September 22, 2016

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304

RE: Application for Rule 13 Construction Permit
Ascent Resources - Marcellus, LLC
Hoyt 401
Facility ID: 103-00051

Dear Sir/Madam,

Ascent Resources – Marcellus, LLC (Ascent) owns and operates the Hoyt 401 facility (Facility), which is located in Wetzel County, West Virginia. The Facility is currently permitted under G70-A189, issued December 31, 2015.

Ascent is updating the production and tank information and requesting a conversion to a Rule 13 permit. To authorize the operation of equipment at the Facility, Ascent is submitting this application for a Rule 13 Construction Permit. The purpose of this application is to obtain authorization to operate the identified emissions units at the Facility. The Facility consists of six (6) production unit heaters, two (2) condensate heaters, two (2) gunbarrel tanks, four (4) condensate storage tanks, four (4) produced water storage tanks, one (1) flare, and various support operations.

This Application has been prepared in accordance with the requirements set forth in 45CSR6, 45CSR13, and applicable guidance documents. Ascent will operate the Facility in compliance with applicable federal and state air quality regulations. The required attachments are included in addition to the application forms.

Enclosed is the original and two (2) copies of the application, along with the fee in the amount of $1,000. If you have any questions or need additional information, please feel free to contact me at 405-252-7753.

Sincerely,

Evan Foster Pearson
EH&S Air Compliance Specialist

Enclosures

Ascent Resources, LLC
P.O. Box 13678, Oklahoma City, OK 73113 · 3501 N.W. 63rd
Evan.Pearson@AscentResources.c

Ascent Resources - Marcellus, LLC
Hoyt 401
103-00051
R13-2992C
Roy Kees

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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):*
Ascent Resources – Marcellus, LLC

2. Federal Employer ID No. ***(FEIN):***
46-5580354

3. Name of facility *(if different from above):*
Hoyt 401

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

5A. Applicant's mailing address:
PO Box 13678

Oklahoma City, OK 73113

5B. Facility's present physical address:
39.60223°N, -80.64115°W

Pine Grove, WV 26581

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

- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation:

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**

- If **YES,** please explain: Lease
- If **NO,** you are not eligible for a permit for this source.

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

10. North American Industry Classification System **(NAICS)** code for the facility:
211111

11A. DAQ Plant ID No. (for existing facilities only):
103-00051

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
G70-A189

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 Wileyville, WV, head south on Fairview Ridge Rd. toward WV-7 W. Turn left at the first cross street onto WV-7 E for 1.6 mi. Turn right onto Barker Run Rd. and go 3.6 mi. Turn left onto N Fork Rd and go 4.4 mi. Turn left onto Four Mile Rd. and go 0.9 mi to facility location.

12.B. New site address (if applicable):	12C. Nearest city or town: Wileyville	12D. County: Wetzel
12.E. UTM Northing (KM): 4383672	12F. UTM Easting (KM): 530808	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:
Ascent is updating the production.

14A. Provide the date of anticipated installation or change: / / – 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: / /

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 D of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known)*. Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

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

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

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

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

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

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

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**
– For chemical processes, provide a MSDS for each compound emitted to the air.

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

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

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

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

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

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 _____ *(Please use blue ink)* DATE: 9/23/16 *(Please use blue ink)*

35B. Printed name of signee: Tim Cummings		35C. Title: VP-Operations
35D. E-mail: N/A	36E. Phone: N/A	36F. FAX: N/A
36A. Printed name of contact person (if different from above): Evan Foster Pearson		36B. Title: EH&S Air Compliance Specialist
36C. E-mail: evan.pearson@ascentresources.com	36D. Phone: 405-252-7753	36E. FAX: N/A

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

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

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

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

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

Source Aggregation Analysis

All equipment at the Hoyt 401 facility (Facility) is owned and operated by Ascent Resources – Marcellus, LLC (Ascent) and has been included in this application.

Traditionally, source aggregation has been determined based on a "three-prong" approach, including:

1. SIC Code: Surrounding or associated sources belong to the same 2-digit industrial grouping (2-digit SIC code) as this facility, OR surrounding or associated sources that belong to different 2-digit SIC codes are support facilities for this source.
2. Common Ownership or Control: Surrounding or associated sources are under common ownership or control as this source.
3. Contiguous or Adjacent: Surrounding or associated sources are contiguous or adjacent with this source.

On June 3, 2016, the United States Environmental Protection Agency (US EPA) finalized a rule clarifying oil and gas source aggregation at major sources. The final rule states that sources shall be aggregated if they are:

1. Under Common Control,
2. Located within ¼ mile of one another (measured from the center of the equipment on the surface site), and
3. Share Equipment (including, but not limited to, produced fluids storage tanks, phase separators, natural gas dehydrators or emissions control devices)

While states are not required to implement this definition, it provides additional reference in determining source aggregation.

Ascent has determined that there are currently no additional sources under the same SIC, under common control, contiguous or adjacent to this Facility, within a quarter (¼) mile of the Facility, or that share equipment; therefore any additional source aggregation analysis is not required.

Attachment A: Business Certificate

State of West Virginia

Certificate

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

the attached true and exact copy of the Articles of Amendment to the Articles of Organization of

AMERICAN ENERGY-MARCELLUS, LLC

are filed in my office, signed and verified, as required by the provisions of West Virginia Code §31B-2-204 and conform to law. Therefore, I issue this

CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY

changing the name of the limited liability company to

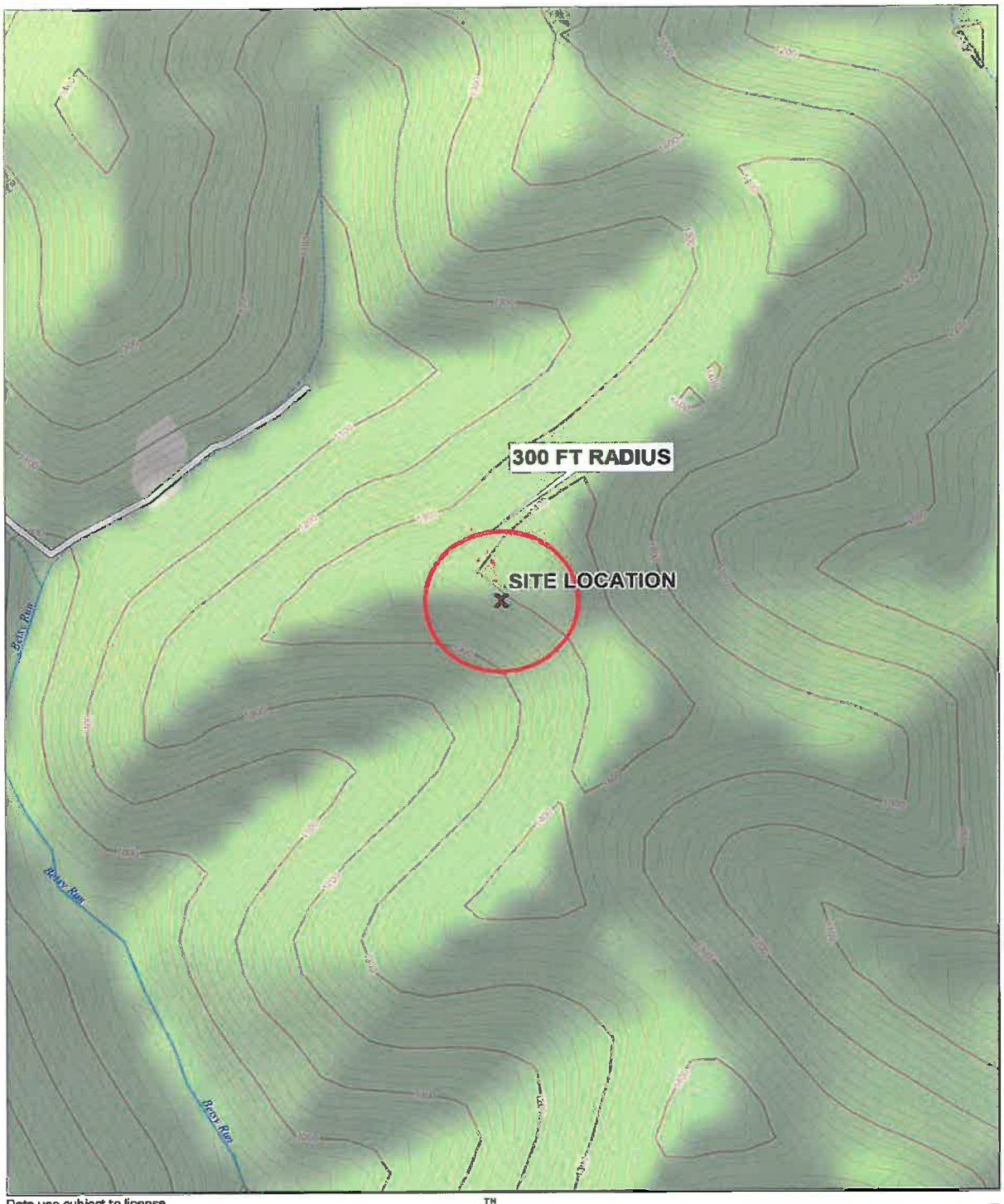
ASCENT RESOURCES - MARCELLUS, LLC

Given under my hand and the Great Seal of the State of West Virginia on this day of July 9, 2015

Natalie E Tennant

Secretary of State

Attachment B: Map(s)



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www.delorme.com

TN
MN (8.7°W)

ENVIRO CLEAN CARDINAL	FIGURE TITLE: AREA MAP
1015 N. Broadway, Suite 300 Oklahoma City, OK 73102 (405) 842-1066 www.eccgrp.com	DOCUMENT TITLE: RULE 13 CONSTRUCTION APPLICATION
	CLIENT: ASCENT RESOURCES – MARCELLUS, LLC
	LOCATION: HOYT 401 FACILITY WETZEL COUNTY, WEST VIRGINA

DATE	9/14/2016
SCALE	AS SHOWN
DESIGNED BY	AD
APPROVED BY	LWL
DRAWN BY	AD
PROJECT NUMBER	
ARMAWV0001	
ATTACHMENT	
B	

Attachment C: Installation and Start-Up Schedule

Installation and Start-up Schedule

Equipment	Unit ID	Installation Date	Startup Date
Production Unit Heater (1.5 MMBtu/hr)	E01	2013	2013
Production Unit Heater (1.5 MMBtu/hr)	E02	2013	2013
Production Unit Heater (1.5 MMBtu/hr)	E03	2013	2013
Production Unit Heater (1.5 MMBtu/hr)	E04	2013	2013
Production Unit Heater (1.5 MMBtu/hr)	E05	2013	2013
Production Unit Heater (1.5 MMBtu/hr)	E06	2013	2013
Condensate Heater (0.75 MMBtu/hr)	E07	2013	2013
Condensate Heater (0.75 MMBtu/hr)	E08	2013	2013
Tank 1 – Gunbarrel Tank (178-bbl)	E09	2013	2013
Tank 2 – Gunbarrel Tank (178-bbl)	E10	2013	2013
Tank 3 – Condensate Tank (210-bbl)	E11	2013	2013
Tank 4 – Condensate Tank (210-bbl)	E12	2013	2013
Tank 5 – Condensate Tank (210-bbl)	E13	2013	2013
Tank 6 – Condensate Tank (210-bbl)	E14	2013	2013
Tank 7 – Produced Water Tank (210-bbl)	E15	2013	2013
Tank 8 – Produced Water Tank (210-bbl)	E16	2013	2013
Tank 9 – Produced Water Tank (210-bbl)	E17	2013	2013
Tank 10 – Produced Water Tank (210-bbl)	E18	2013	2013
Hero Flare G30U4 (20.83 MMBtu/hr)	C01	2013	2013
Condensate Truck Loading	E19	2013	2013
Produced Water Truck Loading	E20	2013	2013
Sitewide Fugitive	E22	2013	2013
Unpaved Road Sources	E23	2013	2013

Attachment D: Regulatory Discussion

Applicable State Requirements

45CSR6 CONTROL OF AIR POLLUTION FROM COMBUSTION OF REFUSE

Ascent is applying for a permit to authorize the operation of the flare that will be used on site to control the storage tanks. Ascent will comply with all requirements of this rule.

45CSR13 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

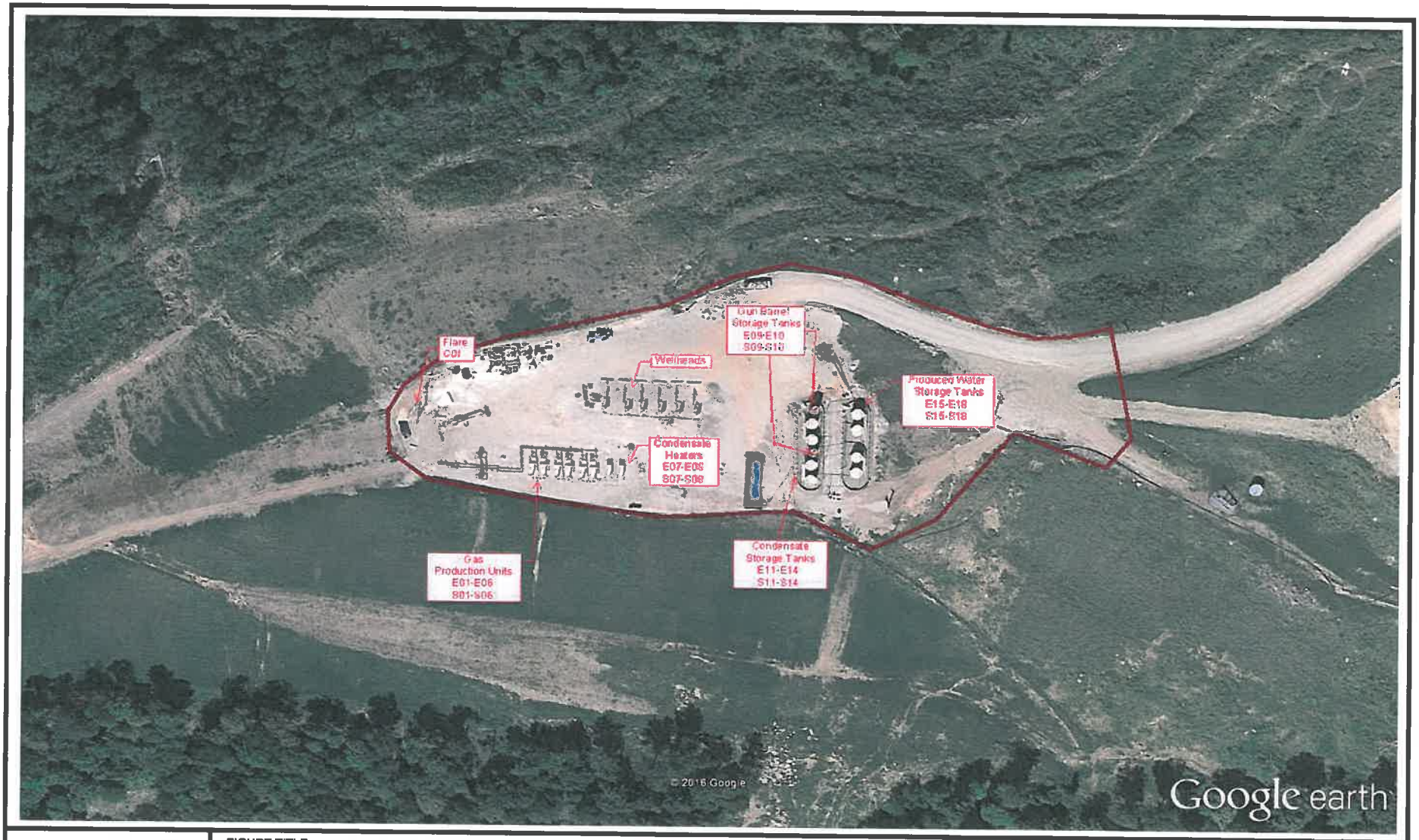
Ascent is submitting this application in accordance with this rule. Ascent will comply will all requirements of this rule.

Applicable Federal Requirements

40CFR NEW SOURCE PERFORMANCE STANDARDS (NSPS) SUBPART OOOO

The storage tanks were constructed after August 23, 2011, however a federally enforceable limit of less than six (6) tons per year (TPY) was requested in the previous permits. Therefore, there are no affected equipment under this subpart for the Facility.

Attachment E: Plot Plan



ENVIRO CLEAN CARDINAL

1250 E. COPELAND RD
SUITE 240
ARLINGTON, TX 76011

www.eccgrp.com

FIGURE TITLE
PLOT PLAN

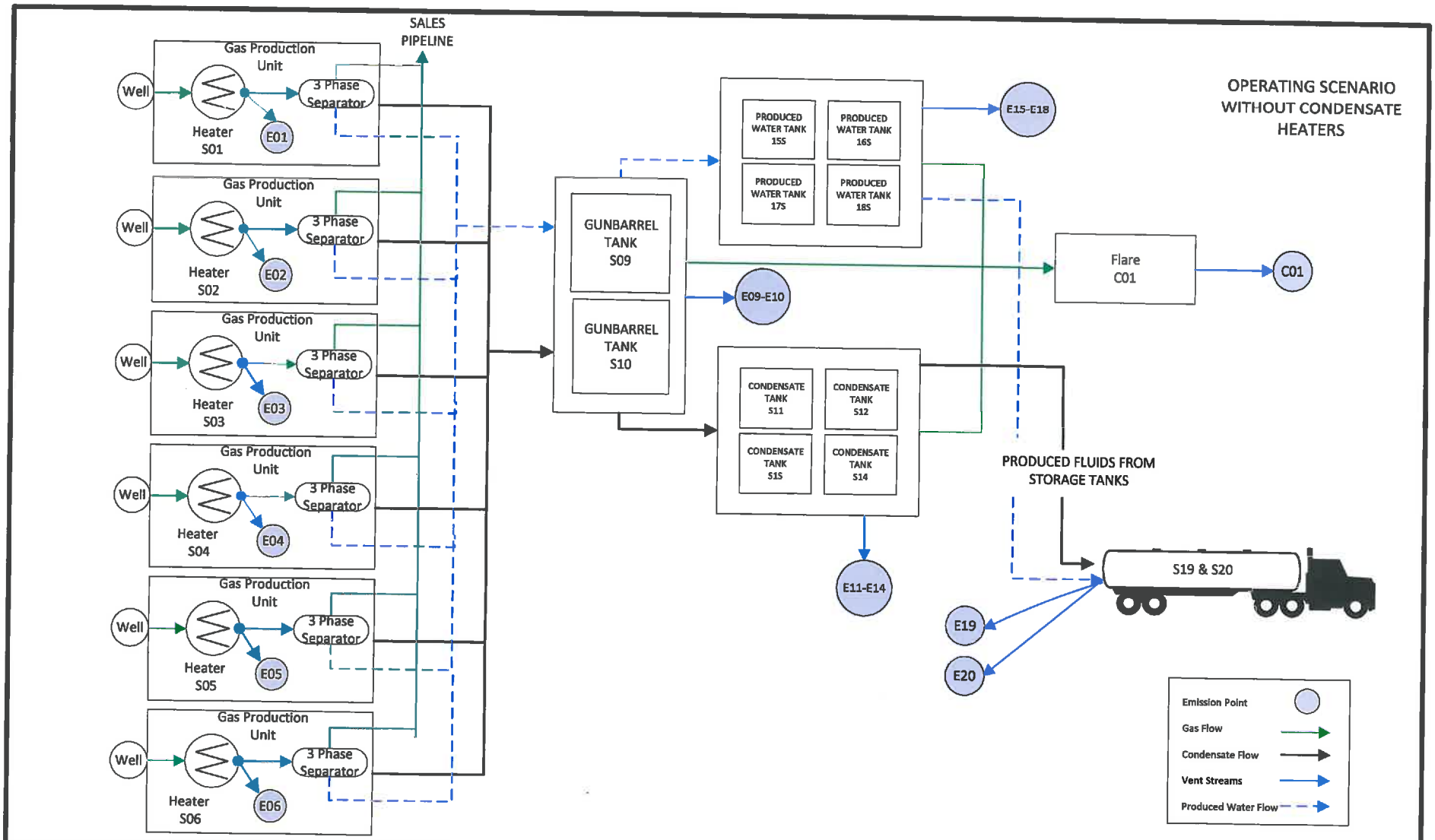
DOCUMENT TITLE
RULE 13 CONSTRUCTION APPLICATION

CLIENT
ASCENT RESOURCES – MARCELLUS, LLC

LOCATION
HOYT 401 FACILITY
WETZEL COUNTRY, WEST VIRGINIA

DATE	9/14/2016
SCALE	NOT TO SCALE
DESIGNED BY	SB
APPROVED BY	LWL
DRAWN BY	PH
PROJECT NUMBER	
ARMAWV0001	
ATTACHMENT	
E	

Attachment F: Detailed Process Flow Diagram(s)



ENVIRO CLEAN CARDINAL
1015 N. BROADWAY
SUITE 300
OKLAHOMA CITY, OK 73102
www.eccgrp.com

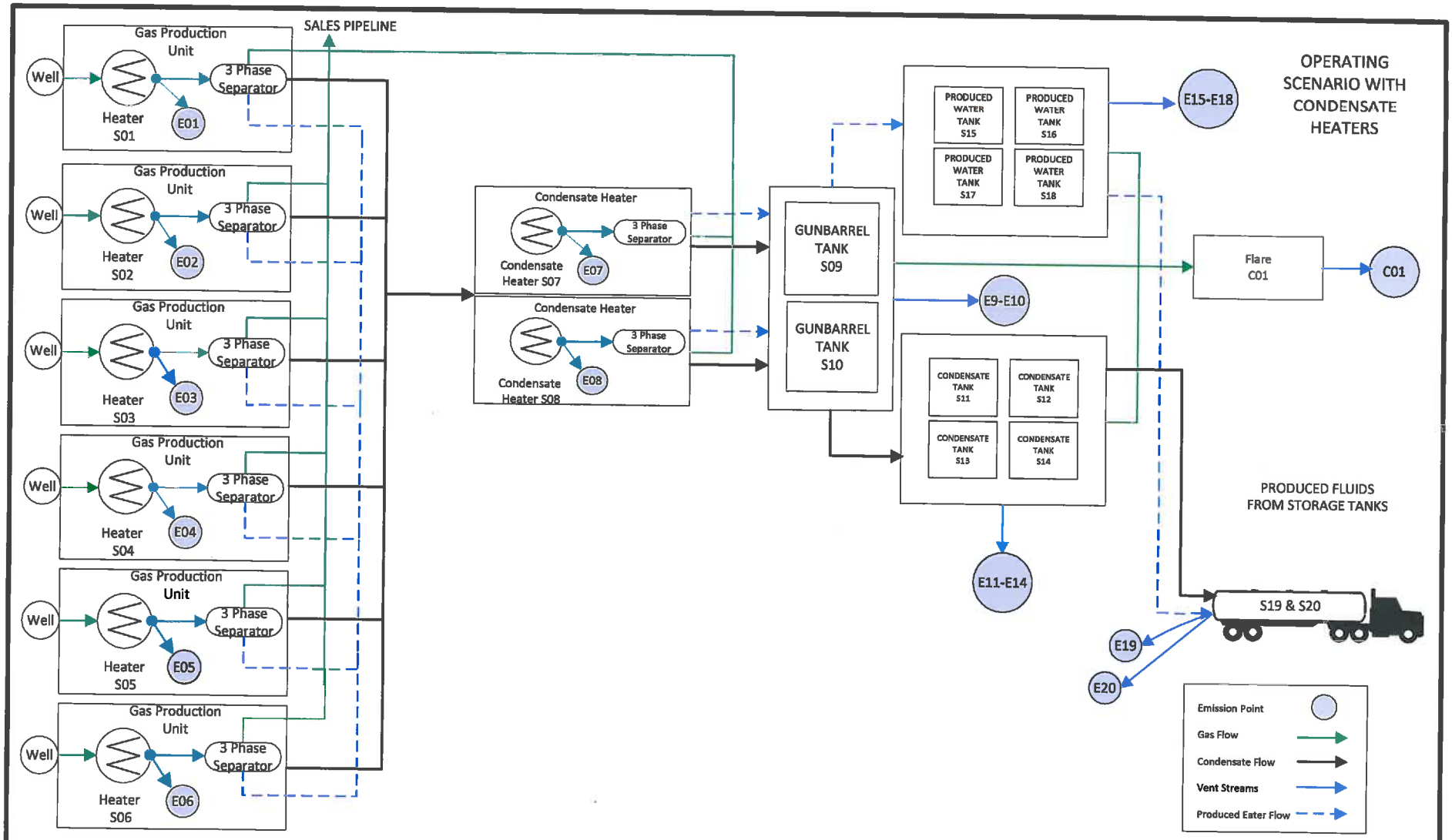
FIGURE TITLE
PROCESS FLOW DIAGRAM (PAGE 1 OF 2)

DOCUMENT TITLE
RULE 13 CONSTRUCTION APPLICATION

CLIENT
ASCENT RESOURCES, LLC

LOCATION
HOYT 401 FACILITY
WETZEL COUNTY, WEST VIRGINA

DATE	9/14/2016
SCALE	NOT TO SCALE
DESIGNED BY	AD
APPROVED BY	LWL
DRAWN BY	AD
PROJECT NUMBER	ARMAWV0001
ATTACHMENT	F



ENVIRO CLEAN CARDINAL
1015 N. BROADWAY
SUITE 300
OKLAHOMA CITY, OK 73102
www.eccgrp.com

FIGURE TITLE
PROCESS FLOW DIAGRAM (PAGE 2 of 2)

DOCUMENT TITLE
RULE 13 CONSTRUCTION APPLICATION

CLIENT
ASCENT RESOURCES, LLC

LOCATION
HOYT 401 FACILITY
WETZEL COUNTY, WEST VIRGINA

DATE	9/14/2016
SCALE	NOT TO SCALE
DESIGNED BY	AD
APPROVED BY	LWL
DRAWN BY	AD
PROJECT NUMBER	ARMAWV0001
FIGURE NUMBER	E

Attachment G: Process Description

Process Description

Natural gas, condensate, and produced water flow from the six (6) wellheads located on the Hoyt 401 Facility. The gas and liquids are first routed through the six (6) 1.5 MMBtu/hr gas production units (GPUs) where the first stage of fluid separation occurs. The GPUs separate the well stream into a high pressure natural gas stream, a condensate liquid stream, and a produced water liquid stream.

