet temperature of cooling material (°F)

10E. Pressure drop of gas to be condensed from inlet to outlet (psig)

10F. Inlet temperature of gas stream (°F)

10G. Outlet temperature of gas stream (°F)

10H. Number of passes

10I. Cooling surface area

11. Provide the following pertaining to auxiliary equipment that burns fuel (heaters, dryers, etc.):

☐ Check here if not applicable

11A. Type of fuel and maximum fuel burn rate, per hour:

11B. Provide maximum percent sulfur (S), ash content of fuel, and the energy content using appropriate units:

%S % Ash BTU/lb, std. ft^3/day, gal

(circle one)

11C. Theoretical combustion air requirement in SCFD per unit of fuel (circle appropriate unit) @ 70°F and 14.7 PSIA:

SCFD/lb, SCFD, gal (circle one)

11D. Percent excess air: %

11E. Type, amount, and BTU rating of burners and all other firing equipment that are planned to be used:

11F. Total maximum design heat input: $\times 10^6$ BTU/hr.

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

MONITORING	RECORDKEEPING
REPORTING	TESTING

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

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

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

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

13. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NOTE: An *AIR POLLUTION CONTROL DEVICE SHEET* must be completed for any air pollution device(s) (except emergency relief devices) used to control emissions from this reactor.

DISTILLATION COLUMN DATA SHEET

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

1. Name and type of equipment

#. Projected actual equipment operating schedule (complete appropriate lines):

hrs/day	days/week	weeks/year
hrs/batch	batches/day, batches/week (circle one)	days/yr, weeks/yr (circle one)

2. Number of stages (plates), excluding condenser

3. Number of feed plates and stage location

4. Specify details of any reheating, recycling, or stage conditioning along with the stage locations

5. Specify reflux ratio, R (where R is defined as the ratio of the reflux to the overhead product, given symbolically as R=L/D, where L = liquid down column, D = distillation product)

6. Specify the fraction of feed which is vaporized, f (where f is the molal fraction of the feed that leaves the feed plate continuously as vapor).

7A. Type of condenser used: ☐ total ☐ partial ☐ multiple ☐ other

7B. For each condenser provide process operating details including all inlet and outlet temperatures, pressures, and compositions.

8. Feed Characteristics
   A. Molar composition
   B. Individual vapor pressure of each component
   C. Total feed stage pressure
   D. Total feed stage temperature
   E. Total mass flow rate of each stream into the system

9. Overhead Product
   A. Molar composition of components
   B. Vapor pressure of components
   C. Total mass flow rate of all streams leaving the system as overhead products

10. Bottom Product
   A. Molar composition of all components
   B. Total mass flow rate of all steams leaving the system as bottom products

11. General Information
    A. Distillation column diameter
    B. Distillation column height
    C. Type of plates
    D. Plate spacing
    E. Murphree plate efficiency
    F. Any other information necessary of describe the operation of this distillation column.

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

MONITORING	RECORDKEEPING
REPORTING	TESTING

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

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

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

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

13. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NOTE: An *AIR POLLUTION CONTROL DEVICE SHEET* must be completed for any air pollution device(s) (except emergency relief devices) used to control emissions from this distillation column.

NATURAL GAS-FIRED COMPRESSOR ENGINE (RICE)
EMISSION UNIT DATA SHEET

Complete this section for any natural gas-fired reciprocating internal combustion engine.

Emission Unit (Source) ID No.[1]		**CE-1S**		**CE-2S**		**CE-3S**	
Emission Point ID No. [2]		**CE-1E**		**CE-2E**		**CE-3E**	
Engine Manufacturer and Model		**Caterpillar G3616**		**Caterpillar G3616**		**Caterpillar G3616**	
Manufacturer's Rated bhp/rpm		**4735**		**4735**		**4735**	
Source Status[3]		**NS**		**NS**		**NS**	
Date Installed/Modified/Removed[4]		**2016**		**2016**		**2016**	
Engine Manufactured/Reconstruction Date[5]		**1/1/2016**		**1/1/2016**		**1/1/2016**	
Is this engine subject to 40CFR60, Subpart JJJJ?		**Yes**		**Yes**		**Yes**	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60, Subpart JJJJ? (Yes or No)[6]		**No**		**No**		**No**	
Is this engine subject to 40CFR63, Subpart ZZZZ? (yes or no)		**Yes**		**Yes**		**Yes**	
Engine, Fuel and Combustion Data	Engine Type[7]	**LB4S**		**LB4S**		**LB4S**	
	APCD Type[8]	**CAT**		**CAT**		**CAT**	
	Fuel Type[9]	**PQ**		**PQ**		**PQ**	
	H_2S (gr/100 scf)	**0.0**		**0.0**		**0.0**	
	Operating bhp/rpm	**4,735 hp at 1,000 rpm**		**4,735 hp at 1,000 rpm**		**4,735 hp at 1,000 rpm**	
	BSFC (Btu/bhp-hr)	**7,491**		**7,491**		**7,491**	
	Fuel throughput (ft^3/hr)	**32,100**		**32,100**		**32,100**	
	Fuel throughput ($MMft^3$/yr)	**281**		**281**		**281**	
	Operation (hrs/yr)	**8,760**		**8,760**		**8,760**	
Reference[10]	Potential Emissions[11]	**lbs/hr**	**tons/yr**	lbs/hr	tons/yr	lbs/hr	tons/yr
MD	NO_X	5.74	22.86	5.74	22.86	5.74	22.86
MD	CO	2.21	8.80	2.21	8.80	2.21	8.80
MD	VOC	3.62	14.40	3.62	14.40	3.62	14.40
AP	SO_2	0.02	0.09	0.02	0.09	0.02	0.09
AP	PM_{10}	0.39	1.55	0.39	1.55	0.39	1.55
MD	Formaldehyde	0.72	2.85	0.72	2.85	0.72	2.85
MRR[12]	Proposed Monitoring:	**See Attachment O**		**See Attachment O**		**See Attachment O**	
	Proposed Recordkeeping:	**See Attachment O**		**See Attachment O**		**See Attachment O**	
	Proposed Reporting:	**See Attachment O**		**See Attachment O**		**See Attachment O**	

Instructions for completing the Engine Emission Unit Data Sheet:

[1] Enter the appropriate Emission Unit (Source) identification number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the production pad. Multiple compressor engines should be designated CE-1S, CE-2S, etc. or other appropriate designation. Generator engines should be designated GE-1S, GE-2S, etc. or other appropriate designation. If more than three (3) engines exist, please use additional sheets.

[2] For Emission Points, use the following numbering system: 1E, 2E, etc. or other appropriate designation.

[3] Enter the Source Status using the following codes: NS = Construction of New Source (installation); ES = Existing Source; MS = Modification of Existing Source; and RS = Removal of Source

[4] Enter the date (or anticipated date) of the engine's installation (construction of source), modification or removal.

[5] Enter the date that the engine was manufactured, modified or reconstructed.

[6] Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart JJJJ. If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance according to 40CFR§60.4243a(2)(i) through (iii), as appropriate. ***Provide a manufacturer's data sheet for all engines being registered and a manufacturer's EPA certification of conformity sheet.***

[7] Enter the Engine Type designation(s) using the following codes: LB2S = Lean Burn Two Stroke, RB4S = Rich Burn Four Stroke, and LB4S =Lean Burn Four Stroke.

[8] Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes: NSCR = Rich Burn & Non-Selective Catalytic Reduction, PSC = Rich Burn & Prestratified Charge, SCR = Lean Burn & Selective Catalytic Reduction, or CAT = Lean Burn & Catalytic Oxidation

[9] Enter the Fuel Type using the following codes: PQ = Pipeline Quality Natural Gas, or RG = Raw Natural Gas

[10] Enter the Potential Emissions Data Reference designation using the following codes. Attach all referenced data to this *Compressor/Generator Data Sheet(s)*. Codes: MD = Manufacturer's Data, AP = AP-42 Factors, GR = GRI-HAPCalc™ , or OT = Other _____ (please list)

[11] Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the *Emissions Summary Sheet as Attachment O*.

[12] Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the operation of this engine operation and associated air pollution control device. Include operating ranges and maintenance procedures required by the manufacturer to maintain the warranty.

EMERGENCY GENERATOR ENGINE DATA SHEET

Source Identification Number[1]		GE-1					
Engine Manufacturer and Model		Caterpillar C15 ACERT					
Manufacturer's Rated bhp/rpm		957 @ 1800 rpm					
Source Status[2]		NS					
Date Installed/Modified/Removed[3]		1/1/2016					
Engine Manufactured/Reconstruction Date[4]		2016					
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart IIII? (Yes or No)[5]		Yes					
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart JJJJ? (Yes or No)[6]		No					
Engine, Fuel and Combustion Data	Engine Type[7]	N/A					
	APCD Type[8]	N/A					
	Fuel Type[9]	2FO					
	H_2S (gr/100 scf)	0.0					
	Operating bhp/rpm	957 @ 1800 rpm					
	BSFC (Btu/bhp-hr)	5,239					
	Fuel throughput (ft^3/hr)						
	Fuel throughput ($MMft^3$/yr)						
	Operation (hrs/yr)	500					
Reference[10]	Potential Emissions[11]	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
MD	NO_X	13.32	3.03				
MD	CO	0.93	0.21				
MD	VOC	0.02	0.01				
AP	SO_2	0.43	0.10				
MD	PM_{10}	0.04	0.01				
AP	Formaldehyde	0.0004	0.0001				

1. Enter the appropriate Source Identification Number for each emergency generator. Generator engines should be designated EG-1, EG-2, EG-3 etc. If more than three (3) engines exist, please use additional sheets.

2. Enter the Source Status using the following codes:

NS	Construction of New Source (installation)	ES	Existing Source
MS	Modification of Existing Source	RS	Removal of Source

3. Enter the date (or anticipated date) of the engine's installation (construction of source), modification or removal.

4. Enter the date that the engine was manufactured, modified or reconstructed.

5. Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart IIII. If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance according to 40CFR§60.4210 as appropriate.

   Provide a manufacturer's data sheet for all engines being registered.

6. Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart JJJJ. If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance according to 40CFR§60.4243a(2)(i) through (iii), as appropriate.

   Provide a manufacturer's data sheet for all engines being registered.

7. Enter the Engine Type designation(s) using the following codes:

LB2S	Lean Burn Two Stroke	RB4S	Rich Burn Four Stroke
LB4S	Lean Burn Four Stroke		

8. Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:

A/F	Air/Fuel Ratio	IR	Ignition Retard
HEIS	High Energy Ignition System	SIPC	Screw-in Precombustion Chambers
PSC	Prestratified Charge	LEC	Low Emission Combustion
NSCR	Rich Burn & Non-Selective Catalytic Reduction	SCR	Lean Burn & Selective Catalytic Reduction

9. Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas
2FO	#2 Fuel Oil	LPG	Liquid Propane Gas

10. Enter the Potential Emissions Data Reference designation using the following codes. Attach all referenced data to this *Compressor/Generator Data Sheet(s)*.

MD	Manufacturer's Data	AP	AP-42	
GR	GRI-HAPCalc™	OT	Other _____	(please list)

11. Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the *Emissions Summary Sheet*.

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*): BD

1. Name or type and model of proposed affected source: Compressor Blowdowns
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: 1 Blowdown event per hour, 12 Blowdowns per engine per year.
4. Name(s) and maximum amount of proposed material(s) produced per hour: Blowdown volume per Event, scf -- 6887 scf/event
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

* 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:

1 Blowdown event per hour, 12 Blowdowns per engine per year.

(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	36 hrs/yr	Days/Week	Weeks/Year

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

@ °F and psia

a.	NO_X		lb/hr	grains/ACF
b.	SO_2		lb/hr	grains/ACF
c.	CO		lb/hr	grains/ACF
d.	PM_{10}		lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	6.53	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	HAPs	0.16	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
Discussed in Attachment O.	Discussed in Attachment O.
REPORTING	**TESTING**
Discussed in Attachment O.	Discussed in Attachment O.

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

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

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

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

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
N/A

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

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

Identification Number (as assigned on *Equipment List Form*): SV

1. Name or type and model of proposed affected source: Engine Starter Vents
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: 1 Start-up per hour, 35 Start-ups per engine per year.
4. Name(s) and maximum amount of proposed material(s) produced per hour: Starter vent volume per Event, scf -- 3099 scf/event
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

* 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:

1 Start-up per hour, 35 Start-ups per engine per year.

(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: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	105 hrs/yr	Days/Week	Weeks/Year

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

@ °F and psia

a.	NO_X		lb/hr	grains/ACF
b.	SO_2		lb/hr	grains/ACF
c.	CO		lb/hr	grains/ACF
d.	PM_{10}		lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	2.94	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	HAPs	0.07	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
Discussed in Attachment O.	Discussed in Attachment O.
REPORTING	**TESTING**
Discussed in Attachment O.	Discussed in Attachment O.

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

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

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

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

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
N/A

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

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

Identification Number (as assigned on *Equipment List Form*): PIG

1. Name or type and model of proposed affected source: Pigging Operations
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of proposed process material(s) charged per hour: 1 Pigging event per hour, 3 Pigging events per year.
4. Name(s) and maximum amount of proposed material(s) produced per hour: Pigging volume per Event, scf -- 48,206 scf/event
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

* 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:

1 Pigging event per hour, 3 Pigging events per year.

(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: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	3 hrs/yr	Days/Week	Weeks/Year

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

@ °F and psia

a.	NO_X		lb/hr	grains/ACF
b.	SO_2		lb/hr	grains/ACF
c.	CO		lb/hr	grains/ACF
d.	PM_{10}		lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	45.68	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	HAPs	1.14	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
Discussed in Attachment O.	Discussed in Attachment O.
REPORTING	**TESTING**
Discussed in Attachment O.	Discussed in Attachment O.

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

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

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

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

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
N/A

Attachment L
FUGITIVE EMISSIONS FROM UNPAVED HAULROADS

UNPAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)

		PM	PM-10
k =	Particle size multiplier	4.9	1.5
s =	Silt content of road surface material (%)	10	10
p =	Number of days per year with precipitation >0.01 in.	171	171

Item Number	Description	Number of Wheels	Mean Vehicle Weight (tons)	Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)
1	Average Truck	18	40	5				N/A	50
2									
3									
4									
5									
6									
7									
8									

Source: *AP-42 Fifth Edition – 13.2.2 Unpaved Roads*

$E = k \times 5.9 \times (s \div 12) \times (S \div 30) \times (W \div 3)^{0.7} \times (w \div 4)^{0.5} \times ((365 - p) \div 365) =$ lb/Vehicle Mile Traveled (VMT)

Where:

		PM	PM-10
k =	Particle size multiplier	4.9	1.5
s =	Silt content of road surface material (%)	10	10
S =	Mean vehicle speed (mph)	5	5
W =	Mean vehicle weight (tons)	40	40
w =	Mean number of wheels per vehicle	18	18
p =	Number of days per year with precipitation >0.01 in.	171	171

For lb/hr: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr

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

SUMMARY OF UNPAVED HAULROAD EMISSIONS

Item No.	PM				PM-10			
	Uncontrolled		Controlled		Uncontrolled		Controlled	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
1	2.79	1.30	1.39	0.65	0.82	0.38	0.41	0.19
2								
3								
4								
5								
6								
7								
8								
TOTALS	2.79	1.30	1.39	0.65	0.82	0.38	0.41	0.19

FUGITIVE EMISSIONS FROM PAVED HAULROADS

INDUSTRIAL PAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)

I =	Industrial augmentation factor (dimensionless)	
n =	Number of traffic lanes	
s =	Surface material silt content (%)	
L =	Surface dust loading (lb/mile)	

Item Number	Description	Mean Vehicle Weight (tons)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)
1							
2							
3							
4							
5							
6							
7							
8							

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

$E = 0.077 \times I \times (4 \div n) \times (s \div 10) \times (L \div 1000) \times (W \div 3)^{0.7}$ = lb/Vehicle Mile Traveled (VMT)

Where:

I =	Industrial augmentation factor (dimensionless)	
n =	Number of traffic lanes	
s =	Surface meterial silt content (%)	
L =	Surface dust loading (lb/mile)	
W =	Average vehicle weight (tons)	

For lb/hr: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr

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

SUMMARY OF PAVED HAULROAD EMISSIONS

Item No.	Uncontrolled		Controlled	
	lb/hr	TPY	lb/hr	TPY
1				
2				
3				
4				
5				
6				
7				
8				
TOTALS				

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form):

Equipment Information

1. Manufacturer: CIG Flameless Gas Infrared Catalytic Heater HC2100	2. Model No. HC2100 Serial No.
3. Number of units: 1	4. Use
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: 2016	8. Date of last modification and explain:
9. Maximum design heat input per unit: 0.51 ×10^6 BTU/hr	10. Peak heat input per unit: 0.51 ×10^6 BTU/hr
11. Steam produced at maximum design output: LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☐ Others, specify	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: %
17. Will flyash be reinjected? ☐ Yes ☐ No	18. Percent of carbon in flyash: %

Stack or Vent Data

19. Inside diameter or dimensions: 0.5 ft.	20. Gas exit temperature: 800 °F
21. Height: 20 ft.	22. Stack serves: ☒ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.						
	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	ft^3/hr	ft^3/hr	TPH	
	Annually	$\times 10^3$ gal	$\times 10^6$ ft^3/hr	$\times 10^6$ ft^3/hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	gr/100 ft^3	Maximum: wt. %	
	Ash (%)				Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	1106 BTU/ft^3	BTU/ft^3	BTU/lb	
	Source					
	Supplier					
	Halogens (Yes/No)					
	List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: VOC = 0.003 lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.04			
Hydrocarbons				
NO_x	0.05			
Pb				
PM_{10}	0.004			
SO_2	0.0003			
VOCs	0.003			
Other (specify)	0.001(HAPs)			

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.04			
Hydrocarbons				
NO_x	0.05			
Pb				
PM_{10}	0.004			
SO_2	0.0003			
VOCs	0.003			
Other (specify)	0.001 (HAPs)			

39. How will waste material from the process and control equipment be disposed of?

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet?