Ascent may operate two (2) 0.75 MMBtu/hr condensate heaters at the Facility. When the heaters are in operation, the liquids will pass from the GPUs to the condensate heaters. Gas recovered from the heaters is routed to the low pressure sales line and liquids are sent to the gunbarrels. To be conservative, emissions are calculated with the burners in operation, but the storage tanks are calculated with all flash occurring at the storage tanks.

The condensate from the gunbarrels is sent to the four (4) 210-bbl condensate storage tanks. The liquids are then sent to the two (2) 178-bbl gunbarrel tanks. Produced water from the gunbarrels is sent to four (4) 210-bbl produced water storage tanks.

The natural gas stream exits the facility via pipeline. Condensate and produced water are transported offsite via truck. Working, breathing, and flashing emissions from the gunbarrels and working and breathing losses from the storage tanks are routed to the onsite flare.

Attachment H: Material Safety Data Sheets (MSDS)

Natural Gas Liquids

Safety Data Sheet

Section 1: Identification of the substance or mixture and of the supplier

Product Name:	Natural Gas Liquids
SDS Number:	786340
Synonyms/Other Means of Identification:	Natural Gas Liquids, Raw Natural Gas Liquids, Ethane Free Plant Condensate Raw NGL EPBC Mix PBC Mix Y-Grade Gas Liquids
MARPOL Annex I Category:	Naphthas and Condensates
Intended Use:	Feedstock
Manufacturer:	Ascent Resources 3501 N.W. 63rd Oklahoma City, OK 73116
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 Hours)
SDS Information:	Phone: 800-642-3074 URL: www.ascentresources.com

Section 2: Hazard(s) Identification

Classification
H224 – Flammable liquids – Category 1
H315 – Skin corrosion/irritation – Category 2
H304 – Aspiration Hazard – Category 1
H336 – Specific target organ toxicity (single exposure) – Category 3
H350 – Carcinogenicity – Category 1B
H411 – Hazardous to the aquatic environment, chronic toxicity – Category 2

Hazards not Otherwise Classified
May contain or release poisonous hydrogen sulfide gas

Label Elements

DANGER
Extremely flammable liquid and vapor. (H224)*
Causes skin irritation. (H315)*
May contain or release poisonous hydrogen sulfide gas
May be fatal if swallowed and enters airways. (H304)*
May cause drowsiness or dizziness. (H336)*
May cause cancer. (H350)*
Toxic to aquatic life with long lasting effects. (H411)*

Precautionary Statement(s):
Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. (P210)*
Keep container tightly closed. (P233)*
Ground/bond container and receiving equipment. (P240)*
Use with explosion-proof equipment. (P241)*
Use only non-sparking tools. (P242)*
Take precautionary measures against static discharge. (P243)*
Avoid breathing dust/fume/gas/mist/vapours/spray. (P261)*
Wash thoroughly after handling. (P264)*
Use only outdoors or in a well-ventilated area. (P271)*
Wear protective gloves / protective clothing / eye protection / face protection. (P280)*
IF ON SKIN: Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. (P303+P361+P353)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction.(P370+P378)*
If skin irritation occurs: Get medical advice/attention. (P313)*
Take off contaminated clothing and wash before reuse. (P362)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P310)*
Do NOT induce vomiting. (P331)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P304+P340)*
Call a POISON CENTER or doctor/physician if you feel unwell. (P312)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction.(P370+P378)*
Store in a well-ventilated place. Keep cool.(P403+P235)*
Store locked up. (P405)*
Dispose of contents/container to approved disposal facility. (P501)*

** (Applicable GHS hazard code.)*

Section 3: Composition / Information on Ingredients

Component	CASRN	Concentration[1]
Natural gas (petroleum), raw liq. mix	64741-48-6	100
n-Hexane	110-54-3	5-25
Benzene	71-43-2	0.1-5
Hydrogen Sulfide	7783-06-4	<1

Total Sulfur: > 0.5 wt%

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Section 4: First Aid Measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

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

Inhalation (Breathing): If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

Most important symptoms and effects

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

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: At high concentrations hydrogen sulfide may produce pulmonary edema, respiratory depression, and/or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. Animal studies suggest that nitrites are a useful antidote, however, documentation of the efficacy of nitrites in humans is lacking. If the diagnosis of hydrogen sulfide poisoning is confirmed and if the patient does not respond rapidly to supportive care, the use of nitrites may be an effective antidote if delivered within the first few minutes of exposure. For adults the dose is 10 mL of a 3% $NaNO_2$ solution (0.5 gm $NaNO_2$ in 15 mL water) I.V. over 2-4 minutes. The dosage should be adjusted in children or in the presence of anemia, and methemoglobin levels, arterial blood gases, and electrolytes should be monitored closely.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Other Comments: Before attempting rescue, first responders should be alert to the possible presence of hydrogen sulfide, a poisonous gas with the smell of rotten eggs, and should consider the need for respiratory protection (see Section 8). Remove casualty to fresh air as quickly as possible. Immediately begin artificial respiration if breathing has ceased. Consider whether oxygen administration is needed. Obtain medical advice for further treatment.

Section 5: Fire-Fighting Measures

NFPA 704 Hazard Class

Health: 1 **Flammability:** 4 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: Extremely flammable. This material can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. This product will float and can be reignited on surface water. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire. Hazardous combustion/decomposition products, including hydrogen sulfide, may be released by this material when exposed to heat or fire. Use caution and wear protective clothing, including respiratory protection.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Hydrogen sulfide and oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. May contain or release poisonous hydrogen sulfide gas. If the presence of dangerous amounts of H2S around the spilled product is suspected, additional or special actions may be warranted, including access restrictions and use of protective equipment. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use foam on spills to minimize vapors. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from ignition sources such as heat/sparks/open flame – No smoking. Take precautionary measures against static discharge. Nonsparking tools should be used. May contain or release dangerous levels of hydrogen sulfide. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing vapors or mists. Use only outdoors or in well-ventilated area. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Extremely Flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open container slowly to relieve any pressure. Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

Static Accumulation Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding of tanks, transfer piping, and storage tank level floats are necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. Special care should be given to ensure that special slow load procedures for "switch loading" are followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha). For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

Conditions for safe storage: This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H2S, and flammability prior to entry. Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	Other
Natural gas (petroleum), raw liq. mix	TWA: 300 ppm (as Gasoline)	TWA: 400 mg/m^3 TWA: 100 ppm	0.5 ppm TWA8hr (as benzene) 0.25 ppm TWA12hr (as benzene) 2.5 ppm STEL (as benzene) (American Energy Guidelines)
n-Hexane	TWA: 50 ppm Skin	TWA: 500 ppm TWA: 1800 mg/m^3	—
Benzene	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 10 ppm TWA: 1 ppm	—
Hydrogen Sulfide	STEL: 5 ppm TWA: 1 ppm	Ceiling: 20 ppm	TWA: 5 ppm 8hr TWA: 2.5 ppm 12hr STEL: 15 ppm (American Energy Guidelines)

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Depending on exposure and use conditions, additional protection may be necessary to prevent skin contact including use of items such as chemical resistant boots, aprons, arm covers, hoods, coveralls, or encapsulated suits. Suggested protective materials: Nitrile

Respiratory Protection: A NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use.

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Colorless
Physical Form:	Liquid
Odor:	Gasoline; Rotten egg / sulfurous
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	150 - 200 psia (Reid VP) @ 100°F / 37.8°C
Vapor Density (air=1):	>1
Initial Boiling Point/Range:	No data
Melting/Freezing Point:	No data
Solubility in Water:	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity (water=1):	(estimated) 0.5 - 0.7 @ 68°F / 20°C
Percent Volatile:	100%
Evaporation Rate (nBuAc=1):	No data
Flash Point:	< -99 °F / < -73 °C
Test Method:	(estimate)
Lower Explosive Limits (vol % in air):	No data
Upper Explosive Limits (vol % in air):	No data
Auto-ignition Temperature:	No data

Section 10: Stability and Reactivity

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

Conditions to Avoid: Avoid high temperatures and all sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents and strong reducing agents.

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

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Expected to have a low degree of toxicity by inhalation	May contain or release poisonous hydrogen sulfide gas - see Other Comments.	> 5.2 mg/L (vapor)
Skin Absorption	Unlikely to be harmful		> 2 g/kg
Ingestion (Swallowing)	Unlikely to be harmful		> 5 g/kg

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

Skin Corrosion/Irritation: Causes skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation. .

Signs and Symptoms: Effects of overexposure can include slight irritation of the respiratory tract, nausea, vomiting, and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued exposure to high concentrations can result in vomiting, cardiac irregularities and sudden loss of consciousness.

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

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

Carcinogenicity: May cause cancer Based on component information.

Germ Cell Mutagenicity: Not expected to cause heritable genetic effects.

Reproductive Toxicity: Not expected to cause reproductive toxicity.

Other Comments: This material may contain or liberate hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure, and death.

Information on Toxicological Effects of Components

Natural gas (petroleum), raw liq. mix

Carcinogenicity: Two year inhalation studies of vaporized unleaded gasoline produced an increased incidence of kidney tumors in male rats and liver tumors in female mice. Repeated skin application of various petroleum naphthas in mice for two years resulted in an increased incidence of skin tumors but only in the presence of severe skin irritation. Follow-up mechanistic studies suggest that the occurrence of these tumors may be the consequence of promotional processes and not relevant to human risk assessment. Epidemiology data collected from a study of more than 18,000 petroleum marketing and distribution workers showed no increased risk of leukemia, multiple myeloma, or kidney cancer from gasoline exposure. Unleaded gasoline has been identified as a possible carcinogen by the International Agency for Research on Cancer.
Target Organs: Two year inhalation studies of wholly vaporized unleaded gasoline, and 90 days studies of various petroleum naphthas, did not produce significant target organ toxicity in laboratory animals. Nephropathy in male rats, characterized by the accumulation of alpha-2-u- globulin in epithelial cells of the proximal tubules was observed, however follow-up studies suggest that these changes are unique to the male rat.
Reproductive Toxicity: No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to high vapor concentrations of unleaded gasoline and petroleum naphthas via inhalation. A two-generation reproductive toxicity study of vapor recovery gasoline did not adversely affect reproductive function or offspring survival and development.

n-Hexane

Target Organs: Excessive exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesias of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone.
Reproductive Toxicity: Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.
Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.
Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

Toluene

Carcinogenicity: Exposure of rats and mice to toluene at concentrations ranging from 120-1200 ppm for two years did not demonstrate evidence of carcinogenicity. Toluene has not been listed as a carcinogen by IARC.
Target Organs: Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.
Reproductive Toxicity: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. Decreased fetal body weight and increased skeletal variations in both inhalation and oral studies, but only at doses that were maternally toxic. No fetal toxicity was seen at doses that were not maternally toxic. Decreased sperm counts have been observed in male rats in the absence of a reduction in fertility. Toluene has been reported to cause mental or growth retardation in the children of solvent abusers who directly inhale toluene during pregnancy.

Cyclohexane

Reproductive Toxicity: Two-generation reproduction and developmental toxicity studies using rats and rabbits exposed (whole-body) to atmospheric concentrations up to 7000 ppm cyclohexane did not detect evidence of developmental toxicity in either species.

Section 12: Ecological Information

Toxicity: Acute aquatic toxicity studies on samples of gasoline and naphtha streams show acute toxicity values greater than 1 mg/L and mostly in the range 1-100 mg/L. These tests were carried out on water accommodated fractions, in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition. These substances should be regarded as toxic to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment. Classification: H411; Chronic Cat 2.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable but are regarded as inherently biodegradable since their hydrocarbon components can be degraded by microorganisms.

Persistence per IOPC Fund definition: Non-Persistent

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material range from 3 to greater than 6 and therefore are regarded as having the potential to bioaccumulate. In practice, metabolic processes or physical properties may prevent this effect or limit bioavailability.

Mobility In Soil: On release to water, hydrocarbons will float on the surface and since they are sparingly soluble, the only significant loss is volatilization to air. In air, these hydrocarbons are photodegraded by reaction with hydroxyl radicals with half lives varying from 6.5 days for benzene to 0.5 days for n-dodecane.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)
- D001 - Ignitability characteristic
- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping Description:
If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:
UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., 2.1; ,
If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:
UN3295, Hydrocarbons, liquid, n.o.s., 3, ***I or*** II [I if BP < 95° F (35° C); II if BP > 95° F]

Non-Bulk Package Marking:
Must be consistent with shipping description, either:
Hydrocarbon gas mixture, liquefied, n.o.s., UN1965
or
Hydrocarbons, liquid, n.o.s., UN3295

Non-Bulk Package Labeling:
For UN1965: Flammable gas
For UN3295: Flammable liquid

Bulk Package/Placard Marking:
For UN1965: Flammable gas / 1965
For UN3295: Flammable / 3295

Packaging - References:
For UN1965: 49 CFR: 173.306; 173.304; 173.314 & .315
For UN3295: 49 CFR 173.150; 173.201; 173.243 ***[PG I]***
-or-
49 CFR 173.150; 173.202; 173.242 ***[PG II]***
(Exceptions; Non-bulk; Bulk)

Hazardous Substance:
See Section 15 for RQ`s
Emergency Response Guide:
UN1965 - 115; ***UN3295*** - 128;
Note:
The following alternate shipping description order may be used until January 1, 2013:
Proper Shipping name, Hazard Class or Division, (Subsidiary Hazard if any), UN or NA number, Packing Group
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: *Not applicable*
Other shipping description elements may be required for DOT compliance.

International Maritime Dangerous Goods (IMDG)

Shipping Description:
If boiling point is < 20° C shipping description is:
UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., (Propane , Butane), 2.1
If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:
UN3295, Hydrocarbons, liquid, n.o.s., 3, ***I or*** II (FP° C cc), *[where FP is the material's flash point in degrees C cc.]*
[I if BP < 95° F (35° C); II if BP > 95° F];

Non-Bulk Package Marking:
Must be consistent with shipping description, either:
Hydrocarbon gas mixture, liquefied, n.o.s., (Propane, Butane), UN1965
or
Hydrocarbons, liquid, n.o.s., UN3295

Labels:
For UN1965: Flammable gas
For UN3295: Flammable liquid

Placards/Marking (Bulk):
For UN1965: Flammable gas / 1965
For UN3295: Flammable / 3295

Packaging - Non-Bulk:
For UN1965: P200
For UN3295: P001

EMS:
For UN1965: F-D, S-U
For UN3295: F-E, S-D

Note:
If transported in bulk by marine vessel in international waters, product is being carried under the scope of MARPOL Annex I.

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)

UN/ID #: UN1965 *or* UN3295

Proper Shipping Name:
For UN1965: Hydrocarbon gas mixture, liquefied, n.o.s. (Propane, Butane)
For UN3295: Hydrocarbons, liquid, n.o.s.

Hazard Class/Division:
For UN1965: 2.1
For UN3295: 3

Subsidiary risk: None

Packing Group:
For UN1965: None
For UN3295: I *or* II ***[Determined by IATA 3.3.2]***

Non-Bulk Package Marking:
For UN1965: Hydrocarbon gas mixture, liquefied, n.o.s. (Propane, Butane), UN1965
For UN3295: Hydrocarbons, liquid, n.o.s., UN3295

Labels:
For UN1965: Flammable gas , Cargo Aircraft Only
For UN3295: Flammable liquid

ERG Code: ***For UN1965:*** 10L ***or For UN3295:*** 3H

	LTD. QTY	Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	***UN1965*** - Forbidden ***UN3295*** - Forbidden - ***[PG I]*** Y341 - ***[PG II]***	***UN1965*** - Forbidden ***UN3295*** - 351 - ***[PG I]*** 353 - ***[PG II]***	***UN1965*** - 200 ***UN3295*** - 361 - ***[PG I]*** 364 - ***[PG II]***
Max. Net Qty. Per Package:	***UN3295*** - Forbidden - ***[PG I]*** 1L - ***[PG II]***	***UN3295*** - 1L - ***[PG I]*** 5 L - ***[PG II]***	***UN1965*** - 150 kg ***UN3295*** - 30 L - ***[PG I]*** 60 L - ***[PG II]***

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:

Component	TPQ	EPCRA RQ
Hydrogen Sulfide	500 lb	100 lb

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

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

CERCLA/SARA - Section 313 and 40 CFR 372:
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration[1]	de minimis
n-Hexane	5-25	1.0%
Toluene	1-5	1.0%
Benzene	0.1-5	0.1%
Cyclohexane	0-3	1.0%

EPA (CERCLA) Reportable Quantity (in pounds):
EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

California Proposition 65:
Warning: This material may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the warning requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Type of Toxicity
Toluene	Developmental Toxicant Female Reproductive Toxicant
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant

International Hazard Classification

Canada:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:
B2 - Flammable Liquids
D2A
D2B

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

U.S. Export Control Classification Number: EAR99

Section 16: Other Information

Date of Issue:	1-Sep-2015
Status:	FINAL
Previous Issue Date:	1-Sep-2015
Revised Sections or Basis for Revision:	Identified Hazards (Section 2) Precautionary Statement(s) (Section 2) First Aid (Section 4)Exposure limits (Section 8) Shipping information (Section 14) Regulatory information (Section 15)
SDS Number:	786340

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and Implied Warranties:
The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Crude Condensate

Safety Data Sheet

Section 1: Identification of the substance or mixture and of the supplier

Product Name:	Crude Condensate
SDS Number:	730370
Synonyms/Other Means of Identification:	Natural Gas Condensates, Petroleum Crude Oil Condensate Gas Drips
MARPOL Annex I Category:	Naphthas and Condensates
Intended Use:	Feedstock
Manufacturer:	Ascent Resources 3501 N.W. 63rd Oklahoma City, OK 73116
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 Hours)
SDS Information:	Phone: 800-642-3074 URL: www.ascent resources.com

Section 2: Hazard(s) Identification

Classification
H224 -- Flammable liquids -- Category 1
H304 -- Aspiration Hazard -- Category 1
H315 -- Skin corrosion/irritation -- Category 2
H332 -- Acute toxicity, Inhalation -- Category 4
H336 -- Specific target organ toxicity (single exposure) -- Category 3
H350 -- Carcinogenicity -- Category 1B
H411 -- Hazardous to the aquatic environment, chronic toxicity -- Category 2

Hazards not Otherwise Classified
May contain or release poisonous hydrogen sulfide gas

Label Elements

DANGER
Extremely flammable liquid and vapor. (H224)*
Causes skin irritation. (H315)*
May be fatal if swallowed and enters airways. (H304)*
Contains poisonous hydrogen sulfide gas
Harmful if inhaled. (H332)*
May cause drowsiness or dizziness. (H336)*
May cause cancer. (H350)*
Toxic to aquatic life with long lasting effects. (H411)*

Precautionary Statement(s):
Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. (P210)*
Keep container tightly closed. (P233)*
Keep cool. (P235)*
Ground/bond container and receiving equipment. (P240)*
Use with explosion-proof equipment. (P241)*
Use only non-sparking tools. (P242)*
Take precautionary measures against static discharge. (P243)*
Avoid breathing dust/fume/gas/mist/vapours/spray. (P261)*
Wash thoroughly after handling. (P264)*
Use only outdoors or in a well-ventilated area. (P271)*
Avoid release to the environment. (P273)*
Wear protective gloves / protective clothing / eye protection / face protection. (P280)*
IF ON SKIN: Remove/Take off immediately all contaminated clothing. (P361)* Wash with plenty of soap and water. (P352)*
If skin irritation occurs: Get medical advice/attention. (P313)*
Take off contaminated clothing and wash before reuse. (P362)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P340)*
Call a POISON CENTER or doctor/physician if you feel unwell. (P312)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P310)*
Do NOT induce vomiting. (P331)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction.(P370+P378)*
Collect spillage. (P391)*
Store locked up. (P405)*
Store in a well-ventilated place. Keep container tightly closed. (P403+P233)*
Dispose of contents/container to approved disposal facility. (P501)*

** (Applicable GHS hazard code.)*

Section 3: Composition / Information on Ingredients

Component	CASRN	Concentration[1]
Natural Gas Condensate ..C2-20	64741-47-5	100
Toluene	108-88-3	1-7
Hydrogen Sulfide	7783-06-4	0.1-5
Benzene	71-43-2	<5

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Crude oil, natural gas and natural gas condensate can contain minor amounts of sulfur, nitrogen and oxygen containing organic compounds as well as trace amounts of heavy metals like mercury, arsenic, nickel, and vanadium. Composition can vary depending on the source of crude.

Section 4: First Aid Measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

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

Inhalation (Breathing): Immediately move victim away from exposure and into fresh air in a position comfortable for breathing. If respiratory symptoms or other symptoms of exposure develop, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

Most important symptoms and effects

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

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: At high concentrations hydrogen sulfide may produce pulmonary edema, respiratory depression, and/or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. Animal studies suggest that nitrites are a useful antidote, however, documentation of the efficacy of nitrites in humans is lacking. If the diagnosis of hydrogen sulfide poisoning is confirmed and if the patient does not respond rapidly to supportive care, the use of nitrites may be an effective antidote if delivered within the first few minutes of exposure. For adults the dose is 10 mL of a 3% $NaNO_2$ solution (0.5 gm $NaNO_2$ in 15 mL water) I.V. over 2-4 minutes. The dosage should be adjusted in children or in the presence of anemia, and methemoglobin levels, arterial blood gases, and electrolytes should be monitored closely.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Other Comments: Before attempting rescue, first responders should be alert to the possible presence of hydrogen sulfide, a poisonous gas with the smell of rotten eggs, and should consider the need for respiratory protection (see Section 8). Remove casualty to fresh air as quickly as possible. Immediately begin artificial respiration if breathing has ceased. Consider whether oxygen administration is needed. Obtain medical advice for further treatment.