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

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

See Attachment O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

See Attachment O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

See Attachment O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

See Attachment O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

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	2. Tank Name Slop Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) TK-1	4. Emission Point Identification No. (as assigned on *Equipment List Form*) TK-1
5. Date of Commencement of Construction (for existing tanks) 1/1/2016	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
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.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 300 bbl	
9A. Tank Internal Diameter (ft) 12	9B. Tank Internal Height (or Length) (ft) 15
10A. Maximum Liquid Height (ft) 15	10B. Average Liquid Height (ft) 7.5
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) 30,000	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ 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 X vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & 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): 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 Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to 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]
See Attachment N					Tanks 4.09

[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	2. Tank Name Waste Water Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) TK-2	4. Emission Point Identification No. (as assigned on *Equipment List Form*) TK-2
5. Date of Commencement of Construction (for existing tanks) 1/1/2016	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
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.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 300 bbl	
9A. Tank Internal Diameter (ft) 12	9B. Tank Internal Height (or Length) (ft) 15
10A. Maximum Liquid Height (ft) 15	10B. Average Liquid Height (ft) 7.5
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) 30,000	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ 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 X vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & 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): 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 — Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to 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]
See Attachment N					Tanks 4.09

[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	2. Tank Name Waste Water Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) TK-3	4. Emission Point Identification No. (as assigned on *Equipment List Form*) TK-3
5. Date of Commencement of Construction (for existing tanks) 1/1/2016	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
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.): NOTE: De Minimis Source No. 58	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 2500 gal	
9A. Tank Internal Diameter (ft) 8	9B. Tank Internal Height (or Length) (ft) 7.5
10A. Maximum Liquid Height (ft) 7.5	10B. Average Liquid Height (ft) 3.75
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) 30,000	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ 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 ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)
- ☐ External Floating Roof ___ pontoon roof ___ double deck roof
- ☐ Domed External (or Covered) Floating Roof
- ☐ Internal Floating Roof ___ vertical column support ___ self-supporting
- ☐ Variable Vapor Space ___ lifter roof ___ diaphragm
- ☐ Pressurized ___ spherical ___ cylindrical
- ☒ Underground
- ☐ Other (describe)

III. TANK CONSTRUCTION & 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): 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 — Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to 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]
See Attachment N					Tanks 4.09

[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	2. Tank Name New Oil Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) TK-4	4. Emission Point Identification No. (as assigned on *Equipment List Form*) TK-4
5. Date of Commencement of Construction (for existing tanks) 1/1/2016	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
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.): NOTE: De Minimis Source No. 58	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 100 bbl	
9A. Tank Internal Diameter (ft) 10	9B. Tank Internal Height (or Length) (ft) 8
10A. Maximum Liquid Height (ft) 8	10B. Average Liquid Height (ft) 4
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) 50,400	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ 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 X vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & 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): 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 ☐ Vapor Mounted Resilient Seal	☐ Liquid 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 — Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to 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]
See Attachment N					Tanks 4.09

[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	2. Tank Name Coolant Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) TK-5	4. Emission Point Identification No. (as assigned on *Equipment List Form*) TK-5
5. Date of Commencement of Construction (for existing tanks) 1/1/2016	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
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.): NOTE: De Minimis Source No. 58	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 100 bbl	
9A. Tank Internal Diameter (ft) 10	9B. Tank Internal Height (or Length) (ft) 8
10A. Maximum Liquid Height (ft) 8	10B. Average Liquid Height (ft) 4
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) 50,400	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ 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 X vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & 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): 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 — Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to 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]
See Attachment N					Tanks 4.09

[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	2. Tank Name Used Coolant Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) TK-6	4. Emission Point Identification No. (as assigned on *Equipment List Form*) TK-6
5. Date of Commencement of Construction (for existing tanks) 1/1/2016	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
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.): NOTE: De Minimis Source No. 58	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 100 bbl	
9A. Tank Internal Diameter (ft) 10	9B. Tank Internal Height (or Length) (ft) 8
10A. Maximum Liquid Height (ft) 8	10B. Average Liquid Height (ft) 4
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) 50,400	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ 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 X vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & 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): 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 ☐ Vapor Mounted Resilient Seal ☐ Liquid 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 — Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to 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]
See Attachment N					Tanks 4.09

[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	2. Tank Name Used Oil Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) TK-7	4. Emission Point Identification No. (as assigned on *Equipment List Form*) TK-7
5. Date of Commencement of Construction (for existing tanks) 1/1/16	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
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.): NOTE: De Minimis Source No. 58	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 100 bbl	
9A. Tank Internal Diameter (ft) 10	9B. Tank Internal Height (or Length) (ft) 8
10A. Maximum Liquid Height (ft) 8	10B. Average Liquid Height (ft) 4
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) 50,400	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ 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 X vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & 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): 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 — Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to 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]
See Attachment N					Tanks 4.09

[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 N: SUPPORTING EMISSIONS CALCULATIONS

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC

SUMMARY OF PROPOSED ALLOWABLE EMISSION RATES

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

		Potential to Emit															
		VOC		NO_X		CO		PM		PM_{10}		$PM_{2.5}$		SO_2		CO_2e	
Emissions Unit ID	Description	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)
CE-1S	Compressor Engine 1	4.33	17.26	5.74	22.86	2.21	8.80	0.39	1.55	0.39	1.55	0.39	1.55	0.02	0.09	--	18,178.25
CE-2S	Compressor Engine 2	4.33	17.26	5.74	22.86	2.21	8.80	0.39	1.55	0.39	1.55	0.39	1.55	0.02	0.09	--	18,178.25
CE-3S	Compressor Engine 3	4.33	17.26	5.74	22.86	2.21	8.80	0.39	1.55	0.39	1.55	0.39	1.55	0.02	0.09	--	18,178.25
GE-1	Emergency Generator 1	0.02	0.01	13.32	3.03	0.93	0.21	0.04	0.01	0.04	0.01	0.04	0.01	0.43	0.10	--	146.68
FUG	Site Fugitives	0.35	1.54	--	--	--	--	--	--	--	--	--	--	--	--	--	288.83
TK-1	Slop Tank (300 bbl)	0.32	0.001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-2	Waste Water Tank 1 (300 bbl)	0.31	0.001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-3	Waste Water Tank 2 (2500 gal)	0.07	0.001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-4	New Oil Tank (100 bbl)	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-5	Coolant Tank (100 bbl)	0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-6	Used Coolant Tank (100 bbl)	0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-7	Used Oil Tank (100 bbl)	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LOAD-1	Slop Truck Loading	0.67	0.001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LOAD-2	Waste Water Truck Loading	0.67	0.001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HTR1	CIG Flameless Gas Infrared Catalytic Heater HC2100	0.003	0.01	0.05	0.22	0.04	0.19	0.004	0.02	0.004	0.02	0.004	0.02	0.0003	0.001	--	263.58
BD	Compressor Blowdowns	6.53	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	132.20
SV	Engine Starter Vents	2.94	0.15	--	--	--	--	--	--	--	--	--	--	--	--	--	173.52
PIG	Pigging Operations	45.68	0.07	--	--	--	--	--	--	--	--	--	--	--	--	--	77.11
R1	Unpaved Road Emissions	--	--	--	--	--	--	1.39	0.65	0.41	0.19	0.04	0.02	--	--	--	--
	Totals:	**70.58**	**53.67**	**30.60**	**71.83**	**7.60**	**26.80**	**2.61**	**5.33**	**1.63**	**4.87**	**1.26**	**4.70**	**0.50**	**0.37**	**--**	**55,616.67**

SUMMARY OF POTENTIAL HAP EMISSION RATES

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

		Potential to Emit																			
		CH_2O		Acetaldehyde		Acrolein		Benzene		Toluene		Ethylbenzene		Methanol		N-Hexane		Other HAPs		Total HAPs	
Emissions Unit ID	Description	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)	Hourly (lb/hr)	Annual (T/yr)
CE-1S	Compressor Engine 1	0.72	2.85	0.15	0.65	0.09	0.40	0.01	0.03	0.01	0.03	0.001	0.003	0.04	0.19	0.02	0.09	0.02	0.09	1.06	4.35
CE-2S	Compressor Engine 2	0.72	2.85	0.15	0.65	0.09	0.40	0.01	0.03	0.01	0.03	0.001	0.003	0.04	0.19	0.02	0.09	0.02	0.09	1.06	4.35
CE-3S	Compressor Engine 3	0.72	2.85	0.15	0.65	0.09	0.40	0.01	0.03	0.01	0.03	0.001	0.003	0.04	0.19	0.02	0.09	0.02	0.09	1.06	4.35
GE-1	Emergency Generator 1	0.0004	0.0001	0.00013	0.00003	0.00004	0.00001	0.004	0.001	0.001	0.000	--	--	--	--	--	--	--	--	0.01	0.001
FUG	Site Fugitives	--	--	--	--	--	--	0.001	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	--	0.001	0.01
TK-1	Slop Tank 1 (300 bbl)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-2	Slop Tank 2 (300 bbl)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-3	Waste Water Tank (2500 gal)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-4	New Oil Tank (100 bbl)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-5	Coolant Tank (100 bbl)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-6	Used Coolant Tank (100 bbl)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TK-7	Used Oil Tank (100 bbl)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LOAD-1	Slop Truck Loading	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LOAD-2	Waste Water Truck Loading	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HTR-1	CIG Flameless Gas Infrared Catalytic Heater HC2100	0.00004	0.0002	--	--	--	--	0.000001	0.000005	0.000002	0.00001	--	--	--	--	0.001	0.004	0.000001	0.000004	0.001	0.004
BD	Compressor Blowdowns	--	--	--	--	--	--	0.16	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	--	0.16	0.003
SV	Engine Starter Vents	--	--	--	--	--	--	0.07	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	--	0.07	0.004
PIG	Pigging Operations	--	--	--	--	--	--	1.14	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	--	1.14	0.002
R1	Unpaved Road Emissions	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Totals:	**2.15**	**8.56**	**0.44**	**1.95**	**0.27**	**1.20**	**1.41**	**0.12**	**0.02**	**0.10**	**0.002**	**0.01**	**0.13**	**0.58**	**0.06**	**0.26**	**0.06**	**0.28**	**4.56**	**13.06**

CALCULATION OF COMPRESSOR ENGINE CRITERIA POLLUTANT POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Emission Unit ID	Description	Engine Ratings: Type	Engine Ratings: Rated Horsepower (hp)	Engine Ratings: Fuel Consumption (Btu/hp-hr)	Fuel Gas Heating Value (Btu/scf)	Annual Operating Hours (hr/yr)	Pollutant	Uncontrolled Emission Factors [a]	Units	Catalyst Control Efficiency	Post-Control Emission Factors [a]	Units	Potential to Emit (PTE): Hourly [a] (lb/hr)	Potential to Emit (PTE): Annual [b] (T/yr)
Proposed Operations														
CE-1S	Compressor Engine 1	Caterpillar G3616 4 Stroke Lean Burn Oxidation Catalyst	4,735	7,491	1,106	8,760	CO	2.75	g/hp-hr	93%	0.19	g/hp-hr	2.21	8.80
							NO_X	0.50	g/hp-hr	0%	0.50	g/hp-hr	5.74	22.86
							$PM/PM_{10}/PM_{2.5}$	0.0099871	lb/MMBtu	0%	0.009987	lb/MMBtu	0.39	1.55
							SO_2	0.0005880	lb/MMBtu	0%	0.000588	lb/MMBtu	0.02	0.09
							VOC	0.63	g/hp-hr	50%	0.32	g/hp-hr	3.62	14.40
CE-2S	Compressor Engine 2	Caterpillar G3616 4 Stroke Lean Burn Oxidation Catalyst	4,735	7,491	1,106	8,760	CO	2.75	g/hp-hr	93%	0.19	g/hp-hr	2.21	8.80
							NO_X	0.50	g/hp-hr	0%	0.50	g/hp-hr	5.74	22.86
							$PM/PM_{10}/PM_{2.5}$	0.0099871	lb/MMBtu	0%	0.0099871	lb/MMBtu	0.39	1.55
							SO_2	0.0005880	lb/MMBtu	0%	0.000588	lb/MMBtu	0.02	0.09
							VOC	0.63	g/hp-hr	50%	0.32	g/hp-hr	3.62	14.40
CE-3S	Compressor Engine 3	Caterpillar G3616 4 Stroke Lean Burn Oxidation Catalyst	4,735	7,491	1,106	8,760	CO	2.75	g/hp-hr	93%	0.19	g/hp-hr	2.21	8.80
							NO_X	0.50	g/hp-hr	0%	0.50	g/hp-hr	5.74	22.86
							$PM/PM_{10}/PM_{2.5}$	0.0099871	lb/MMBtu	0%	0.0099871	lb/MMBtu	0.39	1.55
							SO_2	0.0005880	lb/MMBtu	0%	0.000588	lb/MMBtu	0.02	0.09
							VOC	0.63	g/hp-hr	50%	0.32	g/hp-hr	3.62	14.40

[a] The Emission Factors for CO, NO_X, and VOC are from vendor specification sheets (engine and catalyst). VOC emissions do not include formaldehyde. A 10% safety factor has been added to hourly emissions to account for potential fluctuations for gas-fired engines. An example calculation for hourly CO emissions for Emission Unit ID CE-1S follows:

CO (lb/hr) = (Rated Horsepower, hp)*(Post Control Emission Factor, g/hp-hr)*(1 lb/453.59 g)*(Safety Factor, 10%)

CO (lb/hr) = (4,735 hp)*(0.19 g/hp-hr)*(1 lb/453.59 g)*(1.10)

= 2.21 lb/hr CO

The $PM/PM_{10}/PM_{2.5}$ and SO_2 Emission Factors are from AP-42 Table 3.2-2 for Four-Stroke Lean Burn Engines (dated 7/00). A 10% safety factor has been added to hourly emissions to account for potential fluctuations for gas-fired engines. An example calculation for hourly $PM/PM_{10}/PM_{2.5}$ emissions for Emission Unit ID CE-1S follows:

$PM/PM_{10}/PM_{2.5}$ (lb/hr) = (Fuel Consumption, Btu/hp-hr)*(Rated Horsepower, hp)*(1 MMBtu/10^6 Btu)*(Post Control Emission Factor, lb/MMBtu)*(Safety Factor, 10%)

$PM/PM_{10}/PM_{2.5}$ (lb/hr) = (7,491 Btu/hp-hr)*(4,735 hp)*(1 MMBtu/10^6 Btu)*(0.0099871 lb/MMBtu)*(1.10)

= 0.39 lb/hr PM

[b] An example calculation for annual CO emissions for Emission Unit ID CE-1S follows:

CO (T/yr) = (Rated Horsepower, hp)*(Post Control Emission Factor, g/hp-hr)*(1 lb/453.59 g)*(Annual Operating Hours, hr/yr)*(1 T/2,000 lb)

CO (T/yr) = (4,735 hp)*(0.19 g/hp-hr)*(1 lb/453.59 g)*(8,760 hr/yr)*(1 T/2,000 lb)

= 8.80 T/yr CO

CALCULATION OF COMPRESSOR ENGINE HAP POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Emission Unit ID	Description	Engine Ratings: Type	Engine Ratings: Rated Horsepower (hp)	Engine Ratings: Fuel Consumption (Btu/hp-hr)	Fuel Gas Lower Heating Value (Btu/scf)	Annual Operating Hours (hr/yr)	Pollutant	Emission Factors [a]	Units	Catalyst Control Efficiency	Emission Factors [a]	Units	Potential to Emit (PTE): Hourly [a] (lb/hr)	Potential to Emit (PTE): Annual [b] (T/yr)
Proposed Operations														
CE-1S	Compressor Engine 1	Caterpillar G3616 4 Stroke Lean Burn Oxidation Catalyst	4,735	7,491	1,106	8,760	Formaldehyde	0.26	g/hp-hr	76%	0.062	g/hp-hr	0.72	2.85
							Acetaldehyde	0.008360	lb/MMBtu	50%	0.004180	lb/MMBtu	0.15	0.65
							Acrolein	0.005140	lb/MMBtu	50%	0.002570	lb/MMBtu	0.09	0.40
							Methanol	0.002500	lb/MMBtu	50%	0.001250	lb/MMBtu	0.04	0.19
							Benzene	0.000440	lb/MMBtu	50%	0.000220	lb/MMBtu	0.01	0.03
							n-Hexane	0.001110	lb/MMBtu	50%	0.000555	lb/MMBtu	0.02	0.09
							Toluene	0.000408	lb/MMBtu	50%	0.000204	lb/MMBtu	0.01	0.03
							Ethylbenzene	0.0000397	lb/MMBtu	50%	0.0000199	lb/MMBtu	0.001	0.003
							Xylene	0.000184	lb/MMBtu	50%	0.000092	lb/MMBtu	0.003	0.01
							Other HAP	0.001214	lb/MMBtu	50%	0.000607	lb/MMBtu	0.02	0.09
CE-2S	Compressor Engine 2	Caterpillar G3616 4 Stroke Lean Burn Oxidation Catalyst	4,735	7,491	1,106	8,760	Formaldehyde	0.26	g/hp-hr	76%	0.062	g/hp-hr	0.72	2.85
							Acetaldehyde	0.008360	lb/MMBtu	50%	0.004180	lb/MMBtu	0.15	0.65
							Acrolein	0.005140	lb/MMBtu	50%	0.002570	lb/MMBtu	0.09	0.40
							Methanol	0.002500	lb/MMBtu	50%	0.001250	lb/MMBtu	0.04	0.19
							Benzene	0.000440	lb/MMBtu	50%	0.000220	lb/MMBtu	0.01	0.03
							n-Hexane	0.001110	lb/MMBtu	50%	0.000555	lb/MMBtu	0.02	0.09
							Toluene	0.000408	lb/MMBtu	50%	0.000204	lb/MMBtu	0.01	0.03
							Ethylbenzene	0.0000397	lb/MMBtu	50%	0.0000199	lb/MMBtu	0.001	0.003
							Xylene	0.000184	lb/MMBtu	50%	0.000092	lb/MMBtu	0.003	0.01
							Other HAP	0.001214	lb/MMBtu	50%	0.000607	lb/MMBtu	0.02	0.09
CE-3S	Compressor Engine 3	Caterpillar G3616 4 Stroke Lean Burn Oxidation Catalyst	4,735	7,491	1,106	8,760	Formaldehyde	0.26	g/hp-hr	76%	0.062	g/hp-hr	0.72	2.85
							Acetaldehyde	0.008360	lb/MMBtu	50%	0.004180	lb/MMBtu	0.15	0.65
							Acrolein	0.005140	lb/MMBtu	50%	0.002570	lb/MMBtu	0.09	0.40
							Methanol	0.002500	lb/MMBtu	50%	0.001250	lb/MMBtu	0.04	0.19
							Benzene	0.000440	lb/MMBtu	50%	0.000220	lb/MMBtu	0.01	0.03
							n-Hexane	0.001110	lb/MMBtu	50%	0.000555	lb/MMBtu	0.02	0.09
							Toluene	0.000408	lb/MMBtu	50%	0.000204	lb/MMBtu	0.01	0.03
							Ethylbenzene	0.0000397	lb/MMBtu	50%	0.0000199	lb/MMBtu	0.001	0.003
							Xylene	0.000184	lb/MMBtu	50%	0.000092	lb/MMBtu	0.003	0.01
							Other HAP	0.001214	lb/MMBtu	50%	0.000607	lb/MMBtu	0.02	0.09

[a] HAP Emission Factors are from AP-42 Table 3.2-2 for Four-Stroke Lean Burn Engines (dated 7/00). Formaldehyde emission factor taken from engine manufacturer specifications with credit from catalyst control applied, with a 10% safety factor. An example calculation for hourly Acetaldehyde and Formaldehyde emissions for Emission Unit ID CE-1S follows:

Acetaldehyde (lb/hr) = (Fuel Consumption, Btu/hp-hr)*(Rated Horsepower, hp)*(1 MMBtu/10^6 Btu)*(Emission Factor, lb/MMBtu)

Acetaldehyde (lb/hr) = (7,491 Btu/hp-hr)*(4,735 hp)*(1 MMBtu/10^6 Btu)*(0.008360 lb/MMBtu)

= 0.15 lb/hr Acetaldehyde

An example calculation for hourly Formaldehyde emissions for Emission Unit ID CE-1S follows:

Formaldehyde (lb/hr) = (Rated Horsepower, hp)*(Post Control Emission Factor, g/hp-hr)/(453.59 g/lb)*(Safety Factor, 10%)

Formaldehyde (lb/hr) = (4,735 hp)*(0.062 g/hp-hr)/(453.59 g/lb)*1.10

= 0.72 lb/hr Formaldehyde

[b] An example calculation for annual Acetaldehyde emissions for Emission Unit ID CE-1S follows:

Acetaldehyde (T/yr) = (Hourly Emissions, lb/hr)*(Annual Operating Hours, hr/yr)*(1 T/2,000 lb)

Acetaldehyde (T/yr) = (0.15 lb/hr)*(8,760 hr/yr)*(1 T/2,000 lb)

= 0.65 T/yr Acetaldehyde

An example calculation for annual Formaldehyde emissions for Emission Unit ID CE-1S follows:

Formaldehyde (T/yr) = (Rated Horsepower, hp)*(Post Control Emission Factor, g/hp-hr)/(453.59 g/lb)*(Annual Operating Hours, hr/yr)*(1 T/2,000 lb)

Formaldehyde (T/yr) = (4,735 hp)*(0.06 g/hp-hr)/(453.59 g/lb)*(8,760 hr/yr)*(1T/2,000 lb)

= 2.85 T/yr Formaldehyde

CALCULATION OF EMERGENCY GENERATOR CRITERIA POLLUTANT POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Emission Unit ID	Description	Engine Ratings: Type	Engine Ratings: Rated Horsepower (hp)	Engine Ratings: Fuel Consumption (Btu/hp-hr)	Fuel Gas Lower Heating Value (Btu/scf)	Annual Operating Hours (hr/yr) [a]	Pollutant	Uncontrolled Emission Factors [b]	Units	Catalyst Control Efficiency	Post-Control Emission Factors [b]	Units	Potential to Emit (PTE): Hourly [a] (lb/hr)	Potential to Emit (PTE): Annual [b] (T/yr)
Proposed Operations														
GE-1	Emergency Generator 1	Caterpillar C15 ACERT Diesel	957	5,239	1,106	500	CO	0.40	g/hp-hr	0%	0.40	g/hp-hr	0.93	0.21
							NO_X	5.74	g/hp-hr	0%	5.74	g/hp-hr	13.32	3.03
							$PM/PM_{10}/PM_{2.5}$	0.018	g/hp-hr	0%	0.018	g/hp-hr	0.04	0.01
							SO_2	0.0004	lb/hp-hr	0%	0.0004	lb/hp-hr	0.43	0.10
							VOC	0.01	g/hp-hr	0%	0.01	g/hp-hr	0.02	0.01

[a] The Emission Factors for CO, NO_X, $PM/PM_{10}/PM_{2.5}$ and VOC are from vendor specification sheets. A 10% safety factor has been added to the CO, NO_X, $PM/PM_{10}/PM_{2.5}$ and VOC hourly emissions to account for potential fluctuations for diesel engines. 500 hours of operation is used as worst case (potential to emit), based on the sum of both emergency and non-emergency hours in any given year. Each engine will not be operated more than 100 hours in non-emergency use (combination of maintenance and testing, emergency demand response and "other" non-emergency use), nor more than 50 hours in other non-emergency use. An example calculation for hourly CO emissions for Emission Unit ID GE-1 follows:

CO (lb/hr) = (Rated Horsepower, hp)*(Post Control Emission Factor, g/hp-hr)*(1 lb/453.59 g)*(Safety Factor, 10%)

CO (lb/hr) = (957 hp)*(0.40 g/hp-hr)*(1 lb/453.59 g)*(1.10)

= 0.93 lb/hr CO

The SO_2 Emission Factors are from AP-42 Table 3.4-1 for Large Stationary Diesel Engines. A 10% safety factor has been added to the SO_2 hourly emissions to account for potential fluctuations for diesel engines. An example calculation for hourly SO_2 emissions for Emission Unit ID GE-1 follows:

SO_2 (lb/hr) = (Rated Horsepower, hp)*(Post Control Emission Factor, lb/hp-hr)*(Safety Factor, 10%)

SO_2 (lb/hr) = (957 hp)*(0.0004 lb/hp-hr)*(1.10)

= 0.43 lb/hr SO_2

[b] An example calculation for annual CO emissions for Emission Unit ID GE-1 follows:

CO (T/yr) = (Rated Horsepower, hp)*(Post Control Emission Factor, g/hp-hr)*(1 lb/453.59 g)*(Annual Operating Hours, hr/yr)*(1 T/2,000 lb)

CO (T/yr) = (957 hp)*(0.40 g/hp-hr)*(1 lb/453.59 g)*(500 hr/yr)*(1 T/2,000 lb)"

= 0.21 T/yr CO

CALCULATION OF EMERGENCY GENERATOR HAP POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Emission Unit ID	Description	Engine Ratings: Type	Engine Ratings: Rated Horsepower (hp)	Engine Ratings: Fuel Consumption (Btu/hp-hr)	Fuel Gas Heating Value (Btu/scf)	Annual Operating Hours (hr/yr)	Pollutant	Emission Factors [a]	Units	Catalyst Control Efficiency	Post Control Emission Factors [a]	Units	Potential to Emit (PTE): Hourly [a] (lb/hr)	Potential to Emit (PTE): Annual [b] (T/yr)
Proposed Operations														
GE-1	Emergency Generator 1	Caterpillar C15 ACERT	957	5,239	1,106	500	Formaldehyde	0.0000789	lb/MMBtu	0%	0.0000789	lb/MMBtu	0.0004	0.0001
							Acetaldehyde	0.0000252	lb/MMBtu	0%	0.0000252	lb/MMBtu	0.0001	0.00003
							Acrolein	0.00000788	lb/MMBtu	0%	0.00000788	lb/MMBtu	0.00004	0.00001
							Benzene	0.000776	lb/MMBtu	0%	0.000776	lb/MMBtu	0.004	0.001
							Toluene	0.000281	lb/MMBtu	0%	0.000281	lb/MMBtu	0.001	0.0004
							Xylene	0.000193	lb/MMBtu	0%	0.000193	lb/MMBtu	0.001	0.0002

[a] HAP Emission Factors are from AP-42 Table 3.4-3 for Uncontrolled Stationary Diesel Engines (dated 7/00). An example calculation for hourly Acetaldehyde emissions for Emission Unit ID GE-1 follows:

Acetaldehyde (lb/hr) = (Fuel Consumption, Btu/hp-hr)*(Rated Horsepower, hp)*(1 MMBtu/10^6 Btu)*(Emission Factor, lb/MMBtu)

Acetaldehyde (lb/hr) = (5,239 Btu/hp-hr)*(957 hp)*(1 MMBtu/10^6 Btu)*(0.0000252 lb/MMBtu)

= 0.0001 lb/hr Acetaldehyde

[b] An example calculation for annual Acetaldehyde emissions for Emission Unit ID GE-1 follows:

Acetaldehyde (T/yr) = (Hourly PTE, lb/hr)*(Annual Operating Hours, hr/yr)*(1 T/2,000 lb)

Acetaldehyde (T/yr) = (0.0001 lb/hr)*(500 hr/yr)*(1 T/2,000 lb)

= 0.00003 T/yr Acetaldehyde

CALCULATION OF SITE FUGITIVES (EMISSION UNIT ID FUG) POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Component	Number of Components	Emission Factors [a] (lb/hr-component)	Annual Operating Hours (hr/yr)	Maximum VOC (wt%)	Maximum Methane (wt%)	Maximum CO_2 (wt%)	Reduction Credit [a] (wt%)	Potential To Emit			
								VOC		Methane	CO_2
								Hourly [b] (lb/hr)	Annual [c] (T/yr)	Annual [c] (T/yr)	Annual [c] (T/yr)
Valves											
Gas Streams	184	0.00992	8,760	2.00%	90.00%	1.00%	0%	0.0365	0.1599	7.1953	0.0799
Water/Light Oil Streams	16	0.000216	8,760	100.00%	0.00%	0.00%	0%	0.0035	0.0151	0.0000	0.0000
Light Oil Stream	37	0.005500	8,760	100.00%	0.00%	0.00%	0%	0.2035	0.8913	0.0000	0.0000
Heavy Liquid	30	0.0000185	8,760	100.00%	0.00%	0.00%	0%	0.0006	0.0024	0.0000	0.0000
Relief Valves											
Gas Streams	28	0.0194	8,760	2.00%	90.00%	1.00%	0%	0.0109	0.0476	2.1413	0.0238
Compressor Seals											
Gas Streams	12	0.0194	8,760	2.00%	90.00%	1.00%	0%	0.0047	0.0204	0.9177	0.0102
Flanges											
Gas Streams	112	0.00086	8,760	2.00%	90.00%	1.00%	0%	0.0019	0.0084	0.3797	0.0042
Water/Light Oil Streams	22	0.000006	8,760	100.00%	0.00%	0.00%	0%	0.0001	0.0006	0.0000	0.0000
Light Oil Streams	22	0.000243	8,760	100.00%	0.00%	0.00%	0%	0.0053	0.0234	0.0000	0.0000
Connectors											
Gas Streams	527	0.00044	8,760	2.00%	90.00%	1.00%	0%	0.0046	0.0203	0.9141	0.0102
Water/Light Oil Streams	55	0.000243	8,760	100.00%	0.00%	0.00%	0%	0.0134	0.0585	0.0000	0.0000
Light Oil Streams	139	0.000463	8,760	100.00%	0.00%	0.00%	0%	0.0644	0.2819	0.0000	0.0000
Heavy Liquid	189	0.0000165	8,760	100.00%	0.00%	0.00%	0%	0.0031	0.0137	0.0000	0.0000
							Total:	**0.35**	**1.54**	**11.55**	**0.13**

[a] Fugitive Emission Factors and Reduction Credits are per TCEQ Technical Guidance Document for Equipment Leak Fugitives, dated October 2000. The emission factors are for total hydrocarbon.