Section 5: Fire-Fighting Measures

NFPA 704 Hazard Class

Health: 2 **Flammability:** 4 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: Extremely flammable. This material can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. This product will float and can be reignited on surface water. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire. Hazardous combustion/decomposition products, including hydrogen sulfide, may be released by this material when exposed to heat or fire. Use caution and wear protective clothing, including respiratory protection.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Hydrogen sulfide and oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. Contains poisonous hydrogen sulfide gas. If the presence of dangerous amounts of H2S around the spilled product is suspected, additional or special actions may be warranted, including access restrictions and use of protective equipment. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use foam on spills to minimize vapors. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from ignition sources such as heat/sparks/open flame – No smoking. Take precautionary measures against static discharge. Nonsparking tools should be used. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Wear protective gloves/clothing and eye/face protection. May contain or release dangerous levels of hydrogen sulfide. Use only outdoors or in well-ventilated area. Avoid breathing vapors or mists. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Extremely Flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open container slowly to relieve any pressure. Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

Mercury and other heavy metals may be present in trace quantities in crude oil, raw natural gas, and condensates. Production and processing of these materials can lead to "drop-out" of elemental mercury in enclosed vessels and pipe work, typically at the low point of any process equipment because of its density. Mercury may also occur in other process system deposits such as sludges, sands, scales, waxes, and filter media. Personnel engaged in work with equipment where mercury deposits might occur (confined space entry, sampling, opening drain valves, draining process lines, etc), may be exposed to a mercury hazard (see sections 3 and 8).

Static Accumulation Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding of tanks, transfer piping, and storage tank level floats are necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. Special care should be given to ensure that special slow load procedures for "switch loading" are followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha). For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

Conditions for safe storage: This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H2S, and flammability prior to entry. Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	Other
Natural Gas Condensate ..C2-20	TWA: 300 ppm (as Gasoline)	TWA: 400 mg/m^3 TWA: 100 ppm	0.5 ppm TWA8hr (as benzene) 0.25 ppm TWA12hr (as benzene) 2.5 ppm STEL (as benzene) (American Energy Guidelines)
Toluene	TWA: 20 ppm	Ceiling: 300 ppm TWA: 200 ppm	---
Hydrogen Sulfide	STEL: 5 ppm TWA: 1 ppm	Ceiling: 20 ppm	TWA: 5 ppm 8hr TWA: 2.5 ppm 12hr STEL: 15 ppm (American Energy Guidelines)
Benzene	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 10 ppm TWA: 1 ppm	---

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Depending on exposure and use conditions, additional protection may be necessary to prevent skin contact including use of items such as chemical resistant boots, aprons, arm covers, hoods, coveralls, or encapsulated suits. Suggested protective materials: Nitrile

Respiratory Protection: A NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use.

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Workplace monitoring plans should consider the possibility that heavy metals such as mercury may concentrate in processing vessels and equipment presenting the possibility of exposure during various sampling and maintenance operations. Implement appropriate respiratory protection and the use of other protective equipment as dictated by monitoring results (See Sections 2 and 7).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Amber to dark brown
Physical Form:	Liquid
Odor:	Rotten egg / sulfurous; Petroleum.
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	5-15 psia (Reid VP) @ 100°F / 37.8°C
Vapor Density (air=1):	1
Initial Boiling Point/Range:	-20 to 800 °F / -29 to 427 °C
Melting/Freezing Point:	No data
Solubility in Water:	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity (water=1):	0.6 - 0.8 @ 60°F (15.6°C)
Bulk Density:	6.25 lbs/gal
VOC Content(%):	50
Evaporation Rate (nBuAc=1):	1
Flash Point:	-51 °F / -46 °C
Test Method:	Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
Lower Explosive Limits (vol % in air):	1.1
Upper Explosive Limits (vol % in air):	6.0
Auto-ignition Temperature:	590 °F / 310 °C

Section 10: Stability and Reactivity

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

Conditions to Avoid: Avoid high temperatures and all sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents and strong reducing agents.

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

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Harmful if inhaled	Contains poisonous hydrogen sulfide gas. See Signs and Symptoms.	10 mg/L (vapor, estimated)
Skin Absorption	Unlikely to be harmful		> 2 g/kg
Ingestion (Swallowing)	Unlikely to be harmful		> 5 g/kg

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

Skin Corrosion/Irritation: Causes skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation. .

Signs and Symptoms: Effects of overexposure can include slight irritation of the respiratory tract, nausea, vomiting, and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued exposure to high concentrations can result in vomiting, cardiac irregularities and sudden loss of consciousness.

This material contains hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure, and death.

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

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

Carcinogenicity: May cause cancer

Germ Cell Mutagenicity: Not expected to cause heritable genetic effects.

Reproductive Toxicity: Not expected to cause reproductive toxicity.

Information on Toxicological Effects of Components

Natural Gas Condensate ..C2-20

Carcinogenicity: Two year inhalation studies of vaporized unleaded gasoline produced an increased incidence of kidney tumors in male rats and liver tumors in female mice. Repeated skin application of various petroleum naphthas in mice for two years resulted in an increased incidence of skin tumors but only in the presence of severe skin irritation. Follow-up mechanistic studies suggest that the occurrence of these tumors may be the consequence of promotional processes and not relevant to human risk assessment. Epidemiology data collected from a study of more than 18,000 petroleum marketing and distribution workers showed no increased risk of leukemia, multiple myeloma, or kidney cancer from gasoline exposure. Unleaded gasoline has been identified as a possible carcinogen by the International Agency for Research on Cancer.

Target Organs: Two year inhalation studies of wholly vaporized unleaded gasoline, and 90 days studies of various petroleum naphthas, did not produce significant target organ toxicity in laboratory animals. Nephropathy in male rats, characterized by the accumulation of alpha-2-u- globulin in epithelial cells of the proximal tubules was observed, however follow-up studies suggest that these changes are unique to the male rat.

Reproductive Toxicity: No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to high vapor concentrations of unleaded gasoline and petroleum naphthas via inhalation. A two-generation reproductive toxicity study of vapor recovery gasoline did not adversely affect reproductive function or offspring survival and development.

Xylenes

Target Organs: Rats exposed to xylenes at 800, 1000 or 1200 ppm 14 hours daily for 6 weeks demonstrated high frequency hearing loss. Another study in rats exposed to 1800 ppm 8 hours daily for 5 days demonstrated middle frequency hearing loss.

Reproductive Toxicity: Both mixed xylenes and the individual isomers produced limited evidence of developmental toxicity in laboratory animals. Inhalation and oral administration of xylene resulted in decreased fetal weight, increased incidences of delayed ossification, skeletal variations and resorptions, but no evidence of teratogenicity.

Toluene

Carcinogenicity: Exposure of rats and mice to toluene at concentrations ranging from 120-1200 ppm for two years did not demonstrate evidence of carcinogenicity. Toluene has not been listed as a carcinogen by IARC.

Target Organs: Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.

Reproductive Toxicity: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. Decreased fetal body weight and increased skeletal variations in both inhalation and oral studies, but only at doses that were maternally toxic. No fetal toxicity was seen at doses that were not maternally toxic. Decreased sperm counts have been observed in male rats in the absence of a reduction in fertility. Toluene has been reported to cause mental or growth retardation in the children of solvent abusers who directly inhale toluene during pregnancy.

Cyclohexane

Reproductive Toxicity: Two-generation reproduction and developmental toxicity studies using rats and rabbits exposed (whole-body) to atmospheric concentrations up to 7000 ppm cyclohexane did not detect evidence of developmental toxicity in either species.

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

n-Hexane

Target Organs: Excessive exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesias of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone.

Reproductive Toxicity: Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Ethyl Benzene

Carcinogenicity: Rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study demonstrated limited evidence of kidney, liver, and lung cancer. Ethyl benzene has been listed as a possible human carcinogen by IARC.

Target Organs: In rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study there was mild damage to the kidney (tubular hyperplasia), liver (eosinophilio foci, hypertrophy, necrosis), lung (alveolar epithelium metaplasia), thyroid (hyperplasia), thyroid (hyperplasia) and pituitary (hyperplasia). In animal models (particularly rats), ethyl benzene affects the auditory function mainly in the cochlear mid-frequency range and ototoxicity was observed after combined exposure to noise and ethyl benzene. There is no evidence of either ethyl benzene-induced hearing losses or ototoxicity with combined exposure to ethyl benzene and noise in workers.

Section 12: Ecological Information

Toxicity: Acute aquatic toxicity studies on samples of gasoline and naphtha streams show acute toxicity values greater than 1 mg/L and mostly in the range 1-100 mg/L. These tests were carried out on water accommodated fractions, in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition. These substances should be regarded as toxic to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment. Classification: H411; Chronic Cat 2.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable but are regarded as inherently biodegradable since their hydrocarbon components can be degraded by microorganisms.

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material range from 3 to greater than 6 and therefore are regarded as having the potential to bioaccumulate. In practice, metabolic processes or physical properties may prevent this effect or limit bioavailability.

Mobility in Soil: On release to water, hydrocarbons will float on the surface and since they are sparingly soluble, the only significant loss is volatilization to air. In air, these hydrocarbons are photodegraded by reaction with hydroxyl radicals with half lives varying from 6.5 days for benzene to 0.5 days for n-dodecane.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)

- D001 - Ignitability characteristic
- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping Description:

If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is > 8.8 molar % shipping description is:
UN3160, Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulfide; ,; Liquefied Petroleum Gas), 2.3,; , (2.1), Inhalation Hazard Zone ***X***
If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:
UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., 2.1
If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:
UN1267, Petroleum crude oil, 3, I ***or*** II [**I** if BP < 35° C (95° F); **II** if BP > 35° C]

Non-Bulk Package Marking:

Must be consistent with shipping description, either:
Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulfide, Liquefied petroleum gas), UN3160
or
Hydrocarbon gas mixture, liquefied, n.o.s., UN1965
or
Petroleum crude oil, UN1267

Non-Bulk Package Labeling:

For UN3160: Poison gas and Flammable gas
For UN1965: Flammable gas
For UN1267: Flammable liquid

Bulk Package/Placard Marking:

For UN3160: Poison gas / 3160 and Flammable gas
For UN1965: Flammable gas / 1965
For UN1267: Flammable / 1267

Packaging - References:

For UN3160: None; 49 CFR 173.304; 173.314 & .315
For UN1965: 49 CFR: 173.306; 173.304; 173.314 & .315
For UN1267: 49 CFR 173.150; 173.201; 173.243 ***[PG I]***
-or-
49 CFR 173.150; 173.202; 173.242 ***[PG II]***
(Exceptions; Non-bulk; Bulk)

Hazardous Substance:

The EPA's Petroleum Exclusion applies to Section 2 and/or 15 components which are listed in 49 CFR 172.101, Table 1 to Appendix A.

Emergency Response Guide:

UN3160 - 119; ***UN1965*** - 115; ***UN1267*** - 128;

Note:

Replace ***X*** in shipping description with:
D if Molar % H2S is from 8.8% to 14.8%
C if Molar % H2S is from 14.9% to 44.4%
B if Molar % H2S is from 44.5% to 100.0%
Container(s) greater than 5 liters (liquids) or 5 kilograms (solids), shipped by water mode and ALL bulk shipments may require the shipping description to contain the "Marine Pollutant" notation [49 CFR 172.203(l)] and the container(s) to display the [Marine Pollutant Mark] [49 CFR 172.322].

The following alternate shipping description order may be used until January 1, 2013:
Proper Shipping name, Hazard Class or Division, (Subsidiary Hazard if any), UN or NA number, Packing Group
Other shipping description elements may be required for DOT compliance.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: *Not applicable*

International Maritime Dangerous Goods (IMDG)

Shipping Description:

If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is > 8.8 molar % shipping description is:
UN3160, Liquefied gas, toxic, flammable, n.o.s (Hydrogen sulphide , Liquefied Petroleum Gas), 2.3,; , (2.1)
If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:
UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), 2.1;
If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:
UN1267, Petroleum crude oil, 3, I ***or*** II [I if IBP < 35° C (95° F); II if IBP > 35° C] (-46° C);

Non-Bulk Package Marking:

Must be consistent with shipping description, either:
Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), UN3160
or
Hydrocarbon gas mixture, liquefied, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), UN1965
or
Petroleum crude oil, UN1267

Labels:

For UN3160: Toxic gas and Flammable gas
For UN1965: Flammable gas
For UN1267: Flammable liquid

Placards/Marking (Bulk):

For UN3160: Toxic gas / 3160 and Flammable gas
For UN1965: Flammable gas / 1965
For UN1267: Flammable / 1267

Packaging - Non-Bulk:

For UN3160 & UN1965: P200
For UN1267: P001

EMS:

For UN3160 & UN1965: F-D, S-U
For UN1267: F-E, S-E

Note:

If container(s) is greater than 5 liters (liquids) or 5 kilograms (solids), shipment may require the shipping description to contain the "Marine Pollutant" description [IMDG 5.4.1.4.3.5] and the container(s) to display the Marine Pollutant mark [IMDG 5.2.1.6]. U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 25. If transported in bulk by marine vessel in international waters, product is being carried under the scope of MARPOL Annex I.

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)

UN/ID #:

UN3160 - ***Forbidden***
UN1965 ***or*** UN1267

Proper Shipping Name:

For UN1965: Hydrocarbon gas mixture, liquefied, n.o.s. (Liquefied petroleum gas, Hydrogen sulphide)
For UN1267: Petroleum crude oil

Hazard Class/Division:

For UN1965: 2.1
For UN1267: 3

Subsidiary risk:

None

Packing Group:

For UN1965: None
For UN1267: I ***or*** II ***[Determined by IATA 3.3.2]***

Non-Bulk Package Marking:

For UN1965: Hydrocarbon gas mixture, liquefied, n.o.s. (Liquefied petroleum gas, Hydrogen sulphide), UN1965
For UN1267: Petroleum crude oil, UN1267

Labels:

For UN1965: Flammable gas , Cargo Aircraft Only
For UN1267: Flammable liquid

ERG Code:

For UN1965: 10L ***or For UN1267:*** 3L

LTD. QTY	Passenger Aircraft	Cargo Aircraft Only

Packaging Instruction #:	***UN1965*** - Forbidden ***UN1267*** - Forbidden - ***[PG I]*** Y341 - ***[PG II]***	***UN1965*** - *Forbidden* ***UN1267*** - 351 - ***[PG I]*** 353 - ***[PG II]***	***UN1965*** - 200 ***UN1267*** - 361 - ***[PG I]*** 364 - ***[PG II]***
Max. Net Qty. Per Package:	***UN1267*** - None (PG I); 1L (PG II)	***UN1267*** - 1L - ***[PG I]*** 5 L - ***[PG II]***	***UN1965*** - 150 kg ***UN1267*** - 30 L - ***[PG I]*** 60 L - ***[PG II]***

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:

Component	TPQ	EPCRA RQ
Hydrogen Sulfide	500 lb	100 lb

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

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

CERCLA/SARA - Section 313 and 40 CFR 372:
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration[1]	de minimis
Xylenes	1-8	1.0%
Toluene	1-7	1.0%
Cyclohexane	1-5	1.0%
Benzene	<5	0.1%
n-Hexane	2-4	1.0%
Ethyl Benzene	1-3	0.1%

EPA (CERCLA) Reportable Quantity (in pounds):
EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

California Proposition 65:
Warning: This material may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the warning requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Type of Toxicity
Toluene	Developmental Toxicant Female Reproductive Toxicant
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant
Ethyl Benzene	Cancer

International Hazard Classification

Canada:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:
B2 - Flammable Liquids
D2A
D2B

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

U.S. Export Control Classification Number: 1C981

Section 16: Other Information

Date of Issue:	1-Sep-2015
Status:	FINAL
Previous Issue Date:	1-Sep-2015
Revised Sections or Basis for Revision:	Identified Hazards (Section 2) Precautionary Statement(s) (Section 2) First Aid (Section 4) Exposure limits (Section 8) Shipping information (Section 14) Regulatory information (Section 15)
SDS Number:	730370

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:
The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Produced Brine Water

Safety Data Sheet

Section 1: Identification of the substance or mixture and of the supplier

Product Name:	Produced Brine Water
SDS Number:	401320
Intended Use:	Process Water
Manufacturer:	Ascent Resources 3501 N.W. 63rd Oklahoma City, OK 73116
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 Hours)
SDS Information:	Phone: 800-642-3074 URL: www.ascentresources.com

Section 2: Hazard(s) Identification

Classification

H302 – Harmful if swallowed – Category 1
H319 – Eye damage/irritation – Category 2
H316 – Causes mild skin irritation – Category 1
H332 – Harmful if inhaled – Category 1
H350 – Carcinogenicity – Category 1A
H412 – May cause chronic harmful effects to aquatic life – Category 2

Label Elements

DANGER
Causes serious eye irritation. (H319)*
Harmful if swallowed. (H302)*
Harmful if inhaled. (H332)*
May cause cancer. (H350)*
Toxic to aquatic life with long lasting effects. (H412)*

Precautionary Statement(s):
Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Do not breathe dust/fume/gas/mist/vapours/spray. (P261)
Wash thoroughly after handling. (P264)*
Do not eat, drink, or smoke when using this product. (P270)*
Avoid release to the environment. (P273)*
Use outdoors in a well ventelated space (P271)
Wear protective gloves / protective clothing / eye protection. (P281)*
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305+P351+P338*)
If eye irritation persists: Get medical advice/attention. (P313)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P312)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P304 + P340)*
Get medical advice/attention if you feel unwell. (P314)*
Collect spillage. (P391)*
Store locked up. (P405)*
Store in a well-ventilated place. Keep container tightly closed. (P403+P233)*
Dispose of contents/container to approved disposal facility. (P501)*

* *(Applicable GHS hazard code.)*

Section 3: Composition / Information on Ingredients

Component	CAS#	Concentration[1]
Water	7732-18-5	80-100%
Sodium chloride	91-20-3	<20%
Benzene	71-43-2	<2%

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

Section 4: First Aid Measures

Eye Contact: For direct contact, remove contact lenses if present and easy to do. Immediately hold eyelids apart and flush the affected eye(s) with clean water for at least 20 minutes. Seek immediate medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If breathing is difficult, oxygen or artificial respiration should be administered by qualified personnel. If symptoms persist, seek medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most Important symptoms and effects

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

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Section 5: Fire-Fighting Measures

NFPA 704 Hazard Class

Health: 1 **Flammability:** 4 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from flames and hot surfaces. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe vapors or mists. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H2S, and flammability prior to entry. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	NIOSH
Water (7732-18-5)	Not established	Not established	Not established
Sodium chloride (7647-14-5)	Not established	Not established	Not established
Benzene (71-43-2)	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 1 ppm	STEL: 5 ppm TWA: 0.1 ppm

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection (such as splash goggles) that meets or exceeds ANSI Z.87.1 is recommended when there is potential liquid contact to the eye. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Suggested protective materials: Nitrile

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with organic vapor cartridges/canisters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Varies (clear / amber / brown)
Physical Form:	Liquid
Odor:	Petroleum
Odor Threshold:	No data
pH:	4.9-8.5
Vapor Pressure:	No data available
Vapor Density (air=1):	>1
Initial Boiling Point/Range:	212 °F / 100 °C
Melting/Freezing Point:	32 °F / 0 °C
Pour Point:	No data
Solubility in Water:	Infinintely
Partition Coefficient (n-octanol/water) (Kow):	>10
Specific Gravity (water=1):	1.0 -1.1 °API
Viscosity:	No data available
Evaporation Rate (nBuAc=1):	No data available
Flash Point:	No data available
Test Method:	Not applicable
Lower Explosive Limits (vol % in air):	1%
Upper Explosive Limits (vol % in air):	46%
Auto-ignition Temperature:	No data available

Section 10: Stability and Reactivity

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

Conditions to Avoid: Avoid all possible sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing and reducing agents.

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

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Expected to have a low degree of toxicity by inhalation		No data
Skin Absorption	Unlikely to be harmful		No data
Ingestion (Swallowing)	Unlikely to be harmful		No data

Aspiration Hazard: Not expected to be an aspiration hazard.

Skin Corrosion/Irritation: Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes serious eye irritation.

Signs and Symptoms: Effects of overexposure may include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue).

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure. Laboratory animal studies of hydrocarpon products by the dermal and inhalation exposure routes have demonstrated toxicity to the liver, blood, spleen and thymus

Carcinogenicity: May cause cancer, based on component information.

Germ Cell Mutagenicity: Inadequate information available.

Reproductive Toxicity: Inadequate information available.

Other Comments: This material may contain varying concentrations of polycyclic aromatic hydrocarbons (PAHs) which have been known to produce a phototoxic reaction when contaminated skin is exposed to sunlight. The effect is similar in appearance to an exaggerated sunburn, and is temporary in duration if exposure is discontinued. Continued exposure to sunlight can result in more serious skin problems including pigmentation (discoloration), skin eruptions (pimples), and possible skin cancers.

Information on Toxicological Effects of Components

Water
Carcinogenicity: No data available
Target Organs: No data available
Reproductive Toxicity: No data available
Germ Cell Mutagenicity: No data available

Sodium chloride
Carcinogenicity: No data available but sodium chloride has not been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.
Target Organs: Eyes, respiratory system, central nervous system
Reproductive Toxicity: No data available
Germ Cell Mutagenicity: No data available

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

Section 12: Ecological Information

Toxicity: Not evaluated

Persistence and Degradability: Not evaluated

Persistence per IOPC Fund definition: Not evaluated

Bioaccumulative Potential: Not evaluated although the solubility and log KOW would indicate it has little bioaccumulative potential.

Mobility in Soil: Not evaluated although the solubility properties indicate produced water would be highly mobile throughout a system.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)

- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping name: ***Not regulated***

Note: Some states may require specific shipping lables. Contact each jurisdiction for more information.

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

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

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

CERCLA/SARA - Section 313 and 40 CFR 372:
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration[1]	de minimis
Benzene	<2	0.1%

EPA (CERCLA) Reportable Quantity (in pounds):
EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

Warning: This material may contain detectable quantities of the following chemicalsidentified on federal and individual state hazardouis substances list. Contact each jurisdiction for more information.