[b] Hourly VOC emission rates are calculated as follows:
(184 components) * (0.00992 lb/hr-component) * (2.00 % VOC) * (100% - 0.0 % reduction credit) = 0.0365 lb/hr

[c] Annual VOC emission rates are calculated as follows:
(184 components) * (0.00992 lb/hr-component) * (8,760 hr/yr) * (2.00 % VOC) * (100% - 0.0 % reduction credit) / (2,000 lb/T) = 0.1599 T/yr

CALCULATION OF SITE FUGITIVES (EMISSION UNIT ID FUG) HAP POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Component	Number of Components	Emission Factors [a] (lb/hr-component)	Annual Operating Hours (hr/yr)	Maximum Benzene (wt%)	Toluene (wt%)	Ethylbenzene (wt%)	Xylene (wt%)	n-Hexane (wt%)	Reduction Credit [a] (wt%)	Potential To Emit									
										Benzene		Toluene		Ethylbenzene		Xylene		n-Hexane	
										Hourly [b] (lb/hr)	Annual [c] (T/yr)	Hourly [b] (lb/hr)	Annual [c] (T/yr)	Hourly [b] (lb/hr)	Annual [c] (T/yr)	Hourly [b] (lb/hr)	Annual [c] (T/yr)	Hourly [b] (lb/hr)	Annual [c] (T/yr)
Valves																			
Gas Streams	184	0.00992	8,760	0.05%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0009	0.0040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Light Oil Streams	16	0.000216	8,760	0.00%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Oil Streams	37	0.005500	8,760	0.00%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Liquid	30	0.0000185	8,760	0.00%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Relief Valves																			
Gas Streams	28	0.0194	8,760	0.05%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0003	0.0012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compressor Seals																			
Gas Streams	12	0.0194	8,760	0.05%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0001	0.0005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flanges																			
Gas Streams	112	0.00086	8,760	0.05%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0000	0.0002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Oil Streams	22	0.000243	8,760	0.00%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Light Oil Streams	22	0.000006	8,760	0.00%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Connectors																			
Gas Streams	527	0.00044	8,760	0.05%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0001	0.0005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water/Light Oil Streams	55	0.000243	8,760	0.00%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Oil Streams	139	0.000463	8,760	0.00%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Liquid	189	0.0000165	8,760	0.00%	0.0000%	0.0000%	0.0000%	0.0000%	0%	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
									Total:	**0.001**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

[a] Fugitive Emission Factors and Reduction Credits are per TCEQ Technical Guidance Document for Equipment Leak Fugitives, dated October 2000. The emission factors are for total hydrocarbon.

[b] Hourly Benzene emission rates are calculated as follows:
(184 components) * (0.00992 lb/hr-component) * (0.05 % Benzene) * (100% - 0.0 % reduction credit) = 0.0009 lb/hr

[c] Annual Benzene emission rates are calculated as follows:
(184 components) * (0.00992 lb/hr-component) * (8,760 hr/yr) * (0.05 % Benzene) * (100% - 0.0 % reduction credit) / (2,000 lb/T) = 0.0040 T/yr

SUMMARY OF STORAGE TANK EMISSIONS POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINES LLC

Emission Unit ID	Tank Name	Tanks 4.0.9d Program[a] Working Loss (lb/yr)	Tanks 4.0.9d Program[a] Breathing Loss (lb/yr)	Number of Tanks	Annual Turnovers (turnovers/yr)	Minimum Turnover Time (hr/turnover)	Uncontrolled Working and Breathing Emissions Hourly (lb/hr)	Uncontrolled Working and Breathing Emissions Annual (T/yr)
TK-1	Slop Tank (300 bbl)	0.75	2.09	1	2	1	0.32	0.001
TK-2	Waste Water Tank 1 (300 bbl)	0.74	2.04	1	2	1	0.31	0.001
TK-3	Waste Water Tank 2 (2500 gal)	0.74	0.47	1	11	1	0.07	0.001
TK-4	New Oil Tank (100 bbl)	0.02	0.01	1	11	1	<0.01	<0.01
TK-5	Coolant Tank (100 bbl)	0.14	0.09	1	11	1	0.01	<0.01
TK-6	Used Coolant Tank (100 bbl)	0.14	0.09	1	11	1	0.01	<0.01
TK-7	Used Oil Tank (100 bbl)	0.02	0.01	1	11	1	<0.01	<0.01

[a] The tank emissions are calculated using the EPA Tanks 4.0.9d program. This program calculates the working and breathing losses and these losses are used to calculate the hourly and annual emissions below. The slop tank is not expected to have flash emissions, since it stores mostly water with minimal amounts of heavy oils.

An example calculation of the hourly emissions for Emission Unit ID TK-1 follows:

VOC (lb/hr) = (((Breathing Loss, lb/yr)/(8,760 hr/yr))+((Working Loss, lb/yr)/(Number of Turnovers/yr)/(Number of hrs/turnover)))*(number of tanks)

VOC (lb/hr) = (((2.09 lb/yr)/(8,760 hr/yr))+((0.75 lb/yr)/(2 turnovers/yr)/(1 hr/turnover)))*(1 tank)

= 0.32 lb/hr

An example calculation of the annual emissions for Emission Unit ID TK-1 follows:

VOC (T/yr) = (((Working Loss, lb/yr)+(Breathing Loss, lb/yr))/(2,000 ton/yr))*(Number of Tanks))

VOC (T/yr) = (((0.75 lb/yr)+(2.09 lb/yr))/(2,000 lb/ton))*(1 tank))

= 0.001 T/yr

See the following pages for a printout of the emissions reports.

CALCULATION OF TRUCK LOADING POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Sample Calculations:

Maximum Loading Loss = 12.46 * (Saturation Factor) * (Max. Vapor Pressure, psia) * (Vapor MW, lb/lb-mol) / (Max. Temp., R)
Maximum Loading Loss = 12.46 * (0.60) * (0.23 psia) * (21.93 lb/lb-mol) / (55.86 + 460) R = 0.0740 lb/Mgal

Average Loading Loss = 12.46 * (Saturation Factor) * (Avg. True Vapor Pressure, psia) * (Vapor MW, lb/lb-mol) / (Avg. Temp., R)
Average Loading Loss = 12.46 * (0.60) * (0.20 psia) * (21.93 lb/lb-mol) / (51.17 + 460) R = 0.0633 lb/Mgal

Hourly PTE = (Hourly Throughput, Mgal/hr) * (Max. Loading Loss, lb/Mgal) * (VOC Fraction)
Hourly PTE = (9.00 Mgal/hr) * (0.0740 lb/Mgal) * (1.00) = 0.67 lb/hr

Annual PTE = (Annual Throughput, Mgal/yr) * (Avg. Loading Loss, lb/Mgal) / (2,000 lb/T) * (VOC Fraction)
Annual PTE = (30.0 Mgal/yr) * (0.0633 lb/Mgal) / (2,000 lb/T) * (1.00) = 0.001 T/yr

Facility ID Number (FIN)	Facility Name	Emission Point Number (EPN)	Saturation Factor	Max. Vapor Pressure (psia)	Avg. Vapor Pressure (psia)	Vapor Molecular Weight (lb/mole)	Max. Temp. (F)	Avg. Temp (F)	Hourly Throughput (Mgals/hr)	Annual Throughput (Mgals/yr)	VOC Fraction	Max. Loading Loss (lb/Mgal)	Avg. Loading Loss (lb/Mgal)	Hourly VOC PTE (lb/hr)	Annual VOC PTE (T/yr)
LOAD-1	Slop Truck Loading	LOAD-1	0.60	0.23	0.20	21.93	55.86	51.17	9.00	30.0	1.00	0.0740	0.0633	0.67	0.001
LOAD-2	Waste Water Truck Loading	LOAD-2	0.60	0.24	0.20	21.78	55.86	51.17	9.00	30.0	1.00	0.0747	0.0638	0.67	0.001

1. Calculation method and factors per AP-42, Section 5.2, dated June 2008.

2. Vapor pressure, temperature, and vapor molecular weight are from the TANKS 4.09d program reports for the stored liquids.

CALCULATION OF HEATER POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Emission Unit ID	Description	Rated Duty (MMBtu/hr)	Fuel Higher Heating Value (Btu/scf)	Annual Operating Hours (hr/yr)	Correction Factor	Pollutant	Emission Factor [a]	Unit	Potential to Emit (PTE) Hourly[b] (lb/hr)	Potential to Emit (PTE) Annual[c] (T/yr)
HTR-1	CIG Flameless Gas Infrared Catalytic Heater HC2100	0.51	1,106	8,760	1.08	CO	84	lb/MMscf	0.04	0.19
						NO_X	100	lb/MMscf	0.05	0.22
						$PM/PM_{10}/PM_{2.5}$ [d]	7.6	lb/MMscf	0.004	0.02
						SO_2	0.6	lb/MMscf	0.0003	0.001
						VOC	5.5	lb/MMscf	0.003	0.01
						CH_2O	0.075	lb/MMscf	0.00004	0.0002
						Benzene	0.0021	lb/MMscf	0.000001	0.000005
						Toluene	0.0034	lb/MMscf	0.000002	0.00001
						n-Hexane	1.8	lb/MMscf	0.001	0.004
						Other HAP	0.0019	lb/MMscf	0.000001	0.000004

[a] Unless otherwise noted, emission factors are from AP-42 Tables 1.4-1, 1.4-2, and 1.4-3 (dated 7/98).

[b] An example calculation for hourly PTE CO and SO_2 for Emission Unit ID HTR1 follows:

CO (lb/hr) = (Rated Duty, MMBtu/hr)*(Correction Factor)/(Fuel Heating Value, Btu/scf)*(Emission Factor, lb/MMscf)

CO (lb/hr) = (0.51 MMBtu/hr)*(1.08)/(1106 Btu/scf)*(84 lb/MMscf)

= 0.04 lb/hr CO

[c] An example calculation for annual PTE CO for Emission Unit ID HTR1 follows:

CO (T/yr) = (Hourly PTE, lb/hr)*(Annual Operating Hours, hr/yr)/(2,000 lb/T)

CO (T/yr) = (0.04 lb/hr)*(8,760 hr/yr)/(2,000 lb/T)

= 0.19 T/yr CO

[d] All PM is assumed to be less than 2.5 microns in diameter per footnote "c" of AP-42 Table 1.4-2.

CALCULATION OF COMPRESSOR ENGINE BLOWDOWNS POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Description	Combined Emission Unit ID BD		
	CE-1S	CE-2S	CE-3S
Number of Blowdowns per Year	12	12	12
Number of Blowdowns per Hour	1	1	1
Blowdown Volume per Event, scf	6,887	6,887	6,887
Gas Stream Specific Gravity	0.6200	0.6200	0.6200
Air MW, lb/mole	28.96	28.96	28.96
Gas Stream Density, lb/scf [a]	0.047	0.047	0.047
Max VOC Percentage in Gas Stream, wt%	2.00%	2.00%	2.00%
Max Benzene Percentage in Gas Stream, wt%	0.05%	0.05%	0.05%
Max Methane Percentage in Gas Stream, wt%	90.00%	90.00%	90.00%
Max CO_2 Percentage in Gas Stream, wt%	1.00%	1.00%	1.00%
Toluene Percentage in Gas Stream, wt%	0.0000%	0.0000%	0.0000%
Ethylbenzene Percentage in Gas Stream, wt%	0.0000%	0.0000%	0.0000%
Xylene Percentage in Gas Stream, wt%	0.0000%	0.0000%	0.0000%
n-Hexane Percentage in Gas Stream, wt%	0.0000%	0.0000%	0.0000%
Hourly VOC Emission Rates (lb/hr): [b]	6.53	6.53	6.53
Annual VOC Emission Rates (T/yr): [c]	0.04	0.04	0.04
Hourly Benzene Emission Rates (lb/hr):[b]	0.16	0.16	0.16
Annual Benzene Emission Rates (T/yr): [c]	0.001	0.001	0.001
Annual Methane Emission Rates (T/yr): [c]	1.76	1.76	1.76
Annual CO_2 Emission Rates (T/yr): [c]	0.02	0.02	0.02
Hourly Toluene Emission Rates (lb/hr):[b]	0.00	0.00	0.00
Annual Toluene Emission Rates (T/yr): [c]	0.00	0.00	0.00
Hourly Ethylbenzene Emission Rates (lb/hr):[b]	0.00	0.00	0.00
Annual Ethylbenzene Emission Rates (T/yr): [c]	0.00	0.00	0.00
Hourly Xylene Emission Rates (lb/hr):[b]	0.00	0.00	0.00
Annual Xylene Emission Rates (T/yr): [c]	0.00	0.00	0.00
Hourly n-Hexane Emission Rates (lb/hr):[b]	0.00	0.00	0.00
Annual n-Hexane Emission Rates (T/yr): [c]	0.00	0.00	0.00

[a] Gas stream density is calculated as follows:
(28.96 lb/mole) / (379 scf/mole) * (0.6200) = 0.047 lb/scf

[b] Hourly blowdown VOC emission rates are calculated as follows:
(1 blowdown/hr) * (6,887 scf/blowdown) * (0.047 lb/scf) * (2.00 % VOC) = 6.53 lb/hr

[c] Annual blowdown VOC emission rates are calculated as follows:
(12 blowdowns/yr) * (6,887 scf/blowdown) * (0.047 lb/scf) * (2.00 % VOC) / (2,000 lb/T) = 0.04 T/yr

CALCULATION OF COMPRESSOR ENGINE STARTER VENTS (EMISSION UNIT ID SV) POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Number of Starts per Hour per Engine:	1
Number of Starts per Year Site-Wide:	105
MW of Air, lb/lbmol:	28.96
Gas Stream Specific Gravity:	0.6200
Gas Stream Density, lb/scf : [a]	0.047
Max VOC wt%:	2.00%
Max Benzene wt%:	0.05%
Max Carbon Dioxide wt%:	1.00%
Max Methane wt%:	90.0%
Toluene wt%:	0.0000%
Ethylbenzene wt%:	0.0000%
Xylene wt%:	0.0000%
n-Hexane wt%:	0.0000%

Compressor Engine Starter Vents	Starter Vent Volume	Emission Rates					
		VOC		Benzene		CO_2	Methane
	scf/event	lb/hr [b]	T/yr [c]	lb/hr [b]	T/yr [c]	ton/yr [c]	T/yr [c]
CE-1S	3,099	2.94	--	0.07	--	--	--
CE-2S	3,099	2.94	--	0.07	--	--	--
CE-3S	3,099	2.94	--	0.07	--	--	--
TOTAL	3,099	2.94	0.15	0.07	0.004	0.08	6.94

Compressor Engine Starter Vents	Starter Vent Volume	Emission Rates							
		Toluene		Ethylbenzene		Xylene		n-Hexane	
	scf/event	lb/hr [b]	T/yr [c]	lb/hr [b]	T/yr [c]	lb/hr [b]	T/yr [c]	lb/hr [b]	T/yr [c]
CE-1S	3,099	0.00	--	0.00	--	0.00	--	0.00	--
CE-2S	3,099	0.00	--	0.00	--	0.00	--	0.00	--
CE-3S	3,099	0.00	--	0.00	--	0.00	--	0.00	--
TOTAL	3,099	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

[a] Gas stream density is calculated as follows:
(28.96 lb/mole) / (379 scf/mole) * (0.6200) = 0.047 lb/scf

[b] Hourly starter vent emission rates are calculated as follows:
(1 starts/hr) * (3099 scf/start) * (0.047 lb/scf) * (2 % VOC) = 2.94 lb/hr

[c] Annual starter vent emission rates are calculated as follows:
(105 starts/yr) * (3099 scf/start) * (0.047 lb/scf) * (2 % VOC) / (2,000 lb/T) = 0.15 T/yr

Note - assumes 35 starts per engine per year.