Component	Type of Toxicity
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant

International Hazard Classification:

Canada:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:
D2A
D2B

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

U.S. Export Control Classification Number: 1C981

Section 16: Other Information

Date of Issue:	1-Sep-2015
Status:	FINAL

Revised Sections or Basis for Revision:

Identified Hazards (Section 2)
Precautionary Statement(s) (Section 2)
First Aid (Section 4)
Shipping information (Section 14)
Regulatory information (Section 15)

SDS Number: 401320

Guide to Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Attachment I: Emission Units Table

Attachment I

Emission Units Table

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

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
S22	E22	Sitewide Fugitive	2013	N/A	Mod	N/A
S01	E01	Production Unit Heater	2013	1.50 MMBtuH	Mod	N/A
S02	E02	Production Unit Heater	2013	1.50 MMBtuH	Mod	N/A
S03	E03	Production Unit Heater	2013	1.50 MMBtuH	Mod	N/A
S04	E04	Production Unit Heater	2013	1.50 MMBtuH	Mod	N/A
S05	E05	Production Unit Heater	2013	1.50 MMBtuH	Mod	N/A
S06	E06	Production Unit Heater	2013	1.50 MMBtuH	Mod	N/A
S07	E07	Condensate Heater	2013	0.75 MMBtuH	Mod	N/A
S08	E08	Condensate Heater	2013	0.75 MMBtuH	Mod	N/A
S09	E09	Tank 1 - Gunbarrel Storage Tank	2013	178-bbl	Mod	C01
S10	E10	Tank 2 - Gunbarrel Storage Tank	2013	178-bbl	Mod	C01
S11	E11	Tank 3 - Condensate Storage Tank	2013	210-bbl	Mod	C01
S12	E12	Tank 4 - Condensate Storage Tank	2013	210-bbl	Mod	C01
S13	E13	Tank 5 - Condensate Storage Tank	2013	210-bbl	Mod	C01
S14	E14	Tank 6 - Condensate Storage Tank	2013	210-bbl	Mod	C01
S15	E15	Tank 7 - Prod. Water Storage Tank	2013	210-bbl	Mod	C01
S16	E16	Tank 8 - Prod. Water Storage Tank	2013	210-bbl	Mod	C01
17S	17E	Tank 9 - Prod. Water Storage Tank	2013	210-bbl	Mod	C01
18S	18E	Tank 10 - Prod. Water Storage Tank	2013	210-bbl	Mod	C01
C01	C01	Flare	2013	20.83 MMBtuH	Mod	N/A
S19	E19	Condensate Truck Loading	2013	N/A	Mod	N/A
S20	E20	Produced Water Truck Loading	2013	N/A	Mod	N/A
S23	E23	Unpaved Road Sources	2013	N/A	Mod	N/A

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

Attachment J: Emission Points Data Summary Sheet

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			
E22	Fugitive	E22	S22	N/A	N/A	C	8760	VOC	2.24	9.76	2.24	9.76	Gas/Vapor	EE	
E01	Horizontal Stack	E01	S01	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
E02	Horizontal Stack	E02	S02	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
E03	Horizontal Stack	E03	S03	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			

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			
E04	Horizontal Stack	E04	S04	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
E05	Horizontal Stack	E05	S05	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
E06	Horizontal Stack	E06	S06	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
E07	Horizontal Stack	E07	E07	N/A	N/A	C	8760	VOC	0.01	0.02	0.01	0.02	Gas/Vapor	EE	
								NOx	0.07	0.32	0.07	0.32			
								CO	0.06	0.27	0.06	0.27			
								PM	0.01	0.02	0.01	0.02			
								SO2	<0.01	<0.01	<0.01	<0.01			

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			
E08	Horizontal Stack	E08	S08	N/A	N/A	C	8760	VOC NOx CO PM SO2	0.01 0.07 0.06 0.01 <0.01	0.02 0.32 0.27 0.02 <0.01	0.01 0.07 0.06 0.01 <0.01	0.02 0.32 0.27 0.02 <0.01	Gas/Vapor	EE	
E09	Vent / Combustor Vertical Stack	E09	S09	C01	Flare	C	8760	VOC	--	4.48	--	0.09	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
E10	Vent / Combustor Vertical Stack	E10	S10	C01	Flare	C	8760	VOC	--	4.48	--	0.09	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
E11	Vent / Combustor Vertical Stack	E11	S11	C01	Flare	C	8760	VOC	--	0.68	--	0.01	Gas/Vapor	O (Tanks 4.0.9d methodology)	
E12	Vent / Combustor Vertical Stack	E12	S12	C01	Flare	C	8760	VOC	--	0.68	--	0.01	Gas/Vapor	O (Tanks 4.0.9d methodology)	
E13	Vent / Combustor Vertical Stack	E13	S13	C01	Flare	C	8760	VOC	--	0.68	--	0.01	Gas/Vapor	O (Tanks 4.0.9d methodology)	

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			
E14	Vent / Combustor Vertical Stack	14E	14S	C01	Flare	C	8760	VOC	--	0.68	--	0.01	Gas/Vapor	O (Tanks 4.0.9d methodology)	
E15	Vent / Combustor Vertical Stack	15E	15S	C01	Flare	C	8760	VOC	--	0.02	--	0.0004	Gas/Vapor	O (Tanks 4.0.9d methodology)	
E16	Vent / Combustor Vertical Stack	16E	16S	C01	Flare	C	8760	VOC	--	0.02	--	0.0004	Gas/Vapor	O (Tanks 4.0.9d methodology)	
E17	Vent / Combustor Vertical Stack	17E	17S	C01	Flare	C	8760	VOC	--	0.02	--	0.0004	Gas/Vapor	O (Tanks 4.0.9d methodology)	
E18	Vent / Combustor Vertical Stack	18E	18S	C01	Flare	C	8760	VOC	--	0.02	--	0.0004	Gas/Vapor	O (Tanks 4.0.9d methodology)	
E19	Truck Vent	E09-E18, E19	S09-S18, S19	N/A	N/A	C	8760	VOC	52.47	0.30	52.47	0.30	Gas/Vapor	EE	

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			
E20	Truck Vent	E20	S20	N/A	N/A	C	8760	VOC	0.52	0.09	0.52	0.09	Gas/Vapor	EE	
C01	Flare	C01	C01	N/A	N/A	C	8760	NOx	1.42	6.20	1.42	6.20	Gas/Vapor	EE	
								VOC	0.09	0.40	0.09	0.40			
								CO	6.46	28.28	6.46	28.28			
								PM_{TOTAL}	0.02	0.08	0.02	0.08			
E23	Fugitive	E23	S23	N/A	N/A	C	8760	PM_{10}	0.49	2.13	0.22	0.96	Solid (PM)	EE	
								PM_{TOTAL}	1.64	7.20	0.74	3.24			

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
E22	N/A	N/A	N/A	N/A	1149	N/A	4383672	530808
E01	N/A	N/A	N/A	N/A	1149	10	4383672	530808
E02	N/A	N/A	N/A	N/A	1149	10	4383672	530808
E03	N/A	N/A	N/A	N/A	1149	10	4383672	530808
E04	N/A	N/A	N/A	N/A	1149	10	4383672	530808
E05	N/A	N/A	N/A	N/A	1149	10	4383672	530808
E06	N/A	N/A	N/A	N/A	1149	10	4383672	530808
E07	N/A	N/A	N/A	N/A	1149	10	4383672	530808
E08	N/A	N/A	N/A	N/A	1149	10	4383672	530808
E09	N/A	N/A	N/A	N/A	1149	20	4383672	530808
E10	N/A	N/A	N/A	N/A	1149	20	4383672	530808
E11	N/A	N/A	N/A	N/A	1149	15	4383672	530808
E12	N/A	N/A	N/A	N/A	1149	15	4383672	530808
E13	N/A	N/A	N/A	N/A	1149	15	4383672	530808
E14	N/A	N/A	N/A	N/A	1149	15	4383672	530808
E15	N/A	N/A	N/A	N/A	1149	15	4383672	530808
E16	N/A	N/A	N/A	N/A	1149	15	4383672	530808
E17	N/A	N/A	N/A	N/A	1149	15	4383672	530808

E18	N/A	N/A	N/A	N/A	1149	15	4383672	530808
E19	N/A	N/A	N/A	N/A	1149	N/A	4383672	530808
C01	0.33	300	N/A	N/A	1149	30	4383672	530808
E20	N/A	N/A	N/A	N/A	1149	N/A	4383672	530808
E23	N/A	N/A	N/A	N/A	1149	N/A	4383672	530808

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

Attachment K: Fugitive Emissions Data Summary Sheet

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

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

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

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

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	N/A					
Unpaved Haul Roads	N/A (Included in Attachment L)					
Storage Pile Emissions	N/A					
Loading/Unloading Operations	N/A (Included in Attachment L)					
Wastewater Treatment Evaporation & Operations	N/A					
Equipment Leaks	VOC HAPs	2.24 0.01	9.76 0.03	2.24 0.01	9.76 0.03	EE
General Clean-up VOC Emissions	N/A					
Other	N/A (Included in Attachment L)					

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

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

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

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

Attachment L: Emissions Unit Data Sheet(s)

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*)
   Sitewide Fugitives (E22)

2. Standard Industrial Classification Codes (SICs) for process(es)
   1311

3. List raw materials and ☐ attach MSDSs
   N/A- fugitive gas emissions only

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.

   Ascent staff will perform AVO walkthroughs during site visits, expected to be at least weekly.

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

   Ascent will repair and report any accidental reslease as soon as possible following the incident.

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: N/A

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	52 weeks/year
10B. Typical	24 hrs/day	7 days/week	52 weeks/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
Ascent staff will perform AVO walkthroughs during site visits, expected to be at least weekly.

RECORDKEEPING
Ascent staff will note any detected leaks and the repairs done to repair them.

REPORTING
In the case of a reportable event, Ascent will contact the WV DEP and comply with any applicable requirements.

TESTING
N/A

MONITORING. Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment operation 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)
N/A				

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]				
	heavy liquid VOC[8]				
	Non-VOC[9]				
Valves[10]	Gas VOC	200	0	7	3,360
	Light Liquid VOC	200	0	7	9,636
	Heavy Liquid VOC				
	Non-VOC				
Safety Relief Valves[11]	Gas VOC	35	0	7	2,825
	Non VOC				
Open-ended Lines[12]	VOC				
	Non-VOC				
Sampling Connections[13]	VOC	1300	0	7	2,624
	Non-VOC				
Compressors	VOC				
	Non-VOC				
Flanges	VOC	725	0	7	1,073
	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 

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				
N/A						

[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 °F	mmHg psig mmHg 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.

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*):	
1. Loading Area Name: E19, E20	
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	2
Number of liquids loaded	2 - Condensate, Produced Water
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1
4. Does ballasting of marine vessels occur at this loading area? ☐ Yes ☐ No ☒ Does not apply	
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: N/A	
6. Are cargo vessels pressure tested for leaks at this or any other location? ☐ 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	13	13	13	13

8. Bulk Liquid Data *(add pages as necessary):*							
Pump ID No.		1	2				
Liquid Name		Condensate	Produced Water				
Max. daily throughput (1000 gal/day)		8,000 gal/hr	8,000 gal/hr				
Max. annual throughput (1000 gal/yr)		91.98 gal/yr	2,759.40 gal/yr				
Loading Method [1]		SUB	SUB				
Max. Fill Rate (gal/min)		133.3	133.3				
Average Fill Time (min/loading)		60	60				
Max. Bulk Liquid Temperature (°F)		95 (57.22 Avg.)	95 (57.22 Avg.)				
True Vapor Pressure [2]		6.98	6.98				
Cargo Vessel Condition [3]		U	U				
Control Equipment or Method [4]		N/A	N/A				
Minimum control efficiency (%)							
Maximum Emission Rate	Loading (lb/hr)	52.47	0.52				
	Annual (lb/yr)	603.32	181.00				
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	RECORDKEEPING
Ascent will monitoring loading volume to ensure emissions do not exceed those listed in this application.	Ascent will keep records of loading volumes to ensure emissions do not exceed those listed in this application.
REPORTING	**TESTING**
Ascent will submit reports as required.	N/A

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

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

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

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

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

N/A

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*): E01-E06

1. Name or type and model of proposed affected source:

   Six (6) Production Unit Heaters

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   N/A

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   Per Unit:
   0.01 lb/hr VOC
   0.15 lb/hr NOx
   0.12 lb/hr CO
   0.01 lb/hr PM

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   N/A

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

6. Combustion Data (if applicable):

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

Natural Gas: 1470.6 scf/hr

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

See Attachment N, Table 18.

(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:

1.50 MMBtu/hr, each

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

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

7. Projected operating schedule:

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

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

@ N/A °F and psia

a.	NO_X	0.15	lb/hr	grains/ACF
b.	SO_2		lb/hr	grains/ACF
c.	CO	0.12	lb/hr	grains/ACF
d.	PM_{10}	0.01	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	0.01	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	Benzene	<0.0001	lb/hr	grains/ACF
	Formaldehyde	<0.0001	lb/hr	grains/ACF
	n-Hexane	0.003	lb/hr	grains/ACF
	Toluene	<0.0001	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
N/A	N/A
REPORTING	TESTING
N/A	N/A

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

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

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

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

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

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*): E07-E08

1. Name or type and model of proposed affected source:

   Two (2) Condensate Heaters

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   N/A

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   Per Unit:
   0.004 lb/hr VOC
   0.07 lb/hr NOx
   0.06 lb/hr CO
   0.01 lb/hr PM

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   N/A

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

6. Combustion Data (if applicable):

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

Natural Gas: 735.3 scf/hr

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

See Attachment N, Table 18.

(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:

0.75 MMBtu/hr, each

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

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

7. Projected operating schedule:

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

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

@ N/A °F and psia

a. NO_X	0.07 lb/hr	grains/ACF
b. SO_2	lb/hr	grains/ACF
c. CO	0.06 lb/hr	grains/ACF
d. PM_{10}	0.01 lb/hr	grains/ACF
e. Hydrocarbons	lb/hr	grains/ACF
f. VOCs	0.004 lb/hr	grains/ACF
g. Pb	lb/hr	grains/ACF
h. Specify other(s)		
Benzene	<0.0001 lb/hr	grains/ACF
Formaldehyde	<0.0001 lb/hr	grains/ACF
n-Hexane	0.001 lb/hr	grains/ACF
Toluene	<0.0001 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
N/A	N/A
REPORTING	**TESTING**
N/A	N/A

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

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

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

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

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

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	0.80	0.36
s =	Silt content of road surface material (%)	10	10
p =	Number of days per year with precipitation >0.01 in.	150	150

Item Number	Description	Number of Wheels	Mean Vehicle Weight (tons)	Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)
1	Light Vehicles	4	2.5	10	2	1	730	1	55
2	Heavy Trucks	18	23.7	10	2	1	730	1	55
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	0.80	0.36
s =	Silt content of road surface material (%)	10	10
S =	Mean vehicle speed (mph)	10	10
W =	Mean vehicle weight (tons)	13	13
w =	Mean number of wheels per vehicle	11	11
p =	Number of days per year with precipitation >0.01 in.	150	150

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	1.64	7.20	0.74	3.24	0.49	2.13	0.22	0.96
2								
3								
4								
5								
6								
7								
8								
TOTALS	1.64	7.20	0.74	3.24	0.49	2.13	0.22	0.96

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/A
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
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 Gunbarrel Storage Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) E09	4. Emission Point Identification No. (as assigned on *Equipment List Form*) E09
5. Date of Commencement of Construction (for existing tanks) 2013	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
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. 178-bbl	
9A. Tank Internal Diameter (ft) 8.0	9B. Tank Internal Height (or Length) (ft) 20.0
10A. Maximum Liquid Height (ft) 19.0	10B. Average Liquid Height (ft) 18.0
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 4.5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 7,476 gal	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
1,425,690	3,906

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 10.04

15. Maximum tank fill rate (gal/min): N/A

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
Gray/Light	Gray/Light	

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): 14.7 to 14.7

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) 0.06

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. Charleston, WV
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): Flare

[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, Table 12				

[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 Gunbarrel Storage Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) E10	4. Emission Point Identification No. (as assigned on *Equipment List Form*) E10
5. Date of Commencement of Construction (for existing tanks) 2013	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
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. 178-bbl	
9A. Tank Internal Diameter (ft) 8.0	9B. Tank Internal Height (or Length) (ft) 20.0
10A. Maximum Liquid Height (ft) 19.0	10B. Average Liquid Height (ft) 18.0
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 4.5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 7,476 gal	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
1,425,690	3,906

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 10.04

15. Maximum tank fill rate (gal/min): N/A

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
Gray/Light	Gray/Light	

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): 14.7 to 14.7

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) 0.06

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. Charleston, WV
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): Flare

[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, Table 12				

[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 Condensate Storage Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) E11	4. Emission Point Identification No. (as assigned on *Equipment List Form*) E11
5. Date of Commencement of Construction (for existing tanks) 2013	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
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. 210-bbl	
9A. Tank Internal Diameter (ft) 10.0	9B. Tank Internal Height (or Length) (ft) 15.0
10A. Maximum Liquid Height (ft) 14.0	10B. Average Liquid Height (ft) 11.0
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 4.5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 8,820 gal	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
22,995	63

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 2.80

15. Maximum tank fill rate (gal/min): N/A

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
Gray/Light	Gray/Light	

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): 14.7 to 14.7

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) 0.06

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. Charleston, WV
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): Flare

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, Table 12				

[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 Condensate Storage Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) E12	4. Emission Point Identification No. (as assigned on *Equipment List Form*) E12
5. Date of Commencement of Construction (for existing tanks) 2013	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
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. 210-bbl	
9A. Tank Internal Diameter (ft) 10.0	9B. Tank Internal Height (or Length) (ft) 15.0
10A. Maximum Liquid Height (ft) 14.0	10B. Average Liquid Height (ft) 11.0
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 4.5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 8,820 gal	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
22,995	63

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 2.80

15. Maximum tank fill rate (gal/min): N/A

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 Gray/Light	20B. Roof Color Gray/Light	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): 14.7 to 14.7

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) 0.06

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. Charleston, WV
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): Flare

[1] Complete appropriate Air Pollution Control Device Sheet.

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

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss		Annual Loss (lb/yr)	Estimation Method[1]
		Amount	Units		
	See Attachment N, Table 12				

[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 Condensate Storage Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) E13	4. Emission Point Identification No. (as assigned on *Equipment List Form*) E13
5. Date of Commencement of Construction (for existing tanks) 2013	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
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. 210-bbl	
9A. Tank Internal Diameter (ft) 10.0	9B. Tank Internal Height (or Length) (ft) 15.0
10A. Maximum Liquid Height (ft) 14.0	10B. Average Liquid Height (ft) 11.0
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 4.5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 8,820 gal	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
22,995	63

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 2.80

15. Maximum tank fill rate (gal/min): N/A

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
Gray/Light	Gray/Light	

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): 14.7 to 14.7

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) 0.06

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. Charleston, WV
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): Flare

[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, Table 12				

[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 Condensate Storage Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) E14	4. Emission Point Identification No. (as assigned on *Equipment List Form*) E14
5. Date of Commencement of Construction (for existing tanks) 2013	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
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. 210-bbl	
9A. Tank Internal Diameter (ft) 10.0	9B. Tank Internal Height (or Length) (ft) 15.0
10A. Maximum Liquid Height (ft) 14.0	10B. Average Liquid Height (ft) 11.0
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 4.5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 8,820 gal	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
22,995	63

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 2.80

15. Maximum tank fill rate (gal/min): N/A

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
Gray/Light	Gray/Light	

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): 14.7 to 14.7

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) 0.06

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. Charleston, WV
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): Flare

[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, Table 12				

[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 Produced Water Storage Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) E15	4. Emission Point Identification No. (as assigned on *Equipment List Form*) E15
5. Date of Commencement of Construction (for existing tanks) 2013	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
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. 210-bbl	
9A. Tank Internal Diameter (ft) 10.0	9B. Tank Internal Height (or Length) (ft) 15.0
10A. Maximum Liquid Height (ft) 14.0	10B. Average Liquid Height (ft) 11.0
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 4.5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 8,820 gal	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
689,850	1,890

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 83.87

15. Maximum tank fill rate (gal/min): N/A

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
Gray/Light	Gray/Light	

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): 14.7 to 14.7

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) 0.06

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. Charleston, WV
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): Flare

[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, Table 12				

[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 Produced Water Storage Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) E16	4. Emission Point Identification No. (as assigned on *Equipment List Form*) E16
5. Date of Commencement of Construction (for existing tanks) 2013	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
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. 210-bbl	
9A. Tank Internal Diameter (ft) 10.0	9B. Tank Internal Height (or Length) (ft) 15.0
10A. Maximum Liquid Height (ft) 14.0	10B. Average Liquid Height (ft) 11.0
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 4.5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 8,820 gal	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
689,850	1,890

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 83.87

15. Maximum tank fill rate (gal/min): N/A

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 Gray/Light	20B. Roof Color Gray/Light	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): 14.7 to 14.7

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) 0.06

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. Charleston, WV
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): Flare

[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, Table 12				

[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 Produced Water Storage Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) E17	4. Emission Point Identification No. (as assigned on *Equipment List Form*) E17
5. Date of Commencement of Construction (for existing tanks) 2013	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
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. 210-bbl	
9A. Tank Internal Diameter (ft) 10.0	9B. Tank Internal Height (or Length) (ft) 15.0
10A. Maximum Liquid Height (ft) 14.0	10B. Average Liquid Height (ft) 11.0
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 4.5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 8,820 gal	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
689,850	1,890

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 83.87

15. Maximum tank fill rate (gal/min): N/A

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
Gray/Light	Gray/Light	

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): 14.7 to 14.7

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) 0.06

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. Charleston, WV
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): Flare

[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, Table 12				

[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 Produced Water Storage Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) E18	4. Emission Point Identification No. (as assigned on *Equipment List Form*) E18
5. Date of Commencement of Construction (for existing tanks) 2013	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
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. 210-bbl	
9A. Tank Internal Diameter (ft) 10.0	9B. Tank Internal Height (or Length) (ft) 15.0
10A. Maximum Liquid Height (ft) 14.0	10B. Average Liquid Height (ft) 11.0
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 4.5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 8,820 gal	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
689,850	1,890

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 83.87

15. Maximum tank fill rate (gal/min): N/A

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 Gray/Light	20B. Roof Color Gray/Light	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): 14.7 to 14.7

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) 0.06

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. Charleston, WV
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): Flare

[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, Table 12				

[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 M: Air Pollution Control Device Sheet(s)

Attachment M
Air Pollution Control Device Sheet
(FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): C01

Equipment Information

1. Manufacturer: Hero Flare
   Model No. G30U4

2. Method: ☒ Elevated flare ☐ Ground flare ☐ Other
   Describe

3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

4. Method of system used:
   ☐ Steam-assisted ☐ Air-assisted ☐ Pressure-assisted ☒ Non-assisted

5. Maximum capacity of flare:
   scf/min
   scf/hr

6. Dimensions of stack:
   Diameter 0.33 ft.
   Height 30 ft.

7. Estimated combustion efficiency:
   (Waste gas destruction efficiency)
   Estimated: 98 %
   Minimum guaranteed: 98 %

8. Fuel used in burners:
   ☒ Natural Gas
   ☐ Fuel Oil, Number
   ☐ Other, Specify:

9. Number of burners:
   Rating: 20.83 MM BTU/hr

10. Will preheat be used? ☐ Yes ☒ No

11. Describe method of controlling flame:
    Thermocouple

12. Flare height: 30 ft

13. Flare tip inside diameter: 0.33 ft

14. Natural gas flow rate to flare pilot flame per pilot light:
    scf/min
    40.0 scf/hr

15. Number of pilot lights:
    Total BTU/hr

16. Will automatic re-ignition be used?
    ☒ Yes ☐ No

17. If automatic re-ignition will be used, describe the method:
    The flare pilot switches shall automatically trigger the ignition transformers to ignite the flare tip pilot.

18. Is pilot flame equipped with a monitor? ☒ Yes ☐ No
    If yes, what type? ☒ Thermocouple ☐ Infra-Red
    ☐ Ultra Violet ☐ Camera with monitoring control room
    ☐ Other, Describe:

19. Hours of unit operation per year: 8,760

Steam Injection

20. Will steam injection be used? ☐ Yes ☒ No	21. Steam pressure PSIG Minimum Expected: Design Maximum:
22. Total Steam flow rate: LB/hr	23. Temperature: °F
24. Velocity ft/sec	25. Number of jet streams
26. Diameter of steam jets: in	27. Design basis for steam injected: LB steam/LB hydrocarbon
28. How will steam flow be controlled if steam injection is used?	

Characteristics of the Waste Gas Stream to be Burned

29. Name	Quantity Grains of H_2S/100 ft^3	Quantity (LB/hr, ft^3/hr, etc)	Source of Material
Tank Vapor	N/A	4.61 lb/hr	E09-E18

30. Estimate total combustible to flare: (Maximum mass flow rate of waste gas)	4.61 lb/hr	LB/hr or ACF/hr scfm
31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.: 4.61 lb/hr	LB/hr or ACF/hr	
32. Give composition of carrier gases: Refer to Promax and TANKS 4.0.9d.		