CALCULATION OF PIGGING OPERATIONS POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Description	Emission Unit ID PIG		
	Launcher	Receiver	Combined
Number of Events per Year	3	0	3
Number of Events per Hour	1	0	
Volume per Event, scf	48,206	48,206	
Gas Stream Specific Gravity	0.6200	0.6200	
Air MW, lb/mole	28.96	28.96	
Gas Stream Density, lb/scf [a]	0.047	0.047	
Max VOC Percentage in Gas Stream, wt%	2.00%	2.00%	
Max Benzene Percentage in Gas Stream, wt%	0.05%	0.05%	
Max Methane Percentage in Gas Stream, wt%	90.00%	90.00%	
Max CO_2 Percentage in Gas Stream, wt%	1.00%	1.00%	
Toluene Percentage in Gas Stream, wt%	0.0000%	0.0000%	
Ethylbenzene Percentage in Gas Stream, wt%	0.0000%	0.0000%	
Xylene Percentage in Gas Stream, wt%	0.0000%	0.0000%	
n-Hexane Percentage in Gas Stream, wt%	0.0000%	0.0000%	
Hourly VOC Emission Rates (lb/hr): [b]	45.68	0.00	45.68
Annual VOC Emission Rates (T/yr): [c]	0.07	0.00	0.07
Hourly Benzene Emission Rates (lb/hr):[b]	1.14	0.00	1.14
Annual Benzene Emission Rates (T/yr): [c]	0.002	0.000	0.002
Annual Methane Emission Rates (T/yr): [c]	3.08	0.00	3.08
Annual CO_2 Emission Rates (T/yr): [c]	0.03	0.00	0.03
Hourly Toluene Emission Rates (lb/hr):[b]	0.00	0.00	0.00
Annual Toluene Emission Rates (T/yr): [c]	0.00	0.00	0.00
Hourly Ethylbenzene Emission Rates (lb/hr):[b]	0.00	0.00	0.00
Annual Ethylbenzene Emission Rates (T/yr): [c]	0.00	0.00	0.00
Hourly Xylene Emission Rates (lb/hr):[b]	0.00	0.00	0.00
Annual Xylene Emission Rates (T/yr): [c]	0.00	0.00	0.00
Hourly n-Hexane Emission Rates (lb/hr):[b]	0.00	0.00	0.00
Annual n-Hexane Emission Rates (T/yr): [c]	0.00	0.00	0.00

[a] Gas stream density is calculated as follows:
(28.96 lb/mole) / (379 scf/mole) * (0.6200) = 0.047 lb/scf

[b] Hourly VOC emission rates are calculated as follows:
(1 event/hr) * (48,206 scf/event) * (0.047 lb/scf) * (2.00 % VOC) = 45.68 lb/hr

[c] Annual VOC emission rates are calculated as follows:
(3 events/yr) * (48,206 scf/event) * (0.047 lb/scf) * (2.00 % VOC) / (2,000 lb/T) = 0.07 T/yr

CALCULATION OF FUGITIVE UNPAVED ROAD POTENTIAL TO EMIT

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

EPA METHOD: AP-42 Section 13.2.2.2 (Miscellaneous Sources: November 2006)

Emission Source ID R1		***UNPAVED QUARRY ROADS***
		40-ton Trucks
ID	***CALCULATION PARAMETERS***	***QUARRY ROADS***
k_{PM}	AP-42 constant for PM_{30} (lb/VMT)	4.9
k_{PM10}	AP-42 constant for PM_{10} (lb/VMT)	1.5
$k_{PM2.5}$	AP-42 constant for $PM_{2.5}$ (lb/VMT)	0.15
s	surface material silt content, %	10
W	mean vehicle weight, tons	40.0
a	AP-42 constant for PM_{30}	0.7
b	AP-42 constant for PM_{30}	0.45
a_{PM10} AND $a_{PM\ 2.5}$	AP-42 constant for PM_{10} and $PM_{2.5}$	0.9
b_{PM10} AND $b_{PM\ 2.5}$	AP-42 constant for PM_{10} and $PM_{2.5}$	0.45
E_{PM}	Calculated Emission Factor	13.84
E_{PM10}	Calculated Emission Factor	4.08
$E_{PM2.5}$	Calculated Emission Factor	0.41
P	Avg. Number Days of Rainfall	171.00
$E_{PM-\ EXT}$	Calculated Extended EF	7.35
$E_{PM10-EXT}$	Calculated Extended EF	2.17
$E_{PM2.5-EXT}$	Calculated Extended EF	0.22
VMT	Vehicle Miles Traveled (per hour)	0.38
VMT	Vehicle Miles Traveled (per year)	353
CF	Control Efficiency (%)	50%
	TSP Emission Rate (lb/hr)	1.39
	PM_{10} Emission Rate (lb/hr)	0.41
	$PM_{2.5}$ Emission Rate (lb/hr)	0.04
	TSP Emission Rate (T/yr)	0.65
	PM_{10} Emission Rate (T/yr)	0.19
	$PM_{2.5}$ Emission Rate (T/yr)	0.02

Notes:

E = size specific emission factor (lb/VMT)

where:

E (lb/VMT) = k * (s/12)^a * (W/3)^b

s = surface material silt content, from AP-42 Table 13.2.2-1 for Stone Quarrying and Processing

W = mean vehicle weight, tons

E_{EXT} = E [(365-P)/365]

P = Number of days of year with at least 0.01 in of precipitation

VMT conservatively calculated based on the maximum expected daily throughput.

CF = Control Efficiency. Estimated at 50% for periodic watering of unpaved roads.

TSP Emission Rate (lb/hr) = E_{EXT} * VMT (per hour) * (1-Control Eff.)

TSP Emission Rate (tpy) = E_{EXT} * VMT (per year) * (1-Control Eff.) * 1 T / 2000 lb

CALCULATION OF GREENHOUSE GAS POTENTIAL TO EMIT FOR COMBUSTION SOURCES

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Combustion-Related Green House Gas Emissions

Combustion Emission Unit ID	HP	Btu/hp-hr	MMBtu/hr	Annual Operating Hours	Fuel Usage MMBtu/Yr	CO_2e[a] metric T/yr	CO_2e[a] short T/yr	GHG Mass[a] short T/yr
CE-1S	4,735	7,491	35.47	8,760	310,716	16,491.20	18,178.25	18,159.86
CE-2S	4,735	7,491	35.47	8,760	310,716	16,491.20	18,178.25	18,159.86
CE-3S	4,735	7,491	35.47	8,760	310,716	16,491.20	18,178.25	18,159.86
GE-1	957	5,239	5.01	500	2,507	133.06	146.68	146.53
HTR-1	--	--	0.51	8,760	4,505	239.12	263.58	263.31
SITE TOTAL			**111.94**	**---**	**939,160.95**	**49,845.78**	**54,945.00**	**54,889.41**

[a]Sample calculations:

Greenhouse Gas (GHG) Emission Factors are from 40 CFR 98, Subpart C Tables C-1 and C-2.

Carbon Dioxide Emission Factor (CO_2EF) = 53.02 kg/MMBtu

Methane Emission Factor (CH_4EF) = 0.001 kg/MMBtu

Nitrous Oxide Emission Factor (N_2OEF) = 0.0001 kg/MMBtu

An example calculation for carbon dioxide equivalent CO_2e in metric T/yr for Emission Unit ID CE-1S follows:

CO_2e (metric T/yr) = (0.001 metric T/kg)*(Fuel usage, MMBtu/yr))*[(CO_2EF + 25*CH_4EF + 298*N_2OEF), kg/MMBtu]

CO2e (metric T/yr) = (0.001 metric T/kg) * (310,716 MMBtu/yr) * [(53.02 kg/MMBtu) + (25*0.001 kg/MMBtu) + (298*0.0001 kg/MMBtu)] = 16,491.20 metric T/yr

An example calculation for CO_2e in short T/yr for Emission Unit ID CE-1S follows:

CO_2e (short T/yr) = (0.001 metric T/kg) * (Fuel usage, MMBtu/yr)) * [(CO_2EF + 25*CH_4EF + 298*N_2OEF), kg/MMBtu] * (2,204.6 lb/metric T) / (2,000 lb/short T)

CO2e (short T/yr) = (0.001 metric T/kg) * (310,716 MMBtu/yr) * [(53.02 kg/MMBtu) + (25*0.001 kg/MMBtu) + (298*0.0001 kg/MMBtu)] * (2,204.6 lb/metric T) / (2,000 lb/short T) = 18,178.25 short T/yr

An example calculation for GHG Mass in short T/yr for Emission Unit ID CE-1S follows:

GHG Mass (short T/yr) = (0.001 metric T/kg) * (Fuel usage, MMBtu/yr) * (CO_2EF+CH_4EF+N_2OEF) * (2,204.6 lb/metric T) / (2,000 lb/short T)

GHG Mass (short T/yr) = (0.001 metric T/kg) * (310,716 MMBtu/yr) * [(53.02 kg/MMBtu) + (0.001 kg/MMBtu) + (0.0001 kg/MMBtu)] * (2,204.6 lb/metric T) / (2,000 lb/short T) = 18,159.86 short T/yr

G3616

CATERPILLAR®

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Standard Equipment Company
ETC Rover - Sherwood

GAS COMPRESSION APPLICATION

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	9.2:1	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	GAV
AFTERCOOLER WATER INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
JACKET WATER OUTLET (°F):	190	**SITE CONDITIONS:**	
ASPIRATION:	TA	FUEL:	ETC Rover - Current Fuel
COOLING SYSTEM:	JW, OC+AC	FUEL PRESSURE RANGE(psig):	42.8-47.0
CONTROL SYSTEM:	CIS/ADEM3	FUEL METHANE NUMBER:	73.3
EXHAUST MANIFOLD:	DRY	FUEL LHV (Btu/scf):	999
COMBUSTION:	LOW EMISSION	ALTITUDE(ft):	1100
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	MAXIMUM INLET AIR TEMPERATURE(°F):	100
		STANDARD RATED POWER:	4735 bhp@1000rpm

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(1)	bhp	4735	4735	3551	2368
INLET AIR TEMPERATURE			°F	100	100	100	100
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(2)	Btu/bhp-hr	6766	6766	7061	7728
FUEL CONSUMPTION (HHV)		(2)	Btu/bhp-hr	7491	7491	7818	8556
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3)(4)	ft3/min	12829	12820	9914	6808
AIR FLOW	(WET)	(3)(4)	lb/hr	54508	54508	42154	28946
FUEL FLOW (60ºF, 14.7 psia)			scfm	535	535	419	305
INLET MANIFOLD PRESSURE		(5)	in Hg(abs)	73.7	73.7	56.7	40.5
EXHAUST TEMPERATURE - ENGINE OUTLET		(6)	°F	856	856	897	974
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(7)(4)	ft3/min	32010	32010	25543	18581
EXHAUST GAS MASS FLOW	(WET)	(7)(4)	lb/hr	56022	56022	43339	29810
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(8)(9)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(8)(9)	g/bhp-hr	2.75	2.75	2.75	2.75
THC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	6.30	6.30	6.57	6.81
NMHC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	1.44	1.44	1.50	1.55
NMNEHC (VOCs) (mol. wt. of 15.84)		(8)(9)(10)	g/bhp-hr	0.63	0.63	0.66	0.68
HCHO (Formaldehyde)		(8)(9)	g/bhp-hr	0.26	0.26	0.28	0.31
CO2		(8)(9)	g/bhp-hr	439	439	458	501
EXHAUST OXYGEN		(8)(11)	% DRY	12.0	12.0	11.8	11.4
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(12)	Btu/min	48327	48327	42089	34463
HEAT REJ. TO ATMOSPHERE		(12)	Btu/min	18688	18688	17553	16771
HEAT REJ. TO LUBE OIL (OC)		(12)	Btu/min	24027	24027	22986	22870
HEAT REJ. TO AFTERCOOLER (AC)		(12)(13)	Btu/min	42675	42675	19377	3989

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW)	(13)	Btu/min	58475
TOTAL AFTERCOOLER CIRCUIT (OC+AC)	(13)(14)	Btu/min	81006
A cooling system safety factor of 10% has been added to the cooling system sizing criteria.			

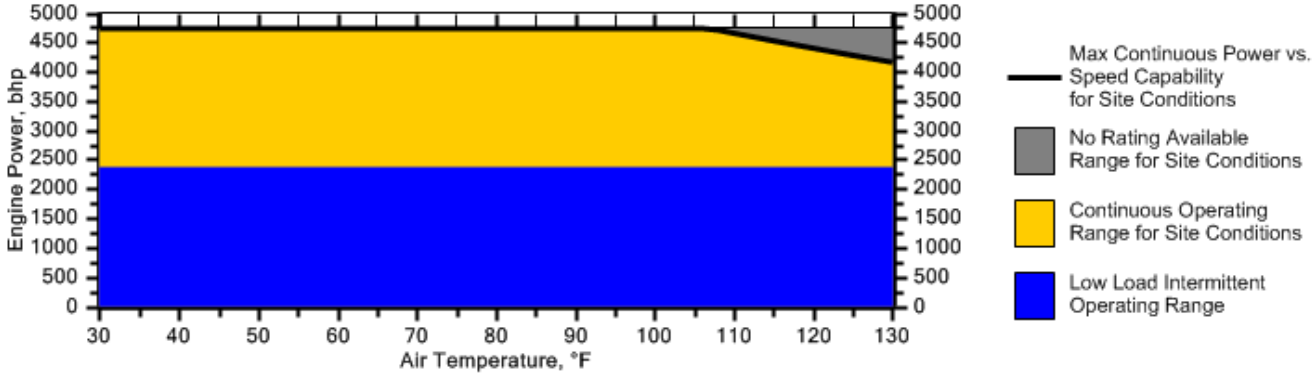
CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

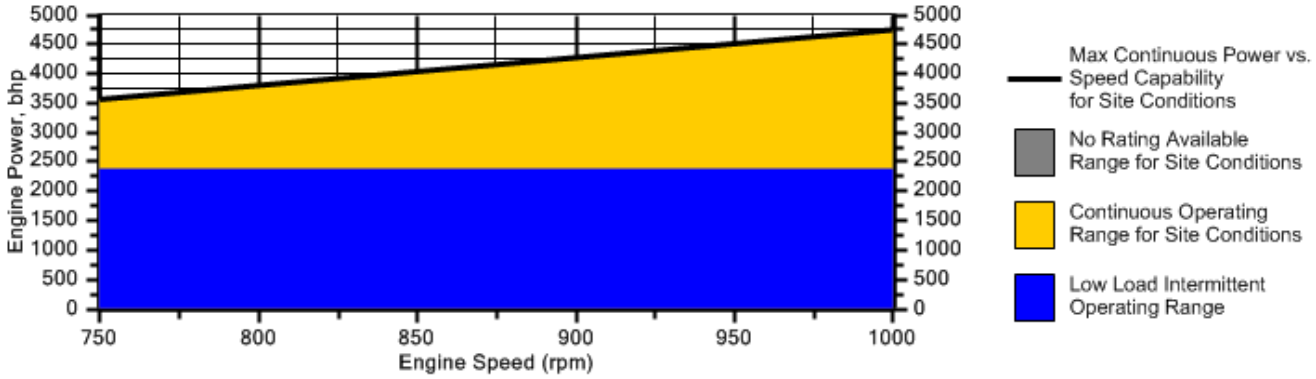
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1100 ft and 1000 rpm



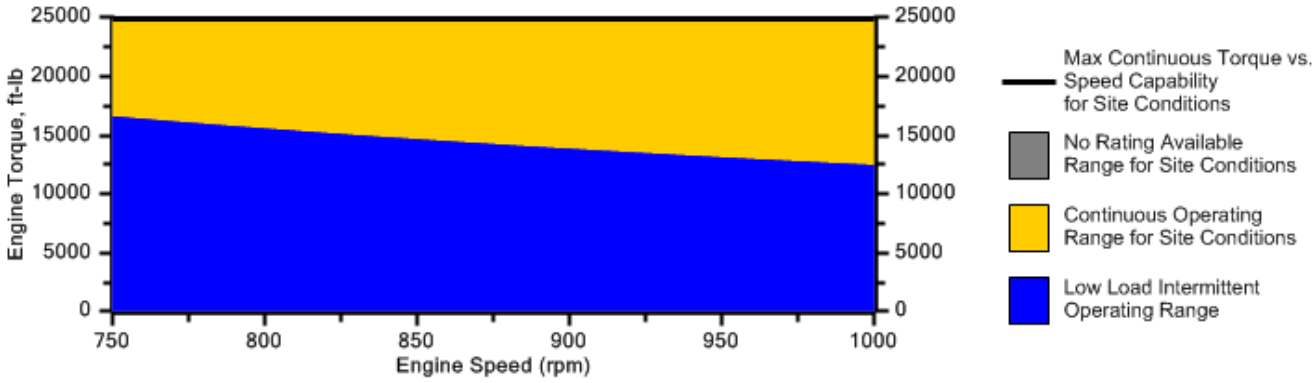
Engine Power vs. Engine Speed

Data represents speed sweep at 1100 ft and 100 °F



Engine Torque vs. Engine Speed

Data represents speed sweep at 1100 ft and 100 °F



Note: At site conditions of 1100 ft and 100°F inlet air temp., constant torque can be maintained down to 750 rpm. The minimum speed for loading at these conditions is 750 rpm.

NOTES

1. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.

2. Fuel consumption tolerance is ± 2.5% of full load data.

3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.

4. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.

5. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.

6. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.

7. Exhaust flow value is on a "wet" basis. Flow is a nominal value for total flow rate with a tolerance of ±6%. Exhaust gas vented through the wastegate flows only to the right exhaust outlet. The total flow through the wastegate may be as great as 15% of the total value for conditions under which the wastegate is open. For installations that use dual exhaust runs this difference must be taken into account when specifying any items to be connected to the exhaust outlets. The flow in the right exhaust outlet must be sized for at least 65% of the total flow to allow for the wastegate full open condition, while the left outlet must be sized for 50% of the total flow for the wastegate closed condition. Both runs must meet the allowable backpressure requirement as described in the Exhaust Systems A&I Guide.

8. Emissions data is at engine exhaust flange prior to any after treatment.

9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

10. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ

11. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.

12. Heat rejection values are nominal. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for radiation, ± 20% for lube oil circuit, and ± 5% for aftercooler circuit.

13. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.

14. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied factory tolerances and an additional cooling system factor of 10%.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	86.7670	86.7670
Ethane	C2H6	12.4290	12.4290
Propane	C3H8	0.2460	0.2460
Isobutane	iso-C4H1O	0.0040	0.0040
Norbutane	nor-C4H1O	0.0040	0.0040
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.0000	0.0000
Hexane	C6H14	0.0000	0.0000
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.4040	0.4040
Carbon Dioxide	CO2	0.1460	0.1460
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup:	ETC Rover - Current
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	73.3
Lower Heating Value (Btu/scf):	999
Higher Heating Value (Btu/scf):	1106
WOBBE Index (Btu/scf):	1268
THC: Free Inert Ratio:	180.82
Total % Inerts (% N2, CO2, He):	0.55%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	10.40
Stoich A/F Ratio (Mass/Mass):	16.78
Specific Gravity (Relative to Air):	0.620
Specific Heat Constant (K):	1.298

CONDITIONS AND DEFINITIONS

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

FUEL LIQUIDS

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

Equipment Specification Report

Proposal Number: **JB-14-3195 Rev(4)**

Engine Data

Number of Engines:	1
Application:	Gas Compression
Engine Manufacturer:	Caterpillar
Model Number:	G3616
Power Output:	4,735 bhp
Lubrication Oil:	0.6 wt% sulfated ash or less
Type of Fuel:	Natural Gas
Exhaust Flow Rate:	32,054 acfm (cfm)
Exhaust Temperature:	856 °F

System Details

Housing Model Number:	SP-PTHIT-72S3624x61-18x2/30-XH4B2
Element Model Number:	RXS-RE-304-3624XH, RXS-RE-3624BLIND
Number of Catalyst Elements:	4
Number of Spare Catalyst Tracks:	2
System Pressure Loss:	7.0 inches of WC (Fresh)
Sound Attenuation:	27-35 dBA insertion loss
Exhaust Temperature Limits:	750 - 1250°F (catalyst inlet); 1350°F (Catalyst Outlet)

NSCR Housing & Catalyst Details

Model Number:	SP-PTHIT-72S3624x61-18x2/30-XH4B2
Material:	Carbon Steel
Approximate Diameter:	72 inches
Inlet Pipe Size & Connection:	(2) 18 inch FF Flange, 150# ANSI standard bolt pattern
Outlet Pipe Size & Connection:	30 inch FF Flange, 150# ANSI standard bolt pattern
Overall Length:	355 inches

Emission Requirements

Exhaust Gases	Engine Outputs (g/bhp-hr)	Reduction (%)	Warranted Converter Outputs (g/bhp-hr)	Requested Emissions Targets
NOx***	0.5	0%		
CO	2.75	93%	0.1925	93% Reduction
NMNEHC**	0.63	50%	0.315	50% Reduction
CH2O	0.26	76%	0.062	76% Reduction
O2	12.0%			
H2O	17.0%			

† MIRATECH warrants the performance of the converter, as stated above, per the MIRATECH General Terms and Conditions of Sale.

*MW referenced as CH_4 **MW referened as CH_4 ***MW referenced as NO_2

Image shown may not reflect actual package.

STANDBY
500 ekW 625 kVA
60 Hz 1800 rpm 600 Volts

Caterpillar is leading the power generation marketplace with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FEATURES

FUEL/EMISSIONS STRATEGY
- EPA Certified for Stationary Emergency Application (EPA Tier 2 emissions levels)

DESIGN CRITERIA
- The generator set accepts 100% rated load in one step per NFPA 110 and meets ISO 8528-5 transient response.

UL 2200 / CSA - Optional
- UL 2200 listed packages
- CSA Certified

Certain restrictions may apply. Consult with your Cat® Dealer.

FULL RANGE OF ATTACHMENTS
- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

SINGLE-SOURCE SUPPLIER
- Fully prototype tested with certified torsional vibration analysis available

WORLDWIDE PRODUCT SUPPORT
- Cat dealers provide extensive post sale support including maintenance and repair agreements
- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- The Cat® S•O•S℠ program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

CAT® C15 ATAAC DIESEL ENGINE
- Utilizes ACERT™ Technology
- Reliable, rugged, durable design
- Field-proven in thousands of applications worldwide
- Four-stroke diesel engine combines consistent performance and excellent fuel economy with minimum weight
- Electronic engine control

CAT GENERATOR
- Matched to the performance and output characteristics of Cat engines
- Load adjustment module provides engine relief upon load impact and improves load acceptance and recovery time
- UL 1446 Recognized Class H insulation

CAT EMCP 4 CONTROL PANELS
- Simple user friendly interface and navigation
- Scalable system to meet a wide range of customer needs
- Integrated Control System and Communications Gateway

SEISMIC CERTIFICATION
- Seismic Certification available
- Anchoring details are site specific, and are dependent on many factors such as generator set size, weight, and concrete strength. IBC Certification requires that the anchoring system used is reviewed and approved by a Professional Engineer
- Seismic Certification per Applicable Building Codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, CBC 2007
- Pre-approved by OSHPD and carries an OSP-0084-10 for use in healthcare projects in California

STANDBY 500 ekW 625 kVA

60 Hz 1800 rpm 600 Volts

FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Air Inlet	• Air cleaner	
Cooling	• Package mounted radiator	
Exhaust	• Exhaust flange outlet	[ ] Industrial [ ] Residential [ ] Critical Mufflers
Fuel	• Primary fuel filter with integral water separator • Secondary fuel filters • Fuel priming pump	
Generator	• Matched to the performance and output characteristics of Cat engines • Load adjustment module provides engine relief upon load impact and improves laod acceptance and recovery time • IP23 protection	[ ] Oversize and premium generators [ ] Permanent magnet excitation (PMG) [ ] Internal excited (IE) [ ] Anti-condensation space heaters
Power Termination	• Bus bar	[ ] Circuit breakers, UL listed [ ] Circuit breakers, IEC compliant
Control Panel	• EMCP 4 Genset Controller	[ ] EMCP 4.2 [ ] EMCP 4.3 [ ] EMCP 4.4 [ ] Local and remote annuniciator modules [ ] Load share module [ ] Digital I/O module [ ] Remote monitoring software
Mounting	• Rubber vibration isolators	
Starting/Charging	• 24 volt starting motor • Batteries	[ ] Battery chargers [ ] Oversize batteries [ ] Jacket water heater [ ] Heavy duty starting system [ ] Charging alternator
General	• Paint - Caterpillar Yellow except rails and radiators gloss black	The following options are based on regional and product configuration: [ ] Seismic Certification per Applicable Building Codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, CBC 2007 [ ] UL 2200 package [ ] EU Certificate of Conformance (CE) [ ] CSA Certification [ ] EEC Declaration of Conformity [ ] Narrow, wide or skid base [ ] Sound attenuated, weather protective or high ambient weather protective enclosures [ ] Single or dual wall integral fuel tanks [ ] Single or dual wall sub-base fuel tanks [ ] Integral & sub-base UL listed dual wall fuel tanks [ ] Automatic transfer switches (ATS)

STANDBY 500 ekW 625 kVA

60 Hz 1800 rpm 600 Volts

SPECIFICATIONS

CAT GENERATOR

Frame size.....LC6124F
Excitation.....Internal Excitation
Pitch.....0.6667
Number of poles.....4
Number of bearings..... Single bearing
Number of Leads.....012
Insulation..... UL 1446 Recognized Class H with tropicalization and antiabrasion
- Consult your Caterpillar dealer for available voltages
IP Rating.....Drip Proof IP23
Alignment.....Pilot Shaft
Overspeed capability.....125
Wave form Deviation (Line to Line).....2%
Voltage regulator.....Three phase sensing
Voltage regulation.....Less than +/- 1/2% (steady state)
Less than +/- ½% (w/ 3% speed change)

CAT DIESEL ENGINE

C15 ATAAC, I-6, 4-Stroke Water-cooled Diesel
Bore..... 137.20 mm (5.4 in)
Stroke..... 171.40 mm (6.75 in)
Displacement.....15.20 L (927.56 in^3)
Compression Ratio..... 16.1:1
Aspiration..... Air-to-Air Aftercooled
Fuel System.....MEUI
Governor Type..... Caterpillar ADEM control system

CAT EMCP 4 SERIES CONTROLS

EMCP 4 controls including:
- Run / Auto / Stop Control
- Speed and Voltage Adjust
- Engine Cycle Crank
- 24-volt DC operation
- Environmental sealed front face
- Text alarm/event descriptions

Digital indication for:
- RPM
- DC volts
- Operating hours
- Oil pressure (psi, kPa or bar)
- Coolant temperature
- Volts (L-L & L-N), frequency (Hz)
- Amps (per phase & average)
- ekW, kVA, kVAR, kW-hr, %kW, PF (4.2 only)

Warning/shutdown with common LED indication of:
- Low oil pressure
- High coolant temperature
- Overspeed
- Emergency stop
- Failure to start (overcrank)
- Low coolant temperature
- Low coolant level

Programmable protective relaying functions:
- Generator phase sequence
- Over/Under voltage (27/59)
- Over/Under Frequency (81 o/u)
- Reverse Power (kW) (32) (4.2 only)
- Reverse reactive power (kVAr) (32RV)
- Overcurrent (50/51)

Communications:
- Four digital inputs (4.1)
- Six digital inputs (4.2 only)
- Four relay outputs (Form A)
- Two relay outputs (Form C)
- Two digital outputs
- Customer data link (Modbus RTU) (4.2 only)
- Accessory module data link (4.2 only)
- Serial annunciator module data link (4.2 only)
- Emergency stop pushbutton

Compatible with the following:
- Digital I/O module
- Local Annunciator
- Remote CAN annunciator
- Remote serial annunciator

STANDBY 500 ekW 625 kVA

60 Hz 1800 rpm 600 Volts

TECHNICAL DATA

Open Generator Set - - 1800 rpm/60 Hz/600 Volts	DM8155	
EPA Certified for Stationary Emergency Application (EPA Tier 2 emissions levels)		
Generator Set Package Performance		
Genset Power rating @ 0.8 pf	625 kVA	
Genset Power rating with fan	500 ekW	
Fuel Consumption		
100% load with fan	138.5 L/hr	36.6 Gal/hr
75% load with fan	106.1 L/hr	28.0 Gal/hr
50% load with fan	88.1 L/hr	23.3 Gal/hr
Cooling System[1]		
Air flow restriction (system)	0.12 kPa	0.48 in. water
Air flow (max @ rated speed for radiator arrangement)	822 m³/min	29029 cfm
Engine Coolant capacity with radiator/exp. tank	57.8 L	15.3 gal
Engine coolant capacity	20.8 L	5.5 gal
Radiator coolant capacity	37.0 L	9.8 gal
Inlet Air		
Combustion air inlet flow rate	39.8 m³/min	1405.5 cfm
Exhaust System		
Exhaust stack gas temperature	505.6 ° C	942.1 ° F
Exhaust gas flow rate	108.8 m³/min	3842.2 cfm
Exhaust flange size (internal diameter)	152.4 mm	6.0 in
Exhaust system backpressure (maximum allowable)	10.0 kPa	40.2 in. water
Heat Rejection		
Heat rejection to coolant (total)	189 kW	10748 Btu/min
Heat rejection to exhaust (total)	505 kW	28719 Btu/min
Heat rejection to atmosphere from engine	94 kW	5346 Btu/min
Heat rejection to atmosphere from generator	29.1 kW	1654.9 Btu/min
Alternator[2]		
Motor starting capability @ 30% voltage dip	1714 skVA	
Frame	LC6124F	
Temperature Rise	130 ° C	234 ° F
Lube System		
Sump refill with filter	60.0 L	15.9 gal
Emissions (Nominal)[3]		
NOx g/hp-hr	5.74 g/hp-hr	
CO g/hp-hr	.4 g/hp-hr	
HC g/hp-hr	.01 g/hp-hr	
PM g/hp-hr	.018 g/hp-hr	

[1] For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

[2] Generator temperature rise is based on a 40° C (104° F) ambient per NEMA MG1-32. Some packages may have oversized generators with a different temperature rise and motor starting characteristics.

[3] Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77°F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

RATING DEFINITIONS AND CONDITIONS

Applicable Codes and Standards: AS1359, CSA C22.2 No 100-04, UL142, UL489, UL601, UL869, UL2200, NFPA 37, NFPA 70, NFPA 99, NFPA 110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG 1-22, NEMA MG 1-33, 72/23/EEC, 98/37/EC, 2004/108/EC

Standby - Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

Fuel Rates are based on fuel oil of 35° API (16° C or 60° F) gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.).

Additional Ratings may be available for specific customer requirements. Consult your Cat representative for details.

STANDBY 500 ekW 625 kVA

60 Hz 1800 rpm 600 Volts

DIMENSIONS

Package Dimensions		
Length	**3775.1 mm**	**148.63 in**
Width	**1110.0 mm**	**43.7 in**
Height	**2091.0 mm**	**82.32 in**

NOTE: For reference only - do not use for installation design. Please contact your local dealer for exact weight and dimensions. (General Dimension Drawing #2781052).