33. Temperature of emission stream: °F Heating value of emission stream: 3,022 BTU/ft^3 Mean molecular weight of emission stream: MW = lb/lb-mole	34. Identify and describe all auxiliary fuels to be burned. BTU/scf BTU/scf BTU/scf BTU/scf
35. Temperature of flare gas: N/A °F	36. Flare gas flow rate: 50 scf/min
37. Flare gas heat content: 3,022 BTU/ft^3	38. Flare gas exit velocity: N/A scf/min
39. Maximum rate during emergency for one major piece of equipment or process unit: N/A scf/min	
40. Maximum rate during emergency for one major piece of equipment or process unit: N/A BTU/min	
41. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification): N/A	
42. Describe the collection material disposal system: Tanks are routed to flare.	
43. Have you included ***Flare Control Device*** in the Emissions Points Data Summary Sheet? Yes	

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

MONITORING:	RECORDKEEPING:
Operator to check during routine walkthroughs.	Operator will keep records if flare is found non-operational.
REPORTING:	**TESTING:**
Notifications will be made as required.	Testing will be conducted as required.

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.
98% VOC

46. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
98% VOC

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

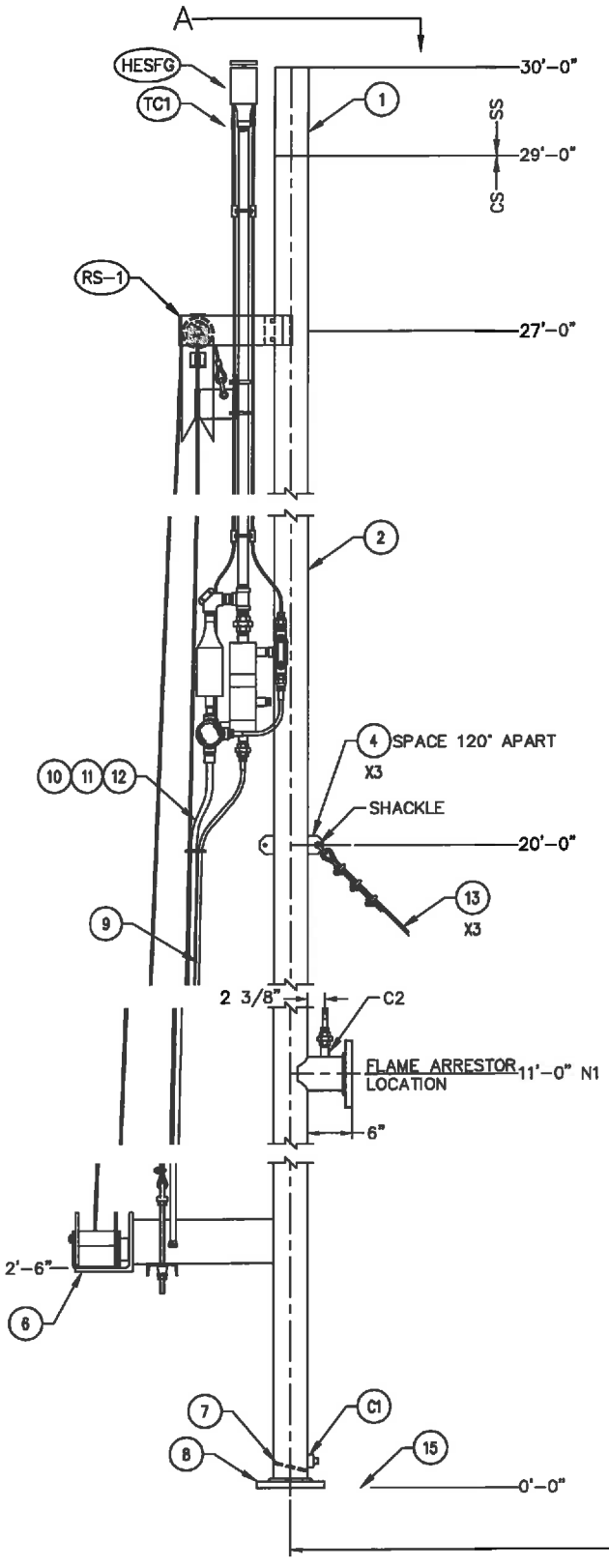
HERO Flare

Quality flares that work every time.

Operations and Maintenance Manual

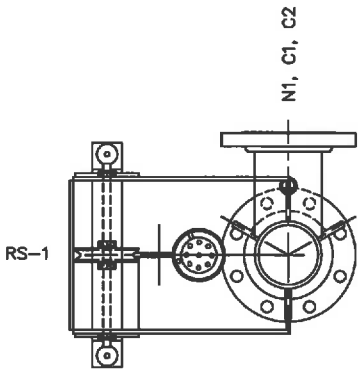
G30U4 Utility Flares

www.heroflare.com

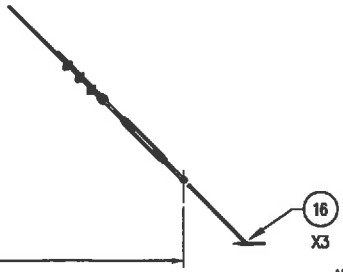


ITEM #	QTY	DESCRIPTION
N1	1	INLET, 4", 150#, RFSO, CS
C1	1	DRAIN PLUG, 1", CS
C2	1	FUEL GAS COUPLING, 1/2", CS
1	1	FLARE TIP, 12" x 4", 304SS
2	1	STACK, 4" S40, A-53 GR B
4	3	GUY LUGS, 3/8" PLATE, CS
6	1	RS-1 BOTTOM BRACKET, CS
7	1	FLOOR PLATE, 1/4" PLATE, CS
8	1	BASE FLANGE, 4" 150#, RFSO, CS
RS-1	1	RETRACTABLE SYSTEM FOR PILOT
HESFG	1	PILOT, SPARK IGNITED, 304SS
TC1	1	THERMOCOUPLE, TYPE K
9	AR	FUEL GAS HOSE, BRAIDED
10	AR	CONDUIT, 3/4", FLEXIBLE
11	AR	WIRE, IGNITION, 3 CONDUCTOR
12	AR	WIRE, THERMOCOUPLE, TYPE K
		THE FOLLOWING ITEMS SHIP LOOSE FOR FIELD INSTALLATION
13	3	GUY WIRE, 5/16" x 35FT WITH CLIPS, THIMBLES, & TURNBUCKLES
		OPTION - "NO CONCRETE" PACKAGE
15	N/A	GROUND PLATE, 20"x20"x1/2", CS
16	N/A	GROUND ANCHORS WITH INSTALLATION TOOLS

NOTE: LENGTHS OF WIRE, TUBING, AND CONDUIT CAN BE INCREASED IF PANEL IS LOCATED FURTHER THAN 10FT FROM THE FLARE.



SECTION A



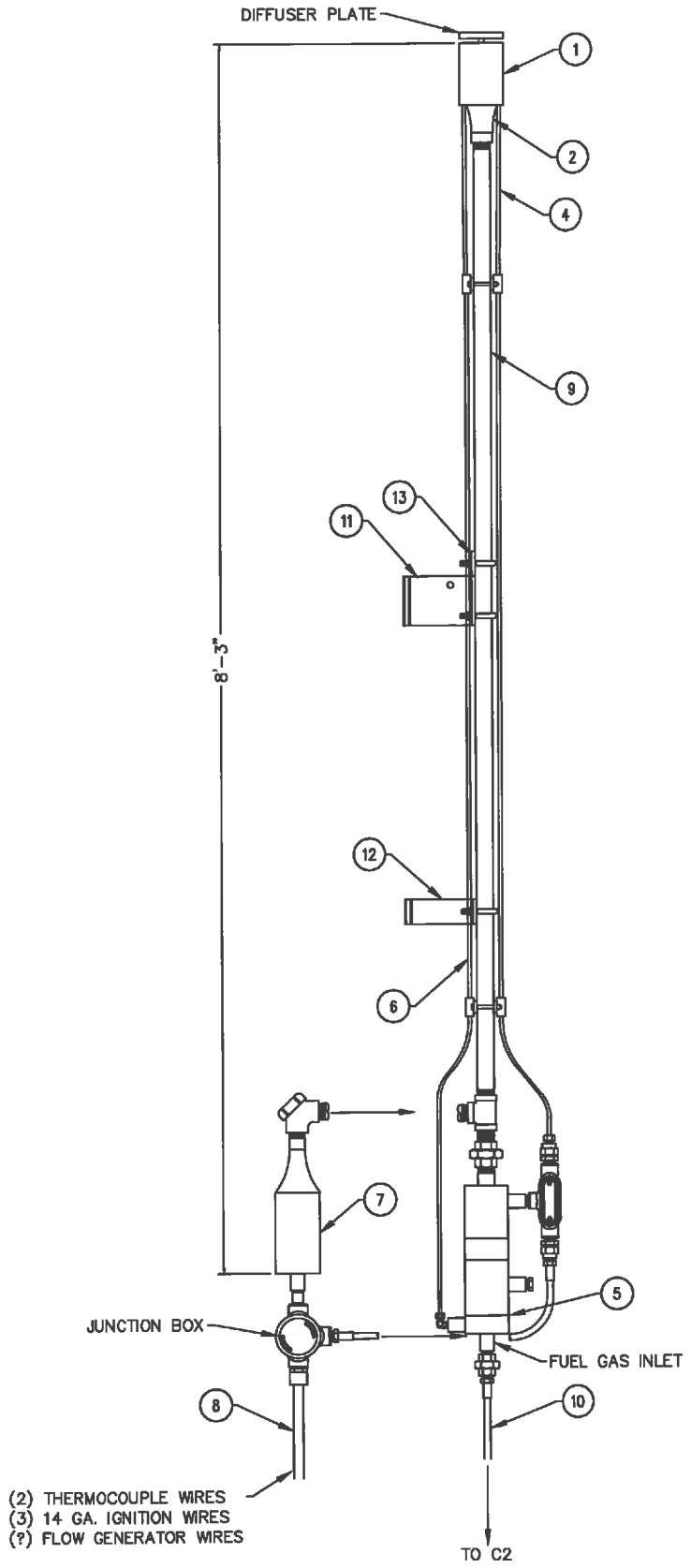
NOTES:
1. WELDING PER ASME B31.4
2. FABRICATION PER AISC
3. SMOOTH CUT ALL HOLES
4. MATERIALS: A-36 U.N.O.

Hero Flare
445 FM20, Bastrop TX, 78602
Tel: (512) 772-5744 www.heroflare.com

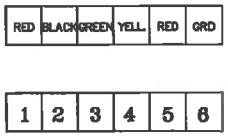
USER	HG ENERGY
JOB SITE	
JOB	

30FT UTILITY FLARE
4" INLET

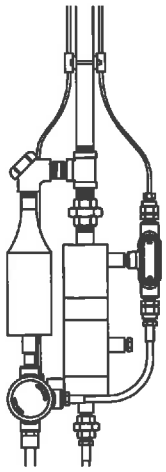
DRAWN: NJ	APPR.	JOB NO: H14132	DWG. NO: G30U4R	REV. S
DATE: 5/13/13	DATE:			



ITEM#	QTY	DESCRIPTION	PART NUMBER
1	1	PILOT WIND SHEILD, 304SS	
2	1	PILOT NOZZLE	SP8-PNA
	1	SPARK IGNITER, INTERNAL	4K30-U-72-SB
4	1	THERMOCOUPLE, TYPE K	
5	1	FLOW GENERATOR	DSI-FG/424
6	1	FUEL GAS LINE TO PILOT	
7	1	IGNITION COIL ASSEMBLY	PART NUMBER
8	AR	FLEX HOSE/CONDUIT	
9	AR	PIPE, 1" S40, 304SS	
10	AR	BRAIDED FLEX HOSE, FUEL GAS	
11	1	TOP MOUNTING BRACKET	
12	1	BOTTOM MOUNTING BRACKET	
13	1	STAB BRACKET	



DETAIL OF TERMINAL STRIP IN JUNCTION BOX



ASSEMBLED VIEW
AT FLOW GENERATOR

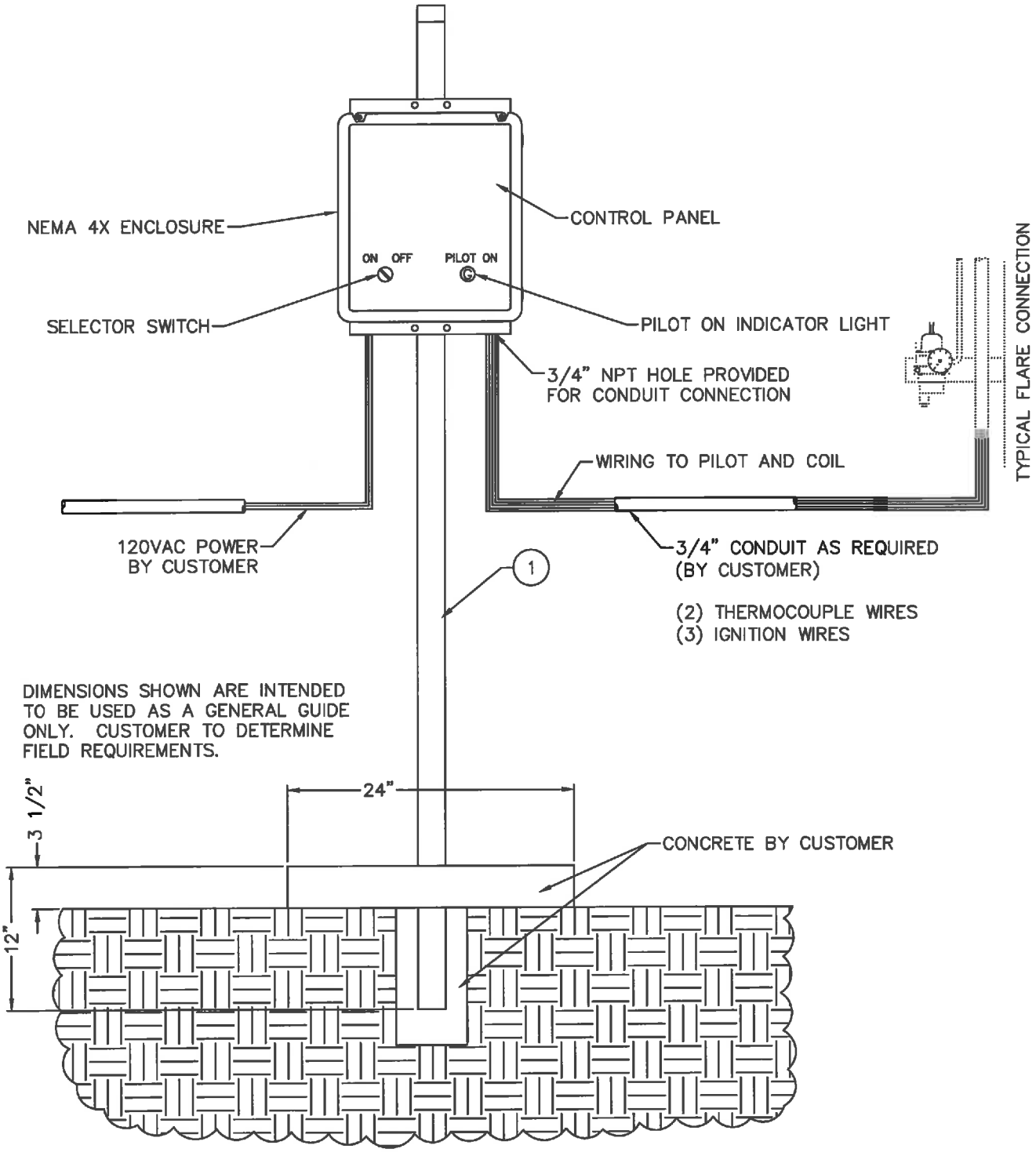
Hero Flare
445 FM20, Bastrop, TX 78602
Tel: (512) 772-5744 www.heroflare.com

USER	HG ENERGY
JOB SITE	
JOB	

HIGH ENERGY
SPARK IGNITED PILOT
WITH FLOW GENERATOR

DRAWN: NJ	APPR.	JOB NO: H14132	DWG. NO: HESFG-1	REV. S
DATE: 5/10/13	DATE:			

ITEM #	QTY	DESCRIPTION
1	1	PIPE, 2" S40 X 7FT LONG, GALV.



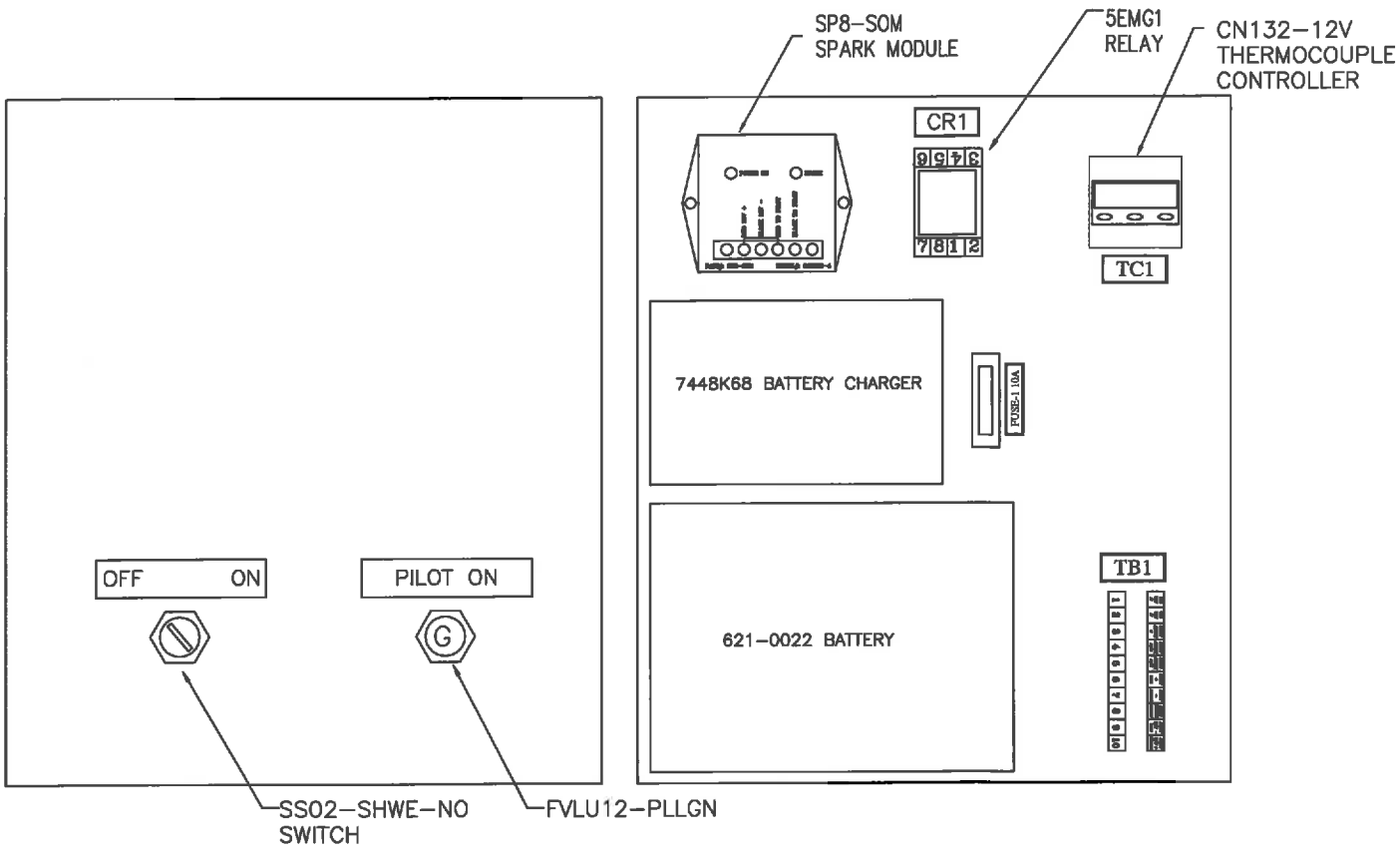
NOTE: CONTROL PANEL WEIGHT WITH BATTERY = 77 LBS

Hero Flare
445 FM20, Bastrop TX, 78602
Tel: (512) 772-5744 www.heroflare.com

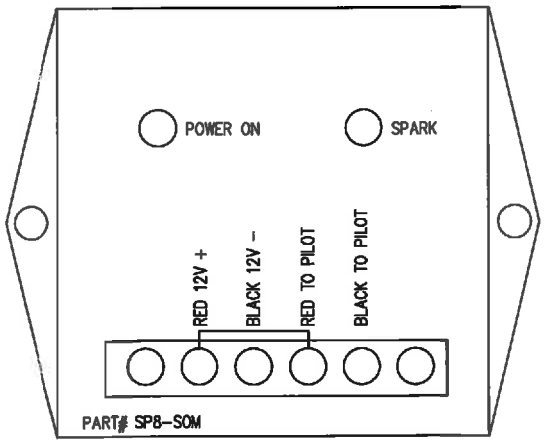
USER	
JOB SITE	
JOB	

CONTROL PANEL STAND
PIPE STAND MOUNT

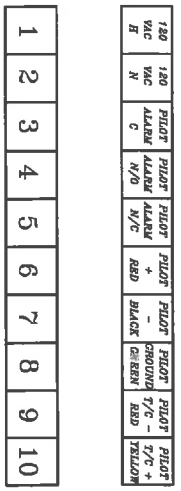
DRAWN: NJ	APPR.	JOB NO:	DWG. NO: ACUPS-1A	REV. S
DATE: 12/11/12	DATE:			



RJ1614HPL NEMA 4X
FIBERGLASS ENCLOSURE



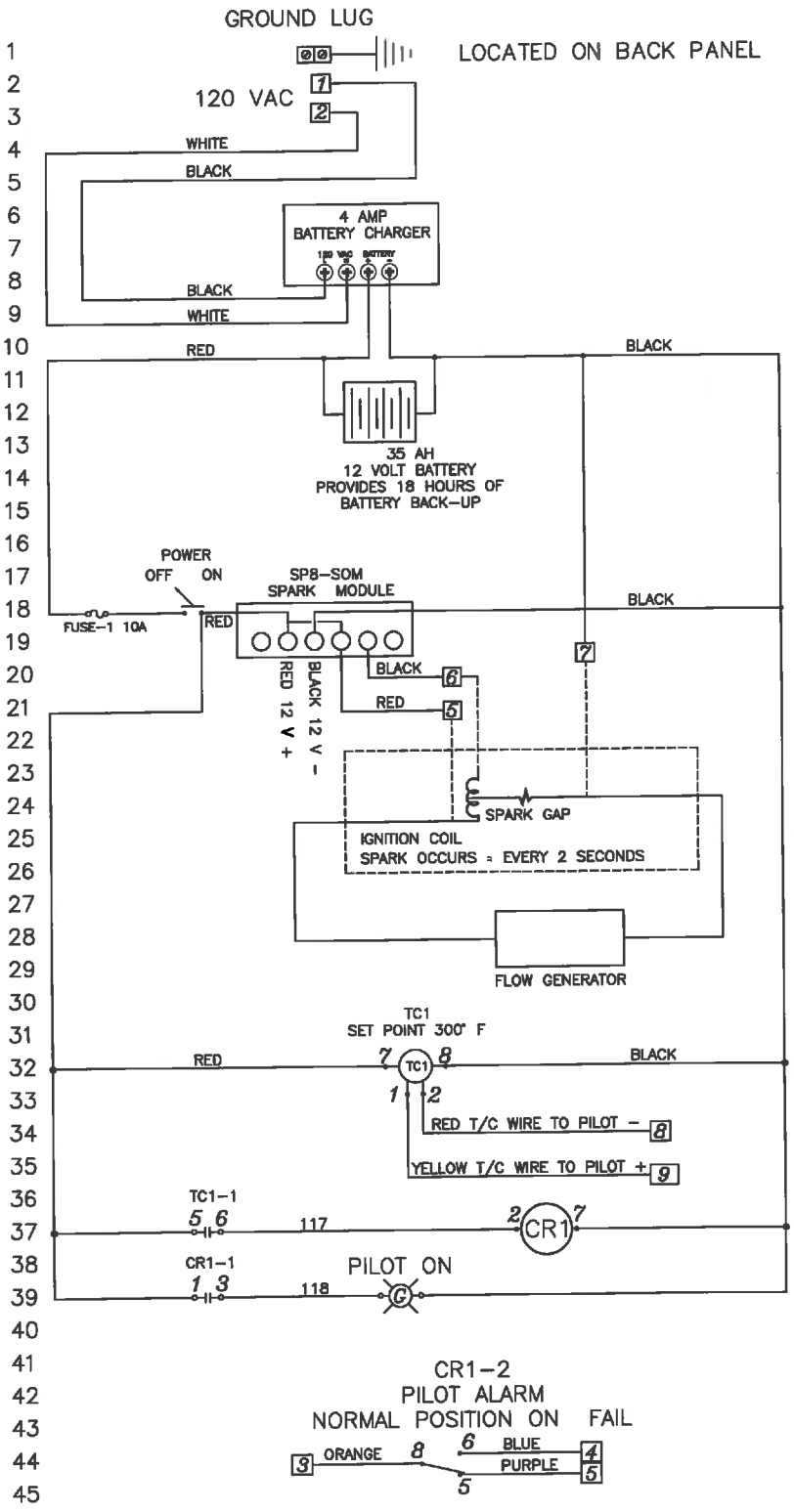
DETAIL OF SPARK MODULE TERMINAL BLOCK



DETAIL OF TB1 TERMINAL STRIP

TB1

Hero Flare 445 FM20, Bastrop TX, 78602 Tel: (512) 772–5744 www.heroflare.com	USER		PANEL LAYOUT 120VAC/12VDC		
	JOB SITE				
	JOB				
THE INFORMATION ON THIS DRAWING IS THE PROPERTY OF HERO FLARE. UNAUTHORIZED USE IS FORBIDDEN.	DRAWN: NJ	APPR.	JOB NO:	DWG. NO: ACUPS–2S	REV. 0
	DATE: 5/13/13	DATE:			



Hero Flare 445 FM20, Bastrop TX, 78602 Tel: (512) 772-5744 www.heroflare.com	USER		SCHEMATIC AC 120V/DC 12V			
	JOB SITE					
	JOB					
THE INFORMATION ON THIS DRAWING IS THE PROPERTY OF HERO FLARE. UNAUTHORIZED USE IS FORBIDDEN.	DRAWN: NJ	APPR.	JOB NO:	DWG. NO: ACUPS-3S	REV. 0	
	DATE: 5/13/13	DATE:				

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I. PRODUCT DESCRIPTION

A. Design Features

This 40' Utility Flare System is designed to provide operators with a safe and reliable method of flaring waste gas produced from biogas and landfill operations.

The following features are incorporated in the 40' Utility Flare System:

- 4" x 30' Flare
- 150# Inlet Flange
- 304 SS Tip and CS Stack
- HESFG Spark Igniter with Thermocouple
- Nema 4X Fiberglass 120 vac / 12 vdc Control Panel
- 35 Amp-Hour Battery Providing 1.5 Days of Operation Without Charging.

Specifications	*HESFG Igniter*	*Control Panel*	*Flare*
Weight:	38 lbs.	77 lbs. with Battery	860 lbs
Dimensions:	8'	16" x 14" x 8"	6" x 40'
Voltage:	12 vdc	12 vdc	N/A
Fuel Gas Required:	None (igniter uses flare gas)		

B. Recommended Spare Parts

Item	Part Number
Spark Module	SP8-SOM
12 vdc Battery	621-0022
Thermocouple	4-K-30-U-72-F4-B8
Thermocouple Controller	CN132-12V
Spark Plug	SP8-J99
Ignition Coil Assembly	SP8-MSD8203
Igniter Nozzle Assembly	SP8-PNA
Flow Generator	DSI-FG/424

C. Operational Overview

The Operational Overview and Operations Manual are intended to give the owner/operator a general idea of how this equipment operates and is to be used. Operators must already have a strong fundamental knowledge of this type of equipment before proceeding. Please review the drawings and cut sheets included in D*RAWINGS AND CUT SHEETS* at the front of this manual to better understand the following overview and manual.

The HESFG Spark Igniter System is designed to operate 24 hours a day. The igniter pulls flare gas from the flare stack and ignites it at the igniter tip. Ignition of the gas is assured by an intermittent spark in the igniter nozzle every two seconds regardless of the flame temperature. This spark is generated when the spark module (located in the igniter control panel) delivers a 12 vdc pulse to the ignition coil on the igniter, thus creating the spark. The igniter is also equipped with a thermocouple to prove igniter flame. This is accomplished by the thermocouple controller (located in the control panel) sensing the igniter thermocouple temperature.

When the igniter temperature reaches 300° F, a relay is energized to prove ignition to a data logger or other recording instrument. Note that CFR 40, Part 60 requires flare igniter flame to be monitored, which is accomplished by the thermocouple.

D. Contact

For any comments or questions, please contact:

HERO Flare
445 FM20
Bastrop, Texas 78602
Phone: 713 542 0925
Email: sales@heroflare.com
David Giles: David.Giles@heroflare.com
Nolan Johnson: Nolan.Johnson@heroflare.com

II. PLACEMENT

A. Flare

Correct placement of the flare system is important to ensure safe and efficient operation. There are several factors that deserve consideration before an installation sight is chosen.

1. Close to accessible utilities - The flare system will require the following utilities:

    - Thermocouple wires from the control panel.
    - Ignition coil wires from the control panel.

2. Within a safe working distance from personnel and process equipment - Sudden and unexpected release of process gas to the flare can generate a tremendous amount of heat creating a hazardous condition for personnel and process equipment. Please refer to API standards to determine a safe working distance.

B. Control Panel

The following factors deserve consideration before an installation site for the control panel is chosen.

1. Close to accessible utilities - The control panel will require the following utilities:

    - Wiring to the control room to alert operators of igniter failure conditions.

2. The control panel may be mounted up to 1,000' from the flare.

3. Within a safe working distance from the flare - Sudden and unexpected release of process gas to the flare can generate a tremendous amount of heat creating a hazardous condition for personnel and process equipment. Please refer to API standards to determine a safe working distance.

III. FOUNDATION AND ERECTION

(Please refer to the Drawings in
Section VIII. DRAWINGS AND CUT SHEETS)

A. Flare Foundation

1. The mounting flange on the flare is 4" x 150#. Structural engineering requirements for the flare foundation, anchor bolts and guy wire anchors will vary depending on sight conditions - therefore must be supplied by others. Minimum recommended size for the flare foundation is 5' x 5' x 8" thick with 6" wide beams dug around the perimeter 6" – 8" deep all reinforced with rebar.

2. The optional Installation Equipment package eliminates the need for a concrete foundation and deadmen. The flare can be placed on stabilized fill or chat. Spearhead ground anchors are driven into the soil to hold the guy wires.

B. Flare Erection

1. The flare has been shipped with the HESFG Spark Igniter mounted and is ready for erection.

2. Using standard lifting practices erect the flare and torque the anchor bolts as recommended by the bolt manufacturer. Do not allow the lifting straps to be placed around the HESFG Spark Igniter. If the 1" pipe on the igniter is bent, the igniter will not function properly.

3. Attach the flare to existing concrete structure. Plumb the flare.

IV. INSTALLATION

(Please refer to the Drawings
At the front of this manual DRAWINGS AND CUT SHEETS)

A. Wiring

1. Provide the following circuits:

   a. 120 vac 5-amp circuit for the control panel.

   b. Ignition coil wires (3 conductors, 14 ga, Red, Black and Green) from the control panel to the base of the flare.

   b. 1 pair of type K thermocouple wires (16 ga) from the control panel to the base of the flare.

   c. Alarm wires (2 conductors) from the control panel to the Control Room (if applicable).

2. Using standard wiring practices:

   a. Run conduit and pull wire as described above from the control panel to the base of the flare. A junction box must be supplied at the base of the flare to make wire terminations. Run rigid or flexible conduit from the ¾" conduit connection provided with the flare to the junction box at the base of the flare.

   b. Run conduit and pull wire as described above from the control panel to the Control Room (if applicable).

   c. In the control panel, terminate the red ignition coil wire (+) to TB1-5, the black ignition coil wire (-) to TB1-6, the green ignition coil wire (ground) to TB1-7, the red T/C wire (-) to TB1-8 and the yellow T/C wire (+) to TB1-9. Terminate the ignition coil wires and thermocouple wires in the junction box at the base of the flare. (Red to Red, Black to Black, Green to Green, Red T/C to Red T/C, and Yellow T/C to Yellow T/C).

   d. Terminate the thermocouple alarm wires in the control panel to TB1-3 and TB1-4. Note that the dry contacts for the alarm will be open on thermocouple fail (if applicable).

B. Piping

Using standard piping practices:

1. It is strongly recommended that a flame arrestor be installed in the flare line at the flare inlet. HERO Flare can supply a flame arrestor on request.

2. Attach the flare line to the inlet flange / flame arrestor. Note that the flare gas must be dry and free from condensate and other liquids. If liquid in the flare gas stream is expected, a knock out drum or other liquid entrapment device must be provided.

V. OPERATIONS

(Please refer to the Drawings
At the front of this manual DRAWINGS AND CUT SHEETS)

A. Start-Up Procedure

Be certain that all piping and wiring as outlined in *Section IV. A & B. INSTALLATION - Wiring and Piping* is complete.

1. Make certain that the on/off switch on the control panel is turned *OFF*.

2. Begin purging the flare gas line with fuel gas or nitrogen.

   WARNING: It is absolutely imperative that all air is purged from the flare gas line before the igniter is lit. A constant purge of 40 scfh must be supplied at all times.

3. Turn on the control panel. The green power-on LED on the spark module will illuminate. The igniter will begin sparking every 2 seconds as indicated by the red spark LED on the spark module. The LED's may not be easily visible during bright days.

4. Verify that TC1 reads ambient temperature and that the thermocouple alarm is activated (if applicable). Note that when the igniter temperature is below 300°F the igniter is considered to be extinguished and in alarm condition.

5. Ignition can be verified by observing TC1 and by listening for the sound of combustion. The flame from the igniter may not be visible during daylight hours. After the thermocouple reaches 300°F, verify that thermocouple alarm has cleared indicating that the flare igniter is above 300°F.

6. Verify that TC1 falls below 300°F and that the thermocouple alarm is activated (if applicable).

7. Repeat steps 4-7.

8. The flare is now ready for service.

VI. MAINTENANCE

A. Periodic Maintenance

Perform the following maintenance procedure on the igniter every three months:

1. Turn off the igniter flare gas supply.

2. Verify that TC1 falls below 300°F and that the igniter alarm is activated (if applicable).

3. Turn on the igniter fuel gas supply.

4. Verify that TC1 reads ambient temperature.

5. After some time, all of the air from the igniter flare gas line will be purged and the igniter will be ignited. Ignition can be verified by observing TC1 and by listening for the sound of combustion. The flame from the igniter may not be visible during daylight hours. After the thermocouple reaches 300°F, verify that thermocouple alarm has cleared indicating that the flare igniter is above 300°F.

B. Warranty

The HESFG Spark Igniter is thoroughly inspected and tested before leaving our manufacturing facility. Should any trouble develop, please consult *Section VII. A. TROUBLESHOOTING - Problem Solving*. If the problem cannot be fixed, please contact HERO Flare.

HERO Flare will warranty the SP8-PTC Spark Igniter for a period of one year from the installation date indicated below, if the inspection shows the trouble is caused by defective workmanship or material. Should the unit need to be shipped, please send it to:

HERO Flare
445 FM 20
Bastrop, Texas 78602

This warranty does not apply where: (1) repairs or attempted repairs have been made by persons other than HERO FLARE personnel or Authorized Service personnel; (2) repairs are required because of normal wear; (3) the unit has been abused or involved in an accident; (4) misuse is evident, such as excessive heat due to incorrect installation; (5) incorrect fuel gas or fuel gas pressure has been used; (6) the unit has been used with an improper accessory; or (7) the flare and/or fuel gas has been subject to liquid or solid particulates.

No other warranty written or verbal, is authorized.

VII. TROUBLESHOOTING

The HESFG Spark Igniter is manufactured using the highest quality parts available. It is then thoroughly tested at the factory before shipment, and should provide years of trouble free service if the maintenance procedure in *Section IV. A. MAINTENANCE - Periodic Maintenance* is followed. If any malfunction should occur, investigate the following:

(Please refer to the Drawings
At the front of this manual DRAWINGS AND CUT SHEETS)

A. Problem Solving

1. HESFG Igniter

Igniter will not light.

Check the following:

a. Verify 12 vdc power to the control panel.

b. Observe the red and green LED's on the Spark Module . The green power-on LED should be illuminated at all times. The red spark LED should flash every 2 seconds. The LED's may not be easily visible during bright days.

If the LED's are not working then:

1) Check for 12 vdc at the battery in the control panel.

If 12 vdc is not indicated,

a) Check Fuse-1 10A

b) Check the power output of the Solar Panel

c) Replace the battery and Solar Panel as required.

If 12 vdc is indicated,

a) Check for 12 vdc to the spark module from the switch contact block.

If 12 vdc is not indicated,
(1) Turn off the control panel.

(2) Replace the igniter switch contact block.

If 12 vdc is indicated,

(1) Replace the Spark Module.

If the LED's are working then:

1) Verify correct gas supply to the igniter.

2) Replace the spark module.

If the above troubleshooting procedures have been performed but the ignitor will still not light:

1) Turn off the fuel gas supply.

   WARNING: Be certain that the flare is inactive, blind and purged with nitrogen until all hydrocarbon compounds are removed, before performing any work at the tip of the flare. Use respiration equipment as required.

2) Obtain access to the tip of the flare.

3) Disconnect the thermocouple wires, ignition coil wires and fuel gas supply from the igniter. Remove the u-bolts that attach the igniter to the flare and bring the igniter to grade.

4) Take the igniter to a safe working area. Using temporary piping and wiring, reconnect the thermocouple wires, ignition coil wires and fuel gas supply to the igniter.

5) Verify that the area is free of hydrocarbon gas using an LEL meter or similar hydrocarbon indicator.

6) Turn on the control panel.

7) Look in the center hole at the top of the igniter nozzle for a spark every 2 seconds.

If there is a spark,

a) Turn off the control panel.

b) Remove the gas hose from the flare.
c) Verify the flow of gas to the igniter nozzle and igniter ignition.

d) Re-mount the igniter as outlined in *Section V. C. TROUBLESHOOTING - Igniter Re-Mounting.*

If there is no spark,

a) Turn off the control panel.

b) Remove the high voltage junction box cover.

c) Remove the 7 mm high voltage cable.

d) Place and secure the 7 mm high voltage cable 1/8" from a known ground.

e) Turn on the control panel.

f) Check for a spark between the 7 mm high voltage cable and ground.

If there is a spark,

(1) Replace the spark plug as outlined in *Section V. B. TROUBLESHOOTING - Repairs.*

If there is no spark,

(1) Turn off the control panel.

(2) Replace the ignition coil assembly.

(3) Place and secure the 7 mm high voltage cable 1/8" from a known ground.

(4) Turn on the control panel.
(5) Check for a spark between the 7 mm high voltage cable and ground.

If there is a spark,

(a) Turn off the control panel.

(b) Completely reassemble the igniter.

(c) Re-mount the igniter as outlined in *Section V. C. TROUBLESHOOTING - Igniter Re-Mounting.*

If there is no spark,

(a) Turn off the control panel.

(b) Replace the wiring harness.

(c) Completely reassemble the igniter.

(d) Re-mount the igniter as outlined in *Section V. C. TROUBLESHOOTING - Igniter Re-Mounting*.

Igniter lights but thermocouple controller does not respond.

Check the following:

a. Verify that the red thermocouple wire (negative) is installed on TB1-8 and the yellow thermocouple wire (positive) is installed on TB1-9.

b. Refer to the thermocouple controller manual in *Section VI. DRAWINGS AND CUT SHEETS* to verify that the correct program is entered.

c. Turn off the control panel.

d. Disconnect the thermocouple wires from TB1-8 and TB1-9.

e. Using a spare thermocouple, connect the thermocouple to TB1-8 and TB1-9.

f. Turn on the control panel.

g. Check that the thermocouple controller reads ambient temperature.

If the thermocouple controller does not read ambient temperature then:

1) Replace the thermocouple controller.

2) Reprogram the new thermocouple controller using the data shown in *Section VI. DRAWINGS AND CUT SHEETS.*

If the thermocouple controller reads ambient temperature then:

1) Turn off the control panel.

2) Disconnect the spare thermocouple from TB1-8 and TB1-9.

3) Reconnect the existing thermocouple wires to TB1-8 and TB1-9.

4) Turn off the fuel gas supply.

WARNING: Be certain that the flare is inactive, blind and purged with nitrogen until all hydrocarbon compounds are removed, before performing any work at the tip of the flare. Use respiration equipment as required.

5) Obtain access to the tip of the flare.

6) Disconnect the thermocouple wires from the thermocouple on the igniter. Connect a spare thermocouple to the thermocouple wires.

7) Turn on the control panel.

8) Check that the thermocouple controller reads ambient temperature.

If the thermocouple controller does not read ambient temperature,

a) Turn off the control panel.

b) Disconnect main power from the control panel.

c) Replace the thermocouple wires from the thermocouple to the control panel.

d) Completely reassemble the igniter.

e) Re-start the igniter as outlined in *Section III. E. INSTALLATION - Start-Up Procedure.*

If the thermocouple controller reads ambient temperature,

a) Turn off the control panel.

b) Replace the thermocouple.

c) Completely reassemble the igniter.

d) Re-start the igniter as outlined in *Section III. E. INSTALLTION - Start-Up Procedure.*

B. Repairs

(Please refer to the Drawings
At the front of this manual DRAWINGS AND CUT SHEETS)

1. Spark Plug Replacement

   a. Turn off the igniter fuel gas supply.

   b. Turn off the control panel.

   c. Remove the 7 mm high voltage cable.

   d. Using a pair of needle nose pliers, pull back the high voltage tension spring and release it from the ¼" high voltage rod.

   e. Release the spring.

   f. Remove the igniter shield.

   g. Remove the igniter nozzle assembly.

   h. Unscrew the 1/16" high voltage cable from the spark plug.

   i. Using a standard 13/16" spark plug socket, remove the old spark plug.

   j. Grind a point on the electrode of the new spark plug.

   k. Install the new spark plug.

   l. Reconnect the 1/16" high voltage cable to the new spark plug.

   m. Reinstall the igniter nozzle assembly and igniter shield.

   n. Using a pair of needle nose pliers, pull back the high voltage tension spring.

   o. Reinstall it on the 1/4" high voltage rod.

   p. Turn on the control panel.

   Verify that there is a spark every 2 seconds.

   q. After the spark plug has been replaced and the igniter is working, re-mount the igniter as outlined in *Section V. C. TROUBLESHOOTING - Igniter Re-Mounting.*

C. Igniter Re-Mounting

WARNING: Be certain that the flare is inactive, blind and purged with nitrogen until all hydrocarbon compounds are removed, before performing any work at the tip of the flare. Use respiration equipment as required.

1. Turn off the fuel gas supply.

2. Turn off the control panel.

3. Disconnect all temporary piping and wiring.

4. Obtain access to the tip of the flare.

5. Attach the igniter to the flare, ensuring that the igniter shield is flush with the top of the flare.

6. Reconnect the thermocouple wires, ignition coil wires and fuel gas supply to the igniter.

7. Re-start the igniter as outlined in *Section III. E. INSTALLATION - Start-Up Procedure.*

B. Repairs

(Please refer to the Drawings
in Section VI. DRAWINGS AND CUT SHEETS)

1. Spark Plug Replacement

   a. Turn off the Pilot fuel gas supply.

   b. Turn off the pilot control panel.

   c. Remove the 7 mm high voltage cable.

   d. Remove the air inspirator.

   e. Using a pair of needle nose pliers, pull back the high voltage tension spring and release it from the ¼" high voltage rod.

   f. Release the spring.

   g. Remove the pilot shield.

   h. Remove the pilot nozzle assembly.

   i. Unscrew the 1/16" high voltage cable from the spark plug.

   j. Using a standard 13/16" spark plug socket, remove the old spark plug.

   k. Grind a point on the electrode of the new spark plug.

   l. Install the new spark plug.

   m. Reconnect the 1/16" high voltage cable to the new spark plug.

   n. Reinstall the pilot nozzle assembly and pilot shield.

   o. Using a pair of needle nose pliers, pull back the high voltage tension spring.

   p. Reinstall it on the 1/4" high voltage rod.

   q. Turn on the pilot control panel.

r. Verify that there is a spark every 2 seconds. This can be done by looking in the center hole at the top of the pilot nozzle.

s. After the spark plug has been replaced and the pilot is working, re-mount the pilot as outlined in *Section V. C. TROUBLESHOOTING - Pilot Re-Mounting.*

C. Pilot Re-Mounting

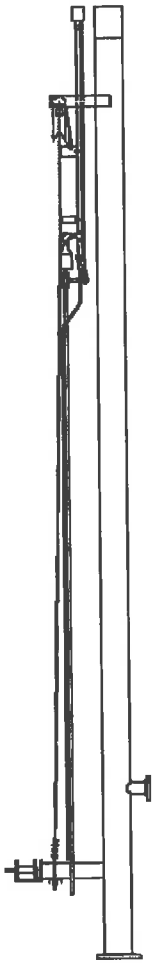
WARNING: Be certain that the flare is inactive, blind and purged with nitrogen until all hydrocarbon compounds are removed, before performing any work at the tip of the flare. Use respiration equipment as required.

1. Turn off the Pilot fuel gas supply.
2. Turn off the pilot control panel.
3. Disconnect all temporary piping and wiring.
4. Obtain access to the tip of the flare.
5. Attach the pilot to the flare, ensuring that the pilot shield is flush with the top of the flare.
6. Reconnect the thermocouple wires, ignition coil wires and fuel gas supply to the pilot.
7. Re-start the pilot as outlined in *Section III. E. INSTALLATION - Start-Up Procedure.*

HERO Flare
Quality flares that work every time.