Performance No.: DM8155

Feature Code: C15DE6Q

Gen. Arr. Number: 2351214

Source: U.S. Sourced

April 24 2013

21646653

www.Cat-ElectricPower.com

SITE DATA

NSR (45 CSR 13) PERMIT APPLICATION (CONSTRUCTION)

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

	Stream 1		Stream 2	
	Fuel/Residue		Inlet Gas	
Component	mole %	wgt. % *	mole %	wgt. % *
Water	--	--	--	--
Nitrogen	0.4040%	0.6306%	0.4040%	0.6306%
Carbon Dioxide	0.1460%	0.3580%	0.1460%	0.3580%
Oxygen	0.0000%	0.0000%	0.0000%	0.0000%
Hydrogen Sulfide	0.0000%	0.0000%	0.0000%	0.0000%
Methane	86.7660%	77.5574%	86.7660%	77.5574%
Ethane	12.4290%	20.8237%	12.4290%	20.8237%
Propane	0.2460%	0.6044%	0.2460%	0.6044%
I-Butane	0.0040%	0.0130%	0.0040%	0.0130%
N-Butane	0.0040%	0.0130%	0.0040%	0.0130%
I-Pentane	0.0000%	0.0000%	0.0000%	0.0000%
N-Pentane	0.0000%	0.0000%	0.0000%	0.0000%
i-Hexane	0.0000%	0.0000%	0.0000%	0.0000%
n-Hexane	0.0000%	0.0000%	0.0000%	0.0000%
Benzene	0.0000%	0.0000%	0.0000%	0.0000%
Cyclohexane	0.0000%	0.0000%	0.0000%	0.0000%
i-Heptanes	0.0000%	0.0000%	0.0000%	0.0000%
n-Heptane	0.0000%	0.0000%	0.0000%	0.0000%
Toluene	0.0000%	0.0000%	0.0000%	0.0000%
i-Octanes	0.0000%	0.0000%	0.0000%	0.0000%
n-Octane	0.0000%	0.0000%	0.0000%	0.0000%
E-Benzene	0.0000%	0.0000%	0.0000%	0.0000%
m,o,&p-Xylene	0.0000%	0.0000%	0.0000%	0.0000%
i-Nonanes	0.0000%	0.0000%	0.0000%	0.0000%
n-Nonane	0.0000%	0.0000%	0.0000%	0.0000%
i-Decanes	0.0000%	0.0000%	0.0000%	0.0000%
n-Decane	0.0000%	0.0000%	0.0000%	0.0000%
i-Undecanes+	0.0000%	0.0000%	0.0000%	0.0000%
Totals	100.00%	100.00%	100.00%	100.00%
Totals (C3+)	0.25%	0.63%	0.25%	0.63%
Max VOC Wt% [a]		2.00%		2.00%
Max Benzene Wt% [a]		0.05%		0.05%
Max H_2S Wt%		0.000%		0.000%
Max Methane Wt% [a]		90.00%		90.00%
Max CO_2 Wt% [a]		1.00%		1.00%
Specific Gravity	0.6200		0.6200	

[a] Worst case conservative assumption of constituent content.

Fuel Gas Higher Heating Value	1,106 Btu/scf
Fuel Gas Lower Heating Value	999 Btu/scf

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

Identification

User Identification:	Rover Pipeline Slop Tank (TK-1)
City:	Cleveland
State:	Ohio
Company:	Rover Pipeline LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	300 bbl Slop Tank. Contents assumed to be 94% water, 2% oil, 2% amine, and 2% glycol.

Tank Dimensions

Shell Height (ft):	15.00
Diameter (ft):	12.00
Liquid Height (ft) :	15.00
Avg. Liquid Height (ft):	7.50
Volume (gallons):	12,690.44
Turnovers:	2.36
Net Throughput(gal/yr):	30,000.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Cleveland, Ohio (Avg Atmospheric Pressure = 14.33 psia)

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

Rover Pipeline Slop Tank (TK-1) - Vertical Fixed Roof Tank
Cleveland, 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
Slop	All	51.17	46.47	55.86	49.58	0.1973	0.1665	0.2330	21.9289			18.73	
Ethanolamine (mono-)						0.0015	0.0011	0.0019	61.0900	0.0200	0.0001	61.09	Option 2: A=7.456, B=1577.67, C=173.37
ETHYLENE GLYCOL						0.0019	0.0019	0.0019	62.1000	0.0200	0.0003	30.03	Option 1: VP50 = .0019 VP60 = .0019
Gasoline (RVP 9)						3.8637	3.5083	4.2476	67.0000	0.0200	0.2437	92.00	Option 4: RVP=9, ASTM Slope=3
Water						0.1857	0.1557	0.2207	18.0152	0.9400	0.7559	18.02	Option 2: A=8.10765, B=1750.286, C=235

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

Rover Pipeline Slop Tank (TK-1) - Vertical Fixed Roof Tank
Cleveland, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	8.5613
Vapor Space Volume (cu ft):	862.3672
Vapor Density (lb/cu ft):	0.0008
Vapor Space Expansion Factor:	0.0372
Vented Vapor Saturation Factor:	0.9262
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	862.3672
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	7.6250
Tank Shell Height (ft):	15.0000
Average Liquid Height (ft):	7.5000
Roof Outage (ft):	0.1250
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1250
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0008
Vapor Molecular Weight (lb/lb-mole):	21.9289
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.1973
Daily Avg. Liquid Surface Temp. (deg. R):	510.8367
Daily Average Ambient Temp. (deg. F):	49.5583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	509.2483
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,189.2337
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0372
Daily Vapor Temperature Range (deg. R):	18.7768
Daily Vapor Pressure Range (psia):	0.0665
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.1973
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1665
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.2330
Daily Avg. Liquid Surface Temp. (deg R):	510.8367
Daily Min. Liquid Surface Temp. (deg R):	506.1425
Daily Max. Liquid Surface Temp. (deg R):	515.5309
Daily Ambient Temp. Range (deg. R):	18.2167
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9262
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.1973

Vapor Space Outage (ft):	7.6250
Working Losses (lb):	3.0900
Vapor Molecular Weight (lb/lb-mole):	21.9289
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.1973
Annual Net Throughput (gal/yr.):	30,000.0000
Annual Turnovers:	2.3640
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	12,690.4443
Maximum Liquid Height (ft):	15.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	11.6513

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

Emissions Report for: Annual

Rover Pipeline Slop Tank (TK-1) - Vertical Fixed Roof Tank
Cleveland, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Slop	3.09	8.56	11.65
Water	2.34	6.47	8.81
ETHYLENE GLYCOL	0.00	0.00	0.00
Gasoline (RVP 9)	0.75	2.09	2.84
Ethanolamine (mono-)	0.00	0.00	0.00

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

Identification

User Identification:	Rover Pipeline Waste Water (TK-2)
City:	Cleveland
State:	Ohio
Company:	Rover Pipeline LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	300 bbl Waste Water tank. Contents assumed to be 98% water and 2% Oil.

Tank Dimensions

Shell Height (ft):	15.00
Diameter (ft):	12.00
Liquid Height (ft) :	15.00
Avg. Liquid Height (ft):	7.50
Volume (gallons):	12,690.44
Turnovers:	2.36
Net Throughput(gal/yr):	30,000.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Cleveland, Ohio (Avg Atmospheric Pressure = 14.33 psia)

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

Rover Pipeline Waste Water (TK-2) - Vertical Fixed Roof Tank
Cleveland, 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
Waste Water	All	51.17	46.47	55.86	49.58	0.2004	0.1691	0.2367	21.7751			18.31	
Gasoline (RVP 9)						3.8637	3.5083	4.2476	67.0000	0.0200	0.2362	92.00	Option 4: RVP=9, ASTM Slope=3
Water						0.1857	0.1557	0.2207	18.0152	0.9800	0.7638	18.02	Option 2: A=8.10765, B=1750.286, C=235

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

Rover Pipeline Waste Water (TK-2) - Vertical Fixed Roof Tank
Cleveland, Ohio

Annual Emission Calcaulations

Standing Losses (lb):	8.6430
Vapor Space Volume (cu ft):	862.3672
Vapor Density (lb/cu ft):	0.0008
Vapor Space Expansion Factor:	0.0373
Vented Vapor Saturation Factor:	0.9251
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	862.3672
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	7.6250
Tank Shell Height (ft):	15.0000
Average Liquid Height (ft):	7.5000
Roof Outage (ft):	0.1250
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1250
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0008
Vapor Molecular Weight (lb/lb-mole):	21.7751
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2004
Daily Avg. Liquid Surface Temp. (deg. R):	510.8367
Daily Average Ambient Temp. (deg. F):	49.5583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	509.2483
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,189.2337
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0373
Daily Vapor Temperature Range (deg. R):	18.7768
Daily Vapor Pressure Range (psia):	0.0676
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2004
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1691
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.2367
Daily Avg. Liquid Surface Temp. (deg R):	510.8367
Daily Min. Liquid Surface Temp. (deg R):	506.1425
Daily Max. Liquid Surface Temp. (deg R):	515.5309
Daily Ambient Temp. Range (deg. R):	18.2167
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9251
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2004
Vapor Space Outage (ft):	7.6250
Working Losses (lb):	3.1163
Vapor Molecular Weight (lb/lb-mole):	21.7751
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2004
Annual Net Throughput (gal/yr.):	30,000.0000
Annual Turnovers:	2.3640
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	12,690.4443
Maximum Liquid Height (ft):	15.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	11.7594

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

Emissions Report for: Annual

Rover Pipeline Waste Water (TK-2) - Vertical Fixed Roof Tank
Cleveland, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Waste Water	3.12	8.64	11.76
Water	2.38	6.60	8.98
Gasoline (RVP 9)	0.74	2.04	2.78

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

Identification

User Identification:	Rover Pipeline Waste Water (TK-3)
City:	Cleveland
State:	Ohio
Company:	Rover Pipeline LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	One (1) 2500 gal tank. Contents assumed to be 98% water and 2% Oil.

Tank Dimensions

Shell Height (ft):	7.50
Diameter (ft):	8.00
Liquid Height (ft) :	7.50
Avg. Liquid Height (ft):	3.75
Volume (gallons):	2,820.10
Turnovers:	10.64
Net Throughput(gal/yr):	30,000.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Cleveland, Ohio (Avg Atmospheric Pressure = 14.33 psia)

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

Rover Pipeline Waste Water (TK-3) - Vertical Fixed Roof Tank
Cleveland, 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
Waste Water	All	51.17	46.47	55.86	49.58	0.2004	0.1691	0.2367	21.7751			18.31	
Gasoline (RVP 9)						3.8637	3.5083	4.2476	67.0000	0.0200	0.2362	92.00	Option 4: RVP=9, ASTM Slope=3
Water						0.1857	0.1557	0.2207	18.0152	0.9800	0.7638	18.02	Option 2: A=8.10765, B=1750.286, C=235

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

Rover Pipeline Waste Water (TK-3) - Vertical Fixed Roof Tank
Cleveland, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	2.0059
Vapor Space Volume (cu ft):	192.6843
Vapor Density (lb/cu ft):	0.0008
Vapor Space Expansion Factor:	0.0373
Vented Vapor Saturation Factor:	0.9609
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	192.6843
Tank Diameter (ft):	8.0000
Vapor Space Outage (ft):	3.8333
Tank Shell Height (ft):	7.5000
Average Liquid Height (ft):	3.7500
Roof Outage (ft):	0.0833
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.0833
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	4.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0008
Vapor Molecular Weight (lb/lb-mole):	21.7751
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2004
Daily Avg. Liquid Surface Temp. (deg. R):	510.8367
Daily Average Ambient Temp. (deg. F):	49.5583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	509.2483
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,189.2337
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0373
Daily Vapor Temperature Range (deg. R):	18.7768
Daily Vapor Pressure Range (psia):	0.0676
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2004
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1691
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.2367
Daily Avg. Liquid Surface Temp. (deg R):	510.8367
Daily Min. Liquid Surface Temp. (deg R):	506.1425
Daily Max. Liquid Surface Temp. (deg R):	515.5309
Daily Ambient Temp. Range (deg. R):	18.2167
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9609
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2004

Vapor Space Outage (ft):	3.8333
Working Losses (lb):	3.1163
Vapor Molecular Weight (lb/lb-mole):	21.7751
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2004
Annual Net Throughput (gal/yr.):	30,000.0000
Annual Turnovers:	10.6379
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	2,820.0987
Maximum Liquid Height (ft):	7.5000
Tank Diameter (ft):	8.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	5.1222

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

Emissions Report for: Annual

Rover Pipeline Waste Water (TK-3) - Vertical Fixed Roof Tank
Cleveland, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Waste Water	3.12	2.01	5.12
Water	2.38	1.53	3.91
Gasoline (RVP 9)	0.74	0.47	1.21

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

Identification

User Identification:	Rover Pipeline New Oil Tank (TK-4)
City:	Cleveland
State:	Ohio
Company:	Rover Pipeline LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	One (1) 100 bbl new oil tank.

Tank Dimensions

Shell Height (ft):	8.00
Diameter (ft):	10.00
Liquid Height (ft) :	8.00
Avg. Liquid Height (ft):	4.00
Volume (gallons):	4,700.16
Turnovers:	10.72
Net Throughput(gal/yr):	50,400.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Cleveland, Ohio (Avg Atmospheric Pressure = 14.33 psia)

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

Rover Pipeline New Oil Tank (TK-4) - Vertical Fixed Roof Tank
Cleveland, 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
LUBE OIL	All	51.17	46.47	55.86	49.58	0.0001	0.0001	0.0001	190.0000			387.00	Option 1: VP50 = .0001 VP60 = .0001

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

Rover Pipeline New Oil Tank (TK-4) - Vertical Fixed Roof Tank
Cleveland, Ohio

Annual Emission Calcaulations

Standing Losses (lb):	0.0133
Vapor Space Volume (cu ft):	322.3405
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0326
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	322.3405
Tank Diameter (ft):	10.0000
Vapor Space Outage (ft):	4.1042
Tank Shell Height (ft):	8.0000
Average Liquid Height (ft):	4.0000
Roof Outage (ft):	0.1042
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1042
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg. R):	510.8367
Daily Average Ambient Temp. (deg. F):	49.5583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	509.2483
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,189.2337
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0326
Daily Vapor Temperature Range (deg. R):	18.7768
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg R):	510.8367
Daily Min. Liquid Surface Temp. (deg R):	506.1425
Daily Max. Liquid Surface Temp. (deg R):	515.5309
Daily Ambient Temp. Range (deg. R):	18.2167
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	1.0000
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0001
Vapor Space Outage (ft):	4.1042
Working Losses (lb):	0.0228
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Annual Net Throughput (gal/yr.):	50,400.0000
Annual Turnovers:	10.7230
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	4,700.1646
Maximum Liquid Height (ft):	8.0000
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.0361

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

Emissions Report for: Annual

Rover Pipeline New Oil Tank (TK-4) - Vertical Fixed Roof Tank
Cleveland, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
LUBE OIL	0.02	0.01	0.04

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

Identification

User Identification:	Rover Pipeline Coolant Tank (TK-5)
City:	Cleveland
State:	Ohio
Company:	Rover Pipeline LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	One (1) - 100 bbl coolant tank.

Tank Dimensions

Shell Height (ft):	8.00
Diameter (ft):	10.00
Liquid Height (ft) :	8.00
Avg. Liquid Height (ft):	4.00
Volume (gallons):	4,700.16
Turnovers:	10.72
Net Throughput(gal/yr):	50,400.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	0.00
Radius (ft) (Dome Roof)	10.00

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Cleveland, Ohio (Avg Atmospheric Pressure = 14.33 psia)

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

Rover Pipeline Coolant Tank (TK-5) - Vertical Fixed Roof Tank
Cleveland, 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
ETHYLENE GLYCOL	All	51.17	46.47	55.86	49.58	0.0019	0.0019	0.0019	62.1000			30.03	Option 1: VP50 = .0019 VP60 = .0019

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

Rover Pipeline Coolant Tank (TK-5) - Vertical Fixed Roof Tank
Cleveland, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	0.0941
Vapor Space Volume (cu ft):	368.0301
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0326
Vented Vapor Saturation Factor:	0.9995
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	368.0301
Tank Diameter (ft):	10.0000
Vapor Space Outage (ft):	4.6859
Tank Shell Height (ft):	8.0000
Average Liquid Height (ft):	4.0000
Roof Outage (ft):	0.6859
Roof Outage (Dome Roof)	
Roof Outage (ft):	0.6859
Dome Radius (ft):	10.0000
Shell Radius (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	62.1000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0019
Daily Avg. Liquid Surface Temp. (deg. R):	510.8367
Daily Average Ambient Temp. (deg. F):	49.5583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	509.2483
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,189.2337
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0326
Daily Vapor Temperature Range (deg. R):	18.7768
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0019
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0019
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0019
Daily Avg. Liquid Surface Temp. (deg R):	510.8367
Daily Min. Liquid Surface Temp. (deg R):	506.1425
Daily Max. Liquid Surface Temp. (deg R):	515.5309
Daily Ambient Temp. Range (deg. R):	18.2167
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9995
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0019
Vapor Space Outage (ft):	4.6859

Working Losses (lb):	0.1416
Vapor Molecular Weight (lb/lb-mole):	62.1000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0019
Annual Net Throughput (gal/yr.):	50,400.0000
Annual Turnovers:	10.7230
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	4,700.1646
Maximum Liquid Height (ft):	8.0000
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.2357

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

Emissions Report for: Annual

Rover Pipeline Coolant Tank (TK-5) - Vertical Fixed Roof Tank
Cleveland, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
ETHYLENE GLYCOL	0.14	0.09	0.24

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

Identification

User Identification:	Rover Pipeline Used Coolant (TK-6)
City:	Cleveland
State:	Ohio
Company:	Rover Pipeline LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	One (1) - 100 bbl used coolant tank.