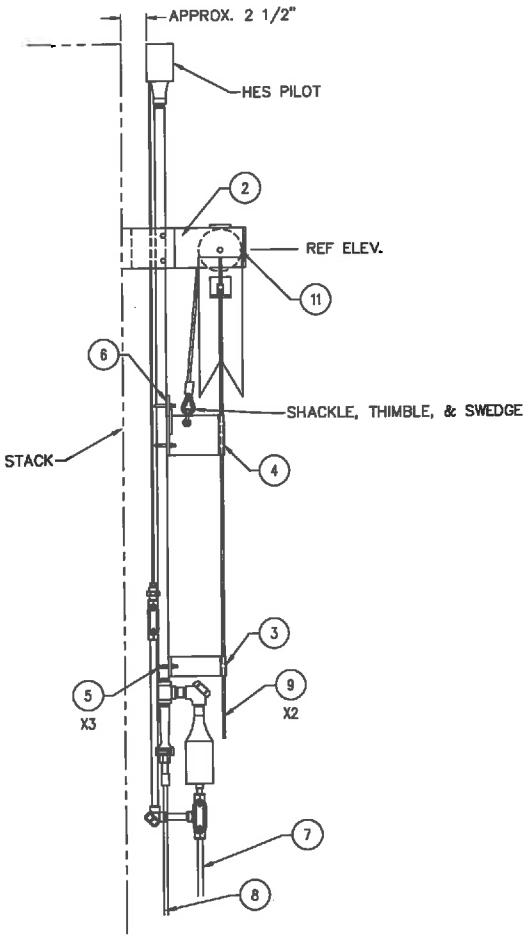
OPERATION AND INSTALLATION MANUAL

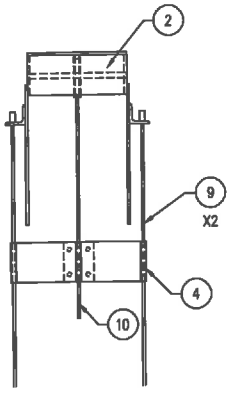
Retractable Pilot System



Rev 0 4/8/2013

ITEM#	QTY	DESCRIPTION (PER PILOT)
1	1	WINCH MOUNTING BRACKET
2	1	PILOT RECEIVER ASSEMBLY
3	1	BOTTOM PILOT CARRIAGE
4	1	TOP PILOT CARRIAGE
5	3	U-BOLT, 1"ø x 3/8"
6	1	STAB BRACKET
7	AR	FLEXIBLE CONDUIT, 3/4"
8	AR	FUELGAS, 3/8" SS FLEXHOSE
9	AR	GUIDE CABLE
10	AR	DRAW CABLE
11	1	PULLEY
12	1	MANUAL WINCH
13	AR	CLIPS FOR TUBING & CONDUIT





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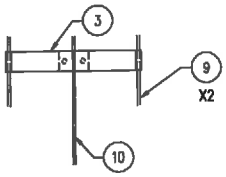
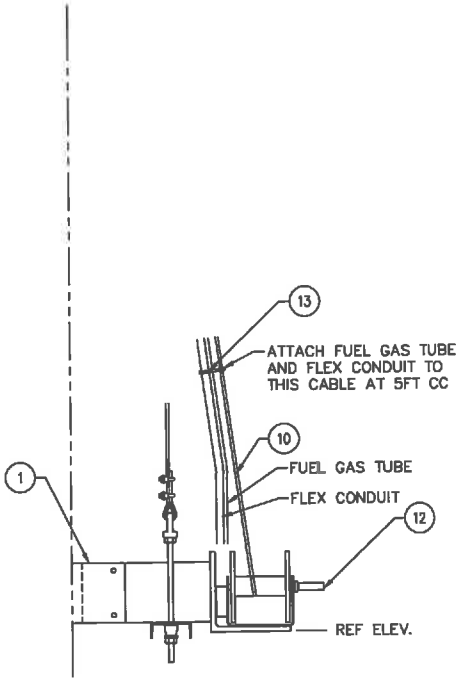
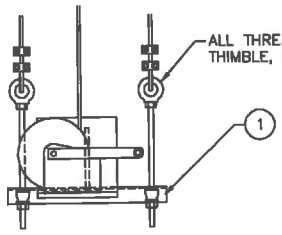






FRONT VIEW

Hero Flare
445 FM20, Bastrop, TX 78602
Tel: (512) 772-5744 www.heroflare.com

USER	
JOB SITE	
JOB	
DRAWN: NJ	APPR.
DATE: 4/24/13	DATE:

RS-1
RETRACTABLE SYSTEM FOR PILOT

JOB NO:	DWG. NO:	REV.
	RS-1 GA	S

Attachment N: Supporting Emissions Calculations

ATTACHMENT N
TABLE 1

FACILITY-WIDE POTENTIAL CRITERIA POLLUTANT EMISSIONS SUMMARY
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Emissions Source	Emission Point Identification	Criteria Pollutants [1]								Hazardous Air Pollutants [1]	
		NO_X		VOC		CO		PM		Total HAPS	
		(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
Production Unit Heater (1.50 MMBtu/hr)	E01 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Production Unit Heater (1.50 MMBtu/hr)	E02 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Production Unit Heater (1.50 MMBtu/hr)	E03 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Production Unit Heater (1.50 MMBtu/hr)	E04 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Production Unit Heater (1.50 MMBtu/hr)	E05 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Production Unit Heater (1.50 MMBtu/hr)	E06 [2]	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Condensate Heater (0.75 MMBtu/hr)	E07 [2]	0.07	0.32	0.01	0.02	0.06	0.27	0.01	0.02	0.002	0.01
Condensate Heater (0.75 MMBtu/hr)	E08 [2]	0.07	0.32	0.01	0.02	0.06	0.27	0.01	0.02	0.002	0.01
Gun Barrel Storage Tank (178-bbl)	E09 [3]	—	—	—	0.09	—	—	—	—	—	0.002
Gun Barrel Storage Tank (178-bbl)	E10 [3]	—	—	—	0.09	—	—	—	—	—	0.002
Condensate Storage Tank (210-bbl)	E11 [3]	—	—	—	0.01	—	—	—	—	—	0.001
Condensate Storage Tank (210-bbl)	E12 [3]	—	—	—	0.01	—	—	—	—	—	0.001
Condensate Storage Tank (210-bbl)	E13 [3]	—	—	—	0.01	—	—	—	—	—	0.001
Condensate Storage Tank (210-bbl)	E14 [3]	—	—	—	0.01	—	—	—	—	—	0.001
Produced Water Storage Tank (210-bbl)	E15 [3]	—	—	—	0.0004	—	—	—	—	—	0.001
Produced Water Storage Tank (210-bbl)	E16 [3]	—	—	—	0.0004	—	—	—	—	—	0.001
Produced Water Storage Tank (210-bbl)	E17 [3]	—	—	—	0.0004	—	—	—	—	—	0.001
Produced Water Storage Tank (210-bbl)	E18 [3]	—	—	—	0.0004	—	—	—	—	—	0.001
Hero Flare G30U4 (20.83 MMBtu/hr)	C01 [4]	1.42	6.20	0.09	0.40	6.48	28.28	0.02	0.08	0.0003	0.0003
Condensate Truck Loading	E19 [5]	—	—	52.47	0.30	—	—	—	—	1.34	0.01
Produced Water Truck Loading	E20 [6]	—	—	0.52	0.09	—	—	—	—	0.01	0.002
Fugitive VOC Emissions	E22 [7]	—	—	2.24	9.76	—	—	—	—	0.01	0.03
Unpaved Road Sources	E23 [8]	—	—	—	—	—	—	0.74	3.24	—	—
Total Facility Emissions		**2.46**	**10.68**	**55.40**	**11.05**	**7.30**	**32.06**	**0.84**	**3.66**	**1.39**	**0.14**

Notes:

1. Emissions of SO2 are assumed to be negligible since pipeline-quality natural gas is used as fuel. Refer to Table 2 for HAP emissions. Refer to Table 3 for GHG emissions.
2. Refer to Tables 4-11 for heater(s) potential emissions calculations.
3. Refer to Tables 12-13 for storage tank(s) potential emissions calculations.
4. Refer to Table 14 for flare(s) potential emissions calculations.
5. Refer to Table 15 for condensate truck loading potential emissions calculations.
6. Refer to Table 16 for produced water truck loading potential emissions calculations.
7. Refer to Tables 17-18 for process piping fugitives potential emissions calculations.
8. Refer to Table 19 for unpaved road sources potential emissions calculations.

ATTACHMENT N
TABLE 2

FACILITY-WIDE POTENTIAL HAP EMISSIONS SUMMARY
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Emissions Source	Emission Point Identification	Hazardous Air Pollutants [1]									
		Formaldehyde		n-Hexane		Benzene		Toluene		Total HAPS	
		(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
Production Unit Heater (1.50 MMBtu/hr)	E01 [2]	0.0001	0.001	0.003	0.01	0.0001	0.0001	0.0001	0.0001	0.003	0.01
Production Unit Heater (1.50 MMBtu/hr)	E02 [2]	0.0001	0.001	0.003	0.01	0.0001	0.0001	0.0001	0.0001	0.003	0.01
Production Unit Heater (1.50 MMBtu/hr)	E03 [2]	0.0001	0.001	0.003	0.01	0.0001	0.0001	0.0001	0.0001	0.003	0.01
Production Unit Heater (1.50 MMBtu/hr)	E04 [2]	0.0001	0.001	0.003	0.01	0.0001	0.0001	0.0001	0.0001	0.003	0.01
Production Unit Heater (1.50 MMBtu/hr)	E05 [2]	0.0001	0.001	0.003	0.01	0.0001	0.0001	0.0001	0.0001	0.003	0.01
Production Unit Heater (1.50 MMBtu/hr)	E06 [2]	0.0001	0.001	0.003	0.01	0.0001	0.0001	0.0001	0.0001	0.003	0.01
Condensate Heater (0.75 MMBtu/hr)	E07 [2]	0.0001	0.0002	0.001	0.01	0.0001	0.0001	0.0001	0.0001	0.002	0.01
Condensate Heater (0.75 MMBtu/hr)	E08 [2]	0.0001	0.0002	0.001	0.01	0.0001	0.0001	0.0001	0.0001	0.002	0.01
Gun Barrel Storage Tank (178-bbl)	E09 [3]	—	—	—	0.001	—	0.001	—	0.0002	—	0.002
Gun Barrel Storage Tank (178-bbl)	E10 [3]	—	—	—	0.001	—	0.001	—	0.0002	—	0.002
Condensate Storage Tank (210-bbl)	E11 [3]	—	—	—	0.0002	—	0.0001	—	0.0001	—	0.001
Condensate Storage Tank (210-bbl)	E12 [3]	—	—	—	0.0002	—	0.0001	—	0.0001	—	0.001
Condensate Storage Tank (210-bbl)	E13 [3]	—	—	—	0.0002	—	0.0001	—	0.0001	—	0.001
Condensate Storage Tank (210-bbl)	E14 [3]	—	—	—	0.0002	—	0.0001	—	0.0001	—	0.001
Produced Water Storage Tank (210-bbl)	E15 [3]	—	—	—	0.0001	—	0.0001	—	0.0001	—	0.001
Produced Water Storage Tank (210-bbl)	E16 [3]	—	—	—	0.0001	—	0.0001	—	0.0001	—	0.001
Produced Water Storage Tank (210-bbl)	E17 [3]	—	—	—	0.0001	—	0.0001	—	0.0001	—	0.001
Produced Water Storage Tank (210-bbl)	E18 [3]	—	—	—	0.0001	—	0.0001	—	0.0001	—	0.001
Hero Flare G30U4 (20.83 MMBtu/hr)	C01 [4]	—	—	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003	0.0003
Condensate Truck Loading	E19 [6]	—	—	0.72	0.004	0.49	0.003	0.13	0.001	1.34	0.01
Produced Water Truck Loading	E20 [6]	—	—	0.01	0.001	0.005	0.001	0.001	0.0002	0.01	0.002
Fugitive VOC Emissions	E22 [7]	—	—	0.01	0.02	0.001	0.005	0.001	0.005	0.01	0.03
Total Facility Emissions		**0.001**	**0.003**	**0.76**	**0.11**	**0.49**	**0.01**	**0.13**	**0.006**	**1.39**	**0.14**

Notes:

1 . To be convservative, emissions less than 0.0001 for each HAP were rounded up to 0.0001 lb/hr and 0.0001 TPY.
2 . Refer to Tables 4-11 for heater(s) potential emissions calculations.
3 . Refer to Tables 12-13 for storage tank(s) potential emissions calculations.
4 . Refer to Table 14 for flare(s) potential emissions calculations.
5 . Refer to Table 15 for condensate truck loading potential emissions calculations.
6 . Refer to Table 16 for produced water truck loading potential emissions calculations.
7 . Refer to Tables 17-18 for process piping fugitives potential emissions calculations.

ATTACHMENT N
TABLE 3

ESTIMATION OF FACILITY-WIDE GHG EMISSIONS
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

GHG Emission Source	Total GHG Emissions (m.t. CO_2e)	(tons CO_2e)
Natural Gas Combustion	4,835	5,385
Tanks	0.6	0.7
Fugitives	387	427
Flares/Combustors	4,673	5,152
Total Estimated Facility Emissions:	9,947	10,964

Conversion Factors		Global Warming Potential	
1.10231	ton/m.t.	CO_2	1
0.001	m.t./kg	CH_4	25
8,760	Hrs/yr	N_2O	298

CO_2 (mol %)	CH_4 (mol %)	C_2H_6 (mol %)	C_3H_8 (mol %)	C_4H_{10} (mol %)	C_5H_{12}+ (mol %)
0.09%	74.83%	16.78%	5.22%	1.86%	0.93%

Notes:
Carbon Dioxide Equivalent (CO_2e) emissions are calculated in the tables below by multiplying emissions by global warming potentials for each pollutant.
Emissions estimates converted to short tons in the tables below using conversion factor from 40 CFR 98 Subpart A.
Global Warming Potentials obtained from 40 CFR 98 Subpart A, Table A-1.
Mol % values obtained from the gas analysis from a representative facility.

Natural Gas & Diesel Combustion Emissions

Emissions Source	Emission Point Identification	Rated Horsepower	Capacity (MMBtu/hr)	BSFC (Btu/hp-hr)	Operation (hr/yr)	Emissions Factors [1] CO_2 (kg/MMBtu)	CH_4 (kg/MMBtu)	N_2O (kg/MMBtu)	Emissions (m.t.) CO_2	CH_4	N_2O	Emissions (m.t. CO_2e) CO_2	CH_4	N_2O	Total Emissions (m.t. CO_2e)	(tons CO_2e)
Production Unit Heater (1.50 MMBtu/hr)	E01	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.01	0.001	697.21	0.33	0.39	698	769
Production Unit Heater (1.50 MMBtu/hr)	E02	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.01	0.001	697.21	0.33	0.39	698	769
Production Unit Heater (1.50 MMBtu/hr)	E03	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.01	0.001	697.21	0.33	0.39	698	769
Production Unit Heater (1.50 MMBtu/hr)	E04	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.01	0.001	697.21	0.33	0.39	698	769
Production Unit Heater (1.50 MMBtu/hr)	E05	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.01	0.001	697.21	0.33	0.39	698	769
Production Unit Heater (1.50 MMBtu/hr)	E06	—	1.50	—	8,760	53.06	0.001	0.0001	697.21	0.01	0.001	697.21	0.33	0.39	698	769
Condensate Heater (0.75 MMBtu/hr)	E07	—	0.75	—	8,760	53.06	0.001	0.0001	348.60	0.01	0.001	348.60	0.16	0.20	349	385
Condensate Heater (0.75 MMBtu/hr)	E08	—	0.75	—	8,760	53.06	0.001	0.0001	348.60	0.01	0.001	348.60	0.16	0.20	349	385
														Total Natural Gas Combustion:	4,835	5,385

Notes:
1. Emission factors for GHG obtained from 40 CFR 98 Subpart C, Tables C-1 and C-2.

Tank Sources

Emissions Source	Emission Point Identification	Annual Condensate Production (bbl/yr)	Annual Condensate Production (1,000 gal/yr)	Default Liquid CH_4 Content [1] (mol %)	Actual VOC Gas/Oil Ratio (scf/bbl oil)	Emissions [2] CH_4 (m.t.)	Total Emissions (m.t. CO_2e)	(tons CO_2e)	Control Efficiency (%)	Total Controlled Emissions (m.t. CO_2e)	(tons CO_2e)
Gun Barrel Storage Tank (178-bbl)	E09	33,945	1,426	27.4	56.61	0.10	2.52	2.78	96%	0.05	0.06
Gun Barrel Storage Tank (178-bbl)	E10	33,945	1,426	27.4	56.61	0.10	2.52	2.78	96%	0.05	0.06
Condensate Storage Tank (210-bbl)	E11	548	23	27.4	56.61	0.16	4.06	4.48	98%	0.08	0.09
Condensate Storage Tank (210-bbl)	E12	548	23	27.4	56.61	0.16	4.06	4.48	98%	0.08	0.09
Condensate Storage Tank (210-bbl)	E13	548	23	27.4	56.61	0.16	4.06	4.48	98%	0.08	0.09
Condensate Storage Tank (210-bbl)	E14	548	23	27.4	56.61	0.16	4.06	4.48	98%	0.08	0.09
Produced Water Storage Tank (210-bbl)	E15	16,425	690	27.4	56.61	0.05	1.22	1.34	96%	0.02	0.03
Produced Water Storage Tank (210-bbl)	E16	16,425	690	27.4	56.61	0.05	1.22	1.34	96%	0.02	0.03
Produced Water Storage Tank (210-bbl)	E17	16,425	690	27.4	56.61	0.05	1.22	1.34	96%	0.02	0.03
Produced Water Storage Tank (210-bbl)	E18	16,425	690	27.4	56.61	0.05	1.22	1.34	96%	0.02	0.03
								Total Tanks:		0.52	0.58

Notes:
1. Default CH4 content for crude oil per API compendium Section 5.4 and Appendix B.
2. Emissions estimated using API Compendium, Section 5.4.

Loading Sources

Emissions Source	Emission Point Identification	Annual Production (bbl/yr)	Annual Production (1,000 gal/yr)	Default Liquid CH_4 Content [1] (mol %)	Emission Factor VOC (lb/1,000 gal)	Emissions VOC (tons)	VOC (m.t.)	Emissions [2] (m.t.) CH_4	Total Emissions (m.t. CO_2e)	(tons CO_2e)
Condensate Truck Loading	E19	2,100	92	27.4	5.56	0.30	0.27	0.07	0.07	0.08
Produced Water Truck Loading	E20	65,700	2,759	27.4	0.07	0.09	0.08	0.02	0.02	0.02
								Total Loading:	0.10	0.11

Notes:
1. Default CH_4 content for crude oil per API compendium Section 5.4 and Appendix B.
2. Emissions estimated using API Compendium, Section 5.5.

Fugitive Sources

Source Type/Service [1]	Number of Sources	Maximum Hours of Operation	CO_2 (mol %)	CH_4 (mol %)	Emission Factor CH_4 (m.t./hr/ component)	Emissions [2] CO_2 (m.t.)	CH_4 (m.t.)	Emissions CO_2 (m.t. CO_2e)	CH_4 (m.t. CO_2e)	Total Emissions (m.t. CO_2e)	(tons CO_2e)
Valves - Gas/Vapor	200	8,760	0.0009	0.7483	0.0000045	0.0188	5.90	0.0188	147.49	147.51	162.60
Flanges - Gas/Vapor	700	8,760	0.0009	0.7483	0.00000039	0.0057	1.79	0.0057	44.74	44.74	49.32
Connectors - Gas/Vapor	800	8,760	0.0009	0.7483	0.0000002	0.003	1.05	0.00	26.22	26.22	28.91
Relief Valves - Gas/Vapor	20	8,760	0.0009	0.7483	0.000017	0.0071	2.23	0.0071	55.72	55.73	61.43
Valves - Light Liquid	200	8,760	0.0009	0.7483	0.0000025	0.0104	3.28	0.0104	81.94	81.95	90.33
Flanges - Light Liquid	25	8,760	0.0009	0.7483	0.00000011	0.00006	0.02	0.00006	0.45	0.45	0.50
Connectors - Light Liquid	600	8,760	0.0009	0.7483	0.00000021	0.002	0.69	0.002	17.21	17.21	18.97
Relief Valves - Light Liquid	15	8,760	0.0009	0.7483	0.00000639	0.0017	0.53	0.0017	13.26	13.26	14.61
									Total Fugitives:	387	427

Notes:
1. Number of each component and type of service estimated based on a similar station.
2. Emission estimated using API Compendium, Section 6.0, Tables 6-12 and 6-21.

Flares/Combustors

Emissions Source	Emission Point Identification	Burner Rating (MMBtu/hr)	Annual Gas Usage [1] (scf/yr)	CO_2 (mol %)	CH_4 (mol %)	Emission Factor N_2O (m.t./MMscf)	Emissions [2] CO_2 (m.t.)	CH_4 (m.t.)	N_2O (m.t.)	Emissions CO_2 (m.t. CO_2e)	CH_4 (m.t. CO_2e)	N_2O (m.t. CO_2e)	Total Emissions (m.t. CO_2e)	(tons CO_2e)
Hero Flare G30U4 (20.83 MMBtu/hr)	CD1	20.8	60,380,807	0.0009	0.7483	6.90E-07	4,241	17	0.00004	4,241	432	0.011	4,673	5,152
												Total Flare Emissions:	4,673	5,152

Notes:
1. Annual gas usage calculated using the gas heating value of 3,022 Btu/scf.
2. Emissions estimated using API Compendium, Section 4.6 for Flare Emissions.

ATTACHMENT N
TABLE 4

POTENTIAL EMISSIONS SUMMARY
PRODUCTION UNIT HEATER (E01)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Pollutant [1]	Emission Factors [2] (lb/MMSCF)	Potential Emission Rates [3]	
		(lb/hr)	(T/yr)
NO_X	100.0	0.15	0.64
VOC	5.5	0.01	0.04
CO	84.0	0.12	0.54
PM	7.6	0.01	0.05
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0005
n-Hexane	1.8	0.003	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 1.50 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

ATTACHMENT N
TABLE 5

POTENTIAL EMISSIONS SUMMARY
PRODUCTION UNIT HEATER (E02)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Pollutant [1]	Emission Factors [2] (lb/MMSCF)	Potential Emission Rates [3]	
		(lb/hr)	(T/yr)
NO_X	100.0	0.15	0.64
VOC	5.5	0.01	0.04
CO	84.0	0.12	0.54
PM	7.6	0.01	0.05
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0005
n-Hexane	1.8	0.003	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 1.50 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

ATTACHMENT N
TABLE 6

POTENTIAL EMISSIONS SUMMARY
PRODUCTION UNIT HEATER (E03)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Pollutant [1]	Emission Factors [2] (lb/MMSCF)	Potential Emission Rates [3]	
		(lb/hr)	(T/yr)
NO_X	100.0	0.15	0.64
VOC	5.5	0.01	0.04
CO	84.0	0.12	0.54
PM	7.6	0.01	0.05
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0005
n-Hexane	1.8	0.003	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 1.50 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

ATTACHMENT N
TABLE 7

POTENTIAL EMISSIONS SUMMARY
PRODUCTION UNIT HEATER (E04)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Pollutant [1]	Emission Factors [2] (lb/MMSCF)	Potential Emission Rates [3]	
		(lb/hr)	(T/yr)
NO_X	100.0	0.15	0.64
VOC	5.5	0.01	0.04
CO	84.0	0.12	0.54
PM	7.6	0.01	0.05
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0005
n-Hexane	1.8	0.003	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 1.50 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

ATTACHMENT N
TABLE 8

POTENTIAL EMISSIONS SUMMARY
PRODUCTION UNIT HEATER (E05)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Pollutant [1]	Emission Factors [2] (lb/MMSCF)	Potential Emission Rates [3]	
		(lb/hr)	(T/yr)
NO_X	100.0	0.15	0.64
VOC	5.5	0.01	0.04
CO	84.0	0.12	0.54
PM	7.6	0.01	0.05
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0005
n-Hexane	1.8	0.003	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 1.50 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

ATTACHMENT N
TABLE 9

POTENTIAL EMISSIONS SUMMARY
PRODUCTION UNIT HEATER (E06)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Pollutant [1]	Emission Factors [2] (lb/MMSCF)	Potential Emission Rates [3]	
		(lb/hr)	(T/yr)
NO_X	100.0	0.15	0.64
VOC	5.5	0.01	0.04
CO	84.0	0.12	0.54
PM	7.6	0.01	0.05
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0005
n-Hexane	1.8	0.003	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 1.50 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

ATTACHMENT N
TABLE 10

POTENTIAL EMISSIONS SUMMARY
CONDENSATE HEATER (E07)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Pollutant [1]	Emission Factors [2] (lb/MMSCF)	Potential Emission Rates [3]	
		(lb/hr)	(T/yr)
NO_X	100.0	0.07	0.32
VOC	5.5	0.004	0.02
CO	84.0	0.06	0.27
PM	7.6	0.01	0.02
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0002
n-Hexane	1.8	0.001	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 0.75 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

ATTACHMENT N
TABLE 11

POTENTIAL EMISSIONS SUMMARY
CONDENSATE HEATER (E08)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Pollutant [1]	Emission Factors [2] (lb/MMSCF)	Potential Emission Rates [3]	
		(lb/hr)	(T/yr)
NO_X	100.0	0.07	0.32
VOC	5.5	0.004	0.02
CO	84.0	0.06	0.27
PM	7.6	0.01	0.02
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0002
n-Hexane	1.8	0.001	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 0.75 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

ATTACHMENT N
TABLE 12

POTENTIAL EMISSIONS SUMMARY
CONDENSATE AND PRODUCED WATER STORAGE TANKS
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Source	Source ID	Annual Throughput (gallons/year)	Tank Capacity (gallons)	Potential VOC Emissions [1]					Potential HAP Emissions		
				Annual Breathing Losses [2] (lbs)	Annual Working Losses [2] (lbs)	Annual Flash Losses [3] (T/yr)	Flare Capture Efficiency [4] (%)	Total Annual Emissions [5] (T/yr)	Benzene Emissions [6] (T/yr)	Toluene Emissions [6] (T/yr)	n-Hexane Emissions [6] (T/yr)
Gun Barrel Storage Tank (178-bbl)	E09	1,425,690	7,476	525.48	659.76	3.89	98%	0.09	0.001	0.0002	0.001
Gun Barrel Storage Tank (178-bbl)	E10	1,425,690	7,476	525.48	659.76	3.89	98%	0.09	0.001	0.0002	0.001
Condensate Storage Tank (210-bbl)	E11	22,995	8,820	1,143.65	211.51	—	98%	0.01	0.0001	<0.0001	0.0002
Condensate Storage Tank (210-bbl)	E12	22,995	8,820	1,143.65	211.51	—	98%	0.01	0.0001	<0.0001	0.0002
Condensate Storage Tank (210-bbl)	E13	22,995	8,820	1,143.65	211.51	—	98%	0.01	0.0001	<0.0001	0.0002
Condensate Storage Tank (210-bbl)	E14	22,995	8,820	1,143.65	211.51	—	98%	0.01	0.0001	<0.0001	0.0002
Produced Water Storage Tank (210-bbl)	E15	689,850	8,820	1,143.65	3,327.26	—	98%	0.0004	<0.0001	<0.0001	<0.0001
Produced Water Storage Tank (210-bbl)	E16	689,850	8,820	1,143.65	3,327.26	—	98%	0.0004	<0.0001	<0.0001	<0.0001
Produced Water Storage Tank (210-bbl)	E17	689,850	8,820	1,143.65	3,327.26	—	98%	0.0004	<0.0001	<0.0001	<0.0001
Produced Water Storage Tank (210-bbl)	E18	689,850	8,820	1,143.65	3,327.26	—	98%	0.0004	<0.0001	<0.0001	<0.0001

Notes:

1. Based on the following maximum annual throughput values:

   Condensate = 2,190-bbls/yr
   Produced Water = 65,700-bbls/yr

2. Annual breathing and working losses were determined using AP-42 Section 7 (11/06).
3. Annual flash losses were based on Promax simulation method. A copy of the Promax output file is available upon request. Throughput is initially routed through gunbarrels. Therefore all flashing occurs at the gunbarrel tanks.
4. Breathing, working, and flash emissions from the gunbarrels and breathing and working emissions from the storage tanks are routed to a flare, which has a capture efficiency of 98%. Refer to Table 14 for enclosed combustor emissions calculations.
5. To be conservative, breathing, working, and flash losses for produced water were calculated using condensate, assuming 1% is emitted.