Tank Dimensions

Shell Height (ft):	8.00
Diameter (ft):	10.00
Liquid Height (ft) :	8.00
Avg. Liquid Height (ft):	4.00
Volume (gallons):	4,700.16
Turnovers:	10.72
Net Throughput(gal/yr):	50,400.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	0.00
Radius (ft) (Dome Roof)	10.00

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Cleveland, Ohio (Avg Atmospheric Pressure = 14.33 psia)

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

Rover Pipeline Used Coolant (TK-6) - Vertical Fixed Roof Tank
Cleveland, 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
ETHYLENE GLYCOL	All	51.17	46.47	55.86	49.58	0.0019	0.0019	0.0019	62.1000			30.03	Option 1: VP50 = .0019 VP60 = .0019

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

Rover Pipeline Used Coolant (TK-6) - Vertical Fixed Roof Tank
Cleveland, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	0.0941
Vapor Space Volume (cu ft):	368.0301
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0326
Vented Vapor Saturation Factor:	0.9995
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	368.0301
Tank Diameter (ft):	10.0000
Vapor Space Outage (ft):	4.6859
Tank Shell Height (ft):	8.0000
Average Liquid Height (ft):	4.0000
Roof Outage (ft):	0.6859
Roof Outage (Dome Roof)	
Roof Outage (ft):	0.6859
Dome Radius (ft):	10.0000
Shell Radius (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	62.1000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0019
Daily Avg. Liquid Surface Temp. (deg. R):	510.8367
Daily Average Ambient Temp. (deg. F):	49.5583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	509.2483
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,189.2337
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0326
Daily Vapor Temperature Range (deg. R):	18.7768
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0019
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0019
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0019
Daily Avg. Liquid Surface Temp. (deg R):	510.8367
Daily Min. Liquid Surface Temp. (deg R):	506.1425
Daily Max. Liquid Surface Temp. (deg R):	515.5309
Daily Ambient Temp. Range (deg. R):	18.2167
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9995
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0019
Vapor Space Outage (ft):	4.6859

Working Losses (lb):	0.1416
Vapor Molecular Weight (lb/lb-mole):	62.1000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0019
Annual Net Throughput (gal/yr.):	50,400.0000
Annual Turnovers:	10.7230
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	4,700.1646
Maximum Liquid Height (ft):	8.0000
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.2357

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

Emissions Report for: Annual

Rover Pipeline Used Coolant (TK-6) - Vertical Fixed Roof Tank
Cleveland, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
ETHYLENE GLYCOL	0.14	0.09	0.24

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

Identification

User Identification:	Rover Pipeline Used Oil (TK-7)
City:	Cleveland
State:	Ohio
Company:	Rover Pipeline LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	One (1) 100 bbl used oil tank.

Tank Dimensions

Shell Height (ft):	8.00
Diameter (ft):	10.00
Liquid Height (ft) :	8.00
Avg. Liquid Height (ft):	4.00
Volume (gallons):	4,700.16
Turnovers:	10.72
Net Throughput(gal/yr):	50,400.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Cleveland, Ohio (Avg Atmospheric Pressure = 14.33 psia)

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

Rover Pipeline Used Oil (TK-7) - Vertical Fixed Roof Tank
Cleveland, 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
LUBE OIL	All	51.17	46.47	55.86	49.58	0.0001	0.0001	0.0001	190.0000			387.00	Option 1: VP50 = .0001 VP60 = .0001

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

Rover Pipeline Used Oil (TK-7) - Vertical Fixed Roof Tank
Cleveland, Ohio

Annual Emission Calcaulations

Standing Losses (lb):	0.0133
Vapor Space Volume (cu ft):	322.3405
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0326
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	322.3405
Tank Diameter (ft):	10.0000
Vapor Space Outage (ft):	4.1042
Tank Shell Height (ft):	8.0000
Average Liquid Height (ft):	4.0000
Roof Outage (ft):	0.1042
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1042
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg. R):	510.8367
Daily Average Ambient Temp. (deg. F):	49.5583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	509.2483
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,189.2337
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0326
Daily Vapor Temperature Range (deg. R):	18.7768
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg R):	510.8367
Daily Min. Liquid Surface Temp. (deg R):	506.1425
Daily Max. Liquid Surface Temp. (deg R):	515.5309
Daily Ambient Temp. Range (deg. R):	18.2167
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	1.0000
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0001
Vapor Space Outage (ft):	4.1042
Working Losses (lb):	0.0228
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Annual Net Throughput (gal/yr.):	50,400.0000
Annual Turnovers:	10.7230
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	4,700.1646
Maximum Liquid Height (ft):	8.0000
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.0361

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

Emissions Report for: Annual

Rover Pipeline Used Oil (TK-7) - Vertical Fixed Roof Tank
Cleveland, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
LUBE OIL	0.02	0.01	0.04

ATTACHMENT O: MONITORING, RECORDKEEPING, REPORTING AND TESTING PLANS

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC

TABLE O

R-13 PERMIT APPLICATION

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Emission Unit ID	Control Device ID	Emission Point ID	Description	Applicable Citation(s)	Limitation/Standard	Monitoring	Testing	Recordkeeping	Reporting
CE-1S CE-2S CE-3S	--	CE-1E CE-2E CE-3E	Caterpillar G3612 (3550 HP)	NSPS JJJJ 45 CSR 16	0.7 g/hp-hr VOC 2.0 g/hp-hr CO 1.0 g/hp-hr NO_X [§60.4233(e) and Table 1]		Initial demonstration of compliance for NSPS JJJJ per [§60.4243(b)(2)(ii)]. Every 8760 hrs or 3 years if reached first per NSPS JJJJ.	Owners and operators of all stationary SI ICE must keep records of the information in paragraphs (a)(1) through (4) of this section. (1) All notifications submitted to comply with this subpart and all documentation supporting any notification. (2) Maintenance conducted on the engine. (3) If the stationary SI internal combustion engine is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR parts 90, 1048, 1054, and 1060, as applicable. (4) If the stationary SI internal combustion engine is not a certified engine or is a certified engine operating in a non-certified manner and subject to §60.4243(a)(2), documentation that the engine meets the emission standards.	(1) Name and address of the owner or operator; (2) The address of the affected source; (3) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement; (4) Emission control equipment; and (5) Fuel used. Submit a copy of each performance test as conducted in §60.4244 within 60 days after the test has been completed.
				MACT ZZZZ 45 CSR 34	Meet MACT ZZZZ by complying with NSPS JJJJ.				
				NSPS OOOO	Not an affected facility, since the Station is a transmission facility.				
HTR-1	--	HTR-1	CIG Flameless Gas Infrared Catalytic Heater HC2100 (0.51 MMBtu/hr)		Maximum heat input: <= 0.51 MMBtu/hr <= 0.001 MMscf/hr <= 4.94 MMscf/yr			Monthly and rolling 12-month total records of natural gas consumed and hours of operation.	
				45CSR§2-3.1, 45CSR§2-3.2 45CSR§2-11 (exempt for 4, 5,6,8,and 9)	10% opacity	At such reasonable time as the Secretary may designate, conduct 40 CFR Part 60, Appendix A, Method 9 opacity observations	Opacity must be determined by 40 CFR Part 60, Appendix A, Method 9 observations or by measurements from a COMS approved by the Director		
GE-1	--	GE-1	Emergency Generator 1 (957 hp) 15.20 L		Maximum heat input: <= 36.6 gal/hr <= 18,300 gal/yr Annual operating hours: <= 500 hr/yr		Stack testing at the request of the agency.	Monthly and rolling 12-month total of diesel fuel burned and hours of operation. Maintenance records relating to failure and/or repair of fire pump equipment. In the event of equipment or system failure, these records shall document the permittee's effort to maintain proper and effective operation of such equipment and/or systems.	Submit written reports of all performance tests.
				NSPS IIII 45 CSR 16	Over life of engine: 5.47 g/hp-hr NO_X 0.01 g/hp-hr HC 0.40 g/hp-hr CO 0.018 g/hp-hr PM EPA Tier 3 emissions provided by Vendor Nonemergency hours (for maintenance checks and readiness testing, etc.) limited to 100/yr. [§60.4211(f)] Fire diesel that meets 40 CFR §80.510(b) for nonroad diesel fuel. [§60.4207(b)] Purchase certified engine and operate per manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer; only change settings allowed by manufacturer; and meet 40 CFR Parts 89, 94, and 1068 as applicable. [§60.4211(a) and (c)]	Install a non-resettable hour meter prior to startup of the engine. [§60.4209(a)] If stationary CI internal combustion engine is equipped with a diesel particulate filter to comply with the emission standards in §60.4204, the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached. [§60.4209(b)]		Maintain manufacturer certification documentation. [§60.4211(c)] Starting with the model years in Table 5 to this subpart, if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the owner or operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time. [§60.4214(b)] If the stationary CI internal combustion engine is equipped with a diesel particulate filter, the owner or operator must keep records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached. [§60.4214(c)]	
				MACT ZZZZ 45 CSR 34	Meet MACT ZZZZ by complying with NSPS IIII.				
				NSPS OOOO	Not an affected facility, since the Station is a transmission facility.				
BD	--	BD	Compressor Blowdown Vents					Maintain daily records of blowdowns, including duration, volume vented, reason for blowdown (i.e., MSS or upset).	
SV	--	SV	Compressor Starter Vents					Maintain daily records of starters, including duration, volume vented, reason for blowdown (i.e., MSS or upset).	

TABLE O

R-13 PERMIT APPLICATION

SHERWOOD COMPRESSOR STATION

ROVER PIPELINE LLC

Emission Unit ID	Control Device ID	Emission Point ID	Description	Applicable Citation(s)	Limitation/Standard	Monitoring	Testing	Recordkeeping	Reporting
TK-1	--	TK-1	Slop Tank (300 BBL)		Maximum Capacity: <= 300 BBL Maximum throughput: <= 30 MGals/yr <=0.32 lb/hr VOC <= 0.001 T/yr VOC			Maintain a record of throughput for the storage tanks on a monthly and rolling twelve month total.	
				NSPS OOOO	Not an affected facility, since VOC emissions are less than 6 tpy.				
				NSPS Kb	Not an affected facility, since the storage vessel is less than 75 cubic meters.				
TK-2	--	TK-2	Waste Water Tank 1 (300 BBL)		Maximum Capacity: <= 300 BBL Maximum throughput: <= 30 MGals/yr <=0.31 lb/hr VOC <= 0.001 T/yr VOC			Maintain a record of throughput for the storage tanks on a monthly and rolling twelve month total.	
				NSPS OOOO	Not an affected facility, since VOC emissions are less than 6 tpy.				
				NSPS Kb	Not an affected facility, since the storage vessel is less than 75 cubic meters.				
TK-3	--	TK-3	Waste Water Tank 2 (2,500 gallons)		Maximum Capacity: <= 2,500 gallons Maximum throughput: <= 30 MGals/yr <=0.07 lb/hr VOC <= 0.001 T/yr VOC			Maintain a record of throughput for the storage tanks on a monthly and rolling twelve month total.	
				NSPS OOOO	Not an affected facility, since VOC emissions are less than 6 tpy.				
				NSPS Kb	Not an affected facility, since the storage vessel is less than 75 cubic meters.				
TK-4	--	TK-4	New Oil Tank (100 BBL)		Maximum Capacity: <= 100 BBL Maximum throughput: <= 50.4 MGals/yr <=0.01 lb/hr VOC <= 0.01 T/yr VOC			Maintain a record of throughput for the storage tanks on a monthly and rolling twelve month total.	
				NSPS OOOO	Not an affected facility, since VOC emissions are less than 6 tpy.				
				NPS Kb	Not an affected facility, since the storage vessel is less than 75 cubic meters.				
TK-5	--	TK-5	Coolant Tank (100 BBL)		Maximum Capacity: <= 100 BBL Maximum throughput: <= 50.4 MGals/yr <=0.01 lb/hr VOC <= 0.01 T/yr VOC			Maintain a record of throughput for the storage tanks on a monthly and rolling twelve month total.	
				NSPS OOOO	Not an affected facility, since VOC emissions are less than 6 tpy.				
				NSPS Kb	Not an affected facility, since the storage vessel is less than 75 cubic meters.				
TK-6	--	TK-6	Used Coolant Tank (100 BBL)		Maximum Capacity: <= 100 BBL Maximum throughput: <= 50.4 MGals/yr <=0.01 lb/hr VOC <= 0.01 T/yr VOC			Maintain a record of throughput for the storage tanks on a monthly and rolling twelve month total.	
				NSPS OOOO	Not an affected facility, since VOC emissions are less than 6 tpy.				
				NSPS Kb	Not an affected facility, since the storage vessel is less than 75 cubic meters.				
TK-7	--	TK-7	Used Oil Tank (100 BBL)		Maximum Capacity: <= 100 BBL Maximum throughput: <= 50.4 MGals/yr <=0.01 lb/hr VOC <= 0.01 T/yr VOC			Maintain a record of throughput for the storage tanks on a monthly and rolling twelve month total.	
				NSPS OOOO	Not an affected facility, since VOC emissions are less than 6 tpy.				
				NSPS Kb	Not an affected facility, since the storage vessel is less than 75 cubic meters.				
LOAD-1	--	LOAD-1	Slop Water Truck Loading		Maximum throughput: <= 30 MGals/yr			Maintain monthly and annual records that include the total quantity of material loaded into tank trucks. The annual records shall be calculated on a 12-month rolling total.	
LOAD-2	--	LOAD-2	Waste Water Truck Loading		Maximum throughput: <= 30 MGals/yr			Maintain monthly and annual records that include the total quantity of material loaded into tank trucks. The annual records shall be calculated on a 12-month rolling total.	
FUG	--	FUG	Fugitives	NSPS OOOO	Not an affected facility, since the Station is a transmission facility.				.
R1	--	R1	Unpaved Roads	45 CSR 17	Maintain PM control of the plant premises, and plant owned, leased or controlled access roads, by paving, application of asphalt, chemical dust suppressants or other suitable dust control measures.				

ATTACHMENT P: PUBLIC NOTICE

SHERWOOD COMPRESSSOR STATION

ROVER PIPELINE LLC

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Rover Pipeline LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit for a Gas Compressor Station located near Smithburg, Doddridge County, West Virginia. The latitude and longitude coordinates are: Latitude 39.266894°, Longitude -80.694028. The applicant estimates the potential to discharge the following Regulated Air Pollutants will be: Volatile Organic Compounds (VOC), 53.67 Tons per year (T/yr); Oxides of Nitrogen (NO_X), 71.83 T/yr; Carbon Monoxide (CO), 26.80 T/yr; Particulate Matter (PM), 5.33 T/yr; Particulate Matter (< 10 microns) (PM_{10}), 4.87 T/yr; Particulate Matter (< 2.5 microns) ($PM_{2.5}$), 4.70 T/yr; Sulfur Dioxide (SO_2), 0.37 T/yr. Startup of operation is planned to begin on or about the 1st day of June, 2017. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice. Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.

Dated this the **(Day)** day of **(Month)**, **(Year)**.

By: Rover Pipeline LLC
Mark Ryan
VP Operations, Midwest Division
8910 Purdue Road
Indianapolis, IN 46268