   Total Annual Emissions (T/yr) = [((Breathing Losses (lbs) + Working Losses (lbs)) / 2000) + Flash Losses (T/yr)] x [1 - Hero Flare G30U4 Capture Efficiency (%)]
   Total Annual Emissions (T/yr) = [((Breathing Losses (lbs) + Working Losses (lbs)) / 2000)] x [1 - Hero Flare G30U4 Capture Efficiency (%)]
   Total Annual Emissions (T/yr) = [((Breathing Losses (lbs) + Working Losses (lbs)) / 2000)] x [1 - Hero Flare G30U4 Capture Efficiency (%)] x 1%

6. Estimated HAP Composition (% by Weight) from Promax.

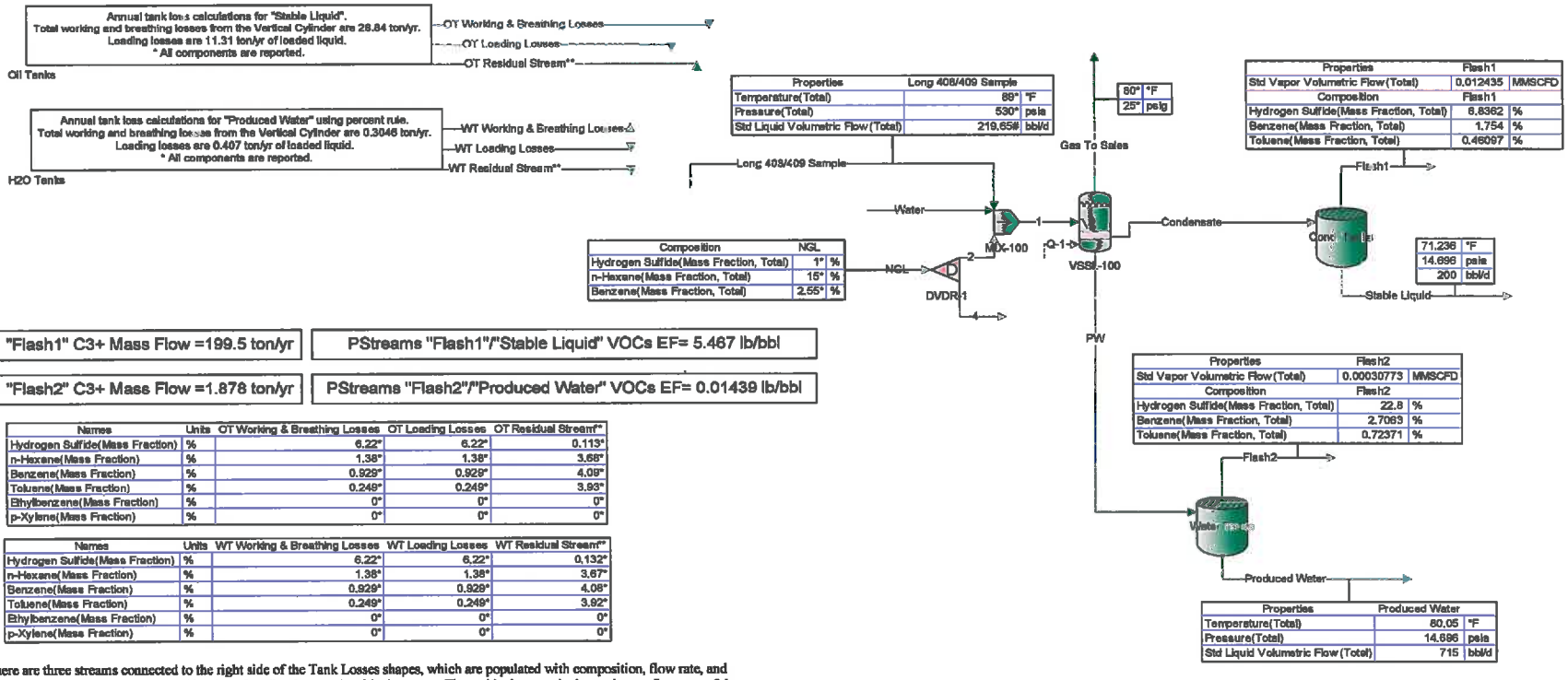
   Benzene = 0.929%
   Toluene = 0.249%
   n-Hexane = 1.380%

ATTACHMENT N
TABLE 13

POTENTIAL EMISSIONS SUMMARY
AP-42 SECTION 7 (EPA TANKS 4.0.9d) FIXED-ROOF TANK EMISSIONS
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Tank Identification	Hoyt 401, E09-E10	Hoyt 401, E11-E14	Hoyt 401, E15-E18
Actual Location	WV	WV	WV
Location for Calculation Purposes	Charleston, West Virginia	Charleston, West Virginia	Charleston, West Virginia
Contents of Tank	Gasoline (RVP 11)	Gasoline (RVP 11)	Gasoline (RVP 11)
Tank/Roof Type	Dome	Dome	Dome
Underground?	Aboveground	Aboveground	Aboveground
Diameter, ft	8.0	10.0	10.0
Shell Height or Length, ft	20.0	15.0	15.0
Nominal Capacity, gal	7,476	8,820	8,820
Throughput, gallons/yr	71,728	22,995	689,850
Tank Paint Color	Gray/Light	Gray/Light	Gray/Light
Tank Paint Condition	Good	Good	Good
Effective Diameter, ft	8.0	10.0	10.0
Geometric Capacity, gal	7,144	8,225	8,225
Maximum Liquid Height, ft	19.0	14.0	14.0
Average Liquid Height, ft	18	11	11
Cone Tank Roof Slope, ft/ft	0.0625	0.0625	0.0625
Dome Tank Roof Radius, ft	8.00	10.00	10.00
Dome Tank Roof Height, ft	1.072	1.340	1.340
Roof Outage, ft	0.549	0.686	0.686
Vapor Space Outage, ft	2.55	5.19	5.19
Vapor Space Volume, ft^3	128	407	407
Average Daily Minimum Ambient Temperature, F	44.22	44.22	44.22
Average Daily Maximum Ambient Temperature, F	65.75	65.75	65.75
Daily Total Solar Insolation Factor, Btu/ft^2/day	1251	1251	1251
Daily Average Ambient Temperature, F	55.0	55.0	55.0
Tank Paint Solar Absorbance, dimensionless	0.540	0.540	0.540
Daily Vapor Temperature Range, R	34.4	34.4	34.4
Daily Average Liquid Surf. Temperature, F	61.6	61.6	61.6
Daily Minimum Liquid Surf. Temperature, F	53.0	53.0	53.0
Daily Maximum Liquid Surf. Temperature, F	70.2	70.2	70.2
Liquid Bulk Temperature	57.22	57.22	57.22
Vapor Molecular Weight, lb/lbmol	65.0	65.0	65.0
Antoine's Coefficient A	N/A	N/A	N/A
Antoine's Coefficient B	N/A	N/A	N/A
Antoine's Coefficient C	N/A	N/A	N/A
Type of Substance (for use in calculations)	Gas	Gas	Gas
Vapor Pressure at Daily Av. Liquid Surf. Temp., psia	5.943	5.943	5.943
Vapor Pressure at Daily Min. Liquid Surf. Temp., psia	5.032	5.032	5.032
Vapor Pressure at Daily Max. Liquid Surf. Temp., psia	6.981	6.981	6.981
Vapor Pressure Calculation Method	AP-42 Figure 7.1-14b: RVP=11 ASTM Slope=3	AP-42 Figure 7.1-14b: RVP=11 ASTM Slope=3	AP-42 Figure 7.1-14b: RVP=11 ASTM Slope=3
Vapor Density, lb/ft^3	0.069067	0.069067	0.069067
Daily Vapor Pressure range, psi	1.949	1.949	1.949
Breather Vent Pressure Setting, psig	0.0300	0.0300	0.0300
Breather Vent Vacuum Setting, psig	-0.0300	-0.0300	-0.0300
Breather Vent Pressure Setting Range, psi	0.0600	0.0600	0.0600
Ambient Pressure, psia	14.3	14.3	14.3
Vapor Space Expansion Factor	0.2933	0.2933	0.2933
Vented Vapor Saturation Factor	0.555	0.380	0.380
Annual Turnovers	10.04	2.80	83.87
Turnover Factor	1.00	1.00	0.52
Working Loss Product Factor	1.00	1.00	1.00
Standing Storage Loss, lb/yr	525.47964	1143.65074	1143.65074
Working Loss, lb/yr	659.76229	211.51107	3327.26074
Total Losses, lb/yr	1185.24192	1355.16181	4470.91149
Standing Storage Loss, TPY	0.26274	0.57183	0.57183
Working Loss, TPY	0.32988	0.10576	1.66383
Total Losses, TPY	0.59262	0.67758	2.23546

Based on AP-42, February 1996, Section 7.1.3.1.



Names	Units	OT Working & Breathing Losses	OT Loading Losses	OT Residual Stream**
Hydrogen Sulfide(Mass Fraction)	%	6.22*	6.22*	0.113*
n-Hexane(Mass Fraction)	%	1.38*	1.38*	3.66*
Benzene(Mass Fraction)	%	0.929*	0.929*	4.09*
Toluene(Mass Fraction)	%	0.249*	0.249*	3.93*
Ethylbenzene(Mass Fraction)	%	0*	0*	0*
p-Xylene(Mass Fraction)	%	0*	0*	0*

Names	Units	WT Working & Breathing Losses	WT Loading Losses	WT Residual Stream**
Hydrogen Sulfide(Mass Fraction)	%	6.22*	6.22*	0.132*
n-Hexane(Mass Fraction)	%	1.38*	1.38*	3.67*
Benzene(Mass Fraction)	%	0.929*	0.929*	4.08*
Toluene(Mass Fraction)	%	0.249*	0.249*	3.92*
Ethylbenzene(Mass Fraction)	%	0*	0*	0*
p-Xylene(Mass Fraction)	%	0*	0*	0*

**There are three streams connected to the right side of the Tank Losses shapes, which are populated with composition, flow rate, and temperature of the Working and Breathing loss, Loading loss, and residual streams. The residual stream is the total mass flow rate of the designated stream less the Working and Breathing Losses. Since these streams are set to be saturated vapor, the pressure may be different from the pressure specified in the shape in order to achieve the saturated condition.

February 3, 2015

FESCO, Ltd.
1100 FESCO Avenue - Alice, Texas 78332

For: American Energy Utica
301 N W 63rd, Suite 600
Oklahoma City, Oklahoma 73116

Sample: Long Well Pad
Stabilizer Outlet Hydrocarbon Liquid
Sampled @ 40 psig & 110 °F

Date Sampled: 01/16/15 Job Number: 51315.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.020	0.005	0.006
Carbon Dioxide	0.000	0.000	0.000
Methane	0.075	0.029	0.012
Ethane	1.315	0.808	0.412
Propane	5.171	3.272	2.377
Isobutane	2.774	2.085	1.681
n-Butane	8.392	6.077	5.085
2,2 Dimethylpropane	0.131	0.115	0.098
Isopentane	6.489	5.451	4.880
n-Pentane	7.635	6.357	5.742
2,2 Dimethylbutane	0.485	0.465	0.436
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.683	0.643	0.614
2 Methylpentane	4.644	4.428	4.172
3 Methylpentane	3.071	2.880	2.759
n-Hexane	6.732	6.358	6.047
Heptanes Plus	52.384	61.028	65.678
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

Specific Gravity	0.7514	(Water=1)
°API Gravity	56.81	@ 60°F
Molecular Weight	120.3	
Vapor Volume	19.83	CF/Gal
Weight	6.26	Lbs/Gal

Characteristics of Total Sample:

Specific Gravity	0.6982	(Water=1)
°API Gravity	71.16	@ 60°F
Molecular Weight	95.9	
Vapor Volume	23.10	CF/Gal
Weight	5.82	Lbs/Gal

Base Conditions: 14.850 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: XG
Processor: XGdjv
Cylinder ID: W-754

David Dannhaus 361-661-7015

FESCO, Ltd.

TANKS DATA INPUT REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.000	0.000	0.000
Nitrogen	0.020	0.005	0.006
Methane	0.075	0.029	0.012
Ethane	1.315	0.808	0.412
Propane	5.171	3.272	2.377
Isobutane	2.774	2.085	1.681
n-Butane	8.522	6.192	5.183
Isopentane	6.489	5.451	4.880
n-Pentane	7.635	6.357	5.742
Other C-6's	8.884	8.416	7.981
Heptanes	15.467	15.774	15.786
Octanes	14.680	15.704	16.587
Nonanes	5.766	7.129	7.621
Decanes Plus	13.158	19.613	22.164
Benzene	0.126	0.081	0.103
Toluene	0.742	0.571	0.713
E-Benzene	0.701	0.621	0.775
Xylenes	1.743	1.535	1.929
n-Hexane	6.732	6.358	6.047
2,2,4 Trimethylpentane	0.000	0.000	0.000
Totals:	100.000	100.000	100.000

Characteristics of Total Sample:

Specific Gravity	0.6982	(Water=1)
°API Gravity	71.16	@ 60°F
Molecular Weight	95.9	
Vapor Volume	23.10	CF/Gal
Weight	5.82	Lbs/Gal

Characteristics of Decanes (C10) Plus:

Specific Gravity	0.7890	(Water=1)
Molecular Weight	161.6	

Characteristics of Atmospheric Sample:

°API Gravity	68.22	@ 60°F
Reid Vapor Pressure (ASTM D-5191)	10.85	psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
		W-754*	W-1106
Cylinder Number	-----	10	8
Pressure, PSIG	40	70	70
Temperature, °F	110		

* Sample used for analysis

FESCO, Ltd.

TOTAL EXTENDED REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.020	0.005	0.006
Carbon Dioxide	0.000	0.000	0.000
Methane	0.075	0.029	0.012
Ethane	1.315	0.808	0.412
Propane	5.171	3.272	2.377
Isobutane	2.774	2.085	1.681
n-Butane	8.392	6.077	5.085
2,2 Dimethylpropane	0.131	0.115	0.098
Isopentane	6.489	5.451	4.880
n-Pentane	7.635	6.357	5.742
2,2 Dimethylbutane	0.485	0.465	0.436
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.683	0.643	0.614
2 Methylpentane	4.644	4.428	4.172
3 Methylpentane	3.071	2.880	2.759
n-Hexane	6.732	6.358	6.047
Methylcyclopentane	1.100	0.894	0.965
Benzene	0.126	0.081	0.103
Cyclohexane	1.013	0.792	0.889
2-Methylhexane	3.856	4.118	4.028
3-Methylhexane	3.208	3.383	3.351
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	1.588	1.605	1.642
n-Heptane	4.702	4.982	4.911
Methylcyclohexane	3.161	2.919	3.236
Toluene	0.742	0.571	0.713
Other C-8's	8.728	9.501	10.028
n-Octane	2.791	3.284	3.323
E-Benzene	0.701	0.621	0.775
M & P Xylenes	0.730	0.651	0.808
O-Xylene	1.012	0.884	1.121
Other C-9's	4.237	5.152	5.576
n-Nonane	1.529	1.977	2.045
Other C-10's	3.823	5.109	5.631
n-decane	0.849	1.196	1.259
Undecanes(11)	3.012	4.129	4.615
Dodecanes(12)	1.945	2.881	3.265
Tridecanes(13)	1.291	2.049	2.355
Tetradecanes(14)	0.842	1.432	1.668
Pentadecanes(15)	0.603	1.098	1.294
Hexadecanes(16)	0.314	0.611	0.727
Heptadecanes(17)	0.202	0.416	0.499
Octadecanes(18)	0.094	0.205	0.247
Nonadecanes(19)	0.063	0.142	0.172
Eicosanes(20)	0.019	0.045	0.055
Heneicosanes(21)	0.007	0.017	0.021
Docosanes(22)	0.009	0.024	0.030
Tricosanes(23)	0.020	0.053	0.065
Tetracosanes(24)	0.006	0.017	0.022
Pentacosanes(25)	0.013	0.037	0.046
Hexacosanes(26)	0.010	0.029	0.037
Heptacosanes(27)	0.009	0.027	0.034
Octacosanes(28)	0.008	0.025	0.032
Nonacosanes(29)	0.008	0.025	0.032
Triacontanes(30)	0.006	0.022	0.028
Hentriacontanes Plus(31+)	0.006	0.024	0.031
Total	100.000	100.000	100.000

February 3, 2015

FESCO, Ltd.
1100 Fesco Avenue - Alice, Texas 78332

For: American Energy Utica
301 N W 63rd, Suite 600
Oklahoma City, Oklahoma 73116

Date Sampled: 01/16/15

Date Analyzed: 01/28/15

Sample: Long Well Pad

Job Number: J51315

FLASH LIBERATION OF HYDROCARBON LIQUID		
	Separator HC Liquid	Stock Tank
Pressure, psig	40	0
Temperature, °F	110	70
Gas Oil Ratio (1)	-----	62.0
Gas Specific Gravity (2)	-----	1.894
Separator Volume Factor (3)	1.0816	1.000

STOCK TANK FLUID PROPERTIES	
Shrinkage Recovery Factor (4)	0.9245
Oil API Gravity at 60 °F	68.22
Reid Vapor Pressure, psi (5)	10.85

Quality Control Check			
	Sampling Conditions	Test Samples	
Cylinder No.	------	W-754*	W-1106
Pressure, psig	40	10	8
Temperature, °F	110	70	70

(1) - Scf of flashed vapor per barrel of stock tank oil
(2) - Air = 1.000
(3) - Separator volume / Stock tank volume
(4) - Fraction of first stage separator liquid
(5) - Absolute pressure at 100 deg F
Analyst E.F.
* Sample used for flash study
Base Conditions: 14.65 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

David Dannhaus 361-661-7015

February 2 , 2015

FESCO, Ltd.
1100 Fesco Ave. - Alice, Texas 78332

For: American Energy Utica
301 N W 63rd, Suite 600
Oklahoma City, Oklahoma 73116

Sample: Long Well Pad
Gas Evolved from Hydrocarbon Liquid Flashed
From 40 psig & 110 °F to 0 psig & 70 °F

Date Sampled: 01/16/15 Job Number: 51315.001

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.077	
Carbon Dioxide	0.035	
Methane	1.088	
Ethane	14.858	3.951
Propane	32.416	8.880
Isobutane	9.381	3.052
n-Butane	20.807	6.522
2-2 Dimethylpropane	0.272	0.103
Isopentane	7.189	2.614
n-Pentane	6.242	2.250
Hexanes	5.080	2.082
Heptanes Plus	2.555	1.107
Totals	100.000	30.562

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.558	(Air=1)
Molecular Weight	100.19	
Gross Heating Value	5304	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.894	(Air=1)
Compressibility (Z)	0.9723	
Molecular Weight	53.34	
Gross Heating Value		
Dry Basis	3075	BTU/CF
Saturated Basis	3022	BTU/CF

*Hydrogen Sulfide tested in laboratory by: Stain Tube Method (GPA 2377)
Results: <0.013 Gr/100 CF, <0.2 PPMV or <0.001 Mol %

Base Conditions: 14.650 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: MR
Processor: AL
Cylinder ID: FL# 6 S

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.077		0.040
Carbon Dioxide	0.035		0.029
Methane	1.088		0.328
Ethane	14.858	3.951	8.375
Propane	32.416	8.880	26.796
Isobutane	9.381	3.052	10.221
n-Butane	20.807	6.522	22.671
2,2 Dimethylpropane	0.272	0.103	0.368
Isopentane	7.189	2.614	9.723
n-Pentane	6.242	2.250	8.443
2,2 Dimethylbutane	0.265	0.110	0.428
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.346	0.141	0.559
2 Methylpentane	1.672	0.690	2.701
3 Methylpentane	1.010	0.410	1.632
n-Hexane	1.787	0.731	2.887
Methylcyclopentane	0.137	0.047	0.216
Benzene	0.033	0.009	0.048
Cyclohexane	0.173	0.059	0.273
2-Methylhexane	0.344	0.159	0.646
3-Methylhexane	0.339	0.154	0.637
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.372	0.161	0.692
n-Heptane	0.370	0.170	0.695
Methylcyclohexane	0.259	0.104	0.477
Toluene	0.052	0.017	0.090
Other C8's	0.302	0.140	0.624
n-Octane	0.062	0.032	0.133
Ethylbenzene	0.002	0.001	0.004
M & P Xylenes	0.017	0.007	0.034
O-Xylene	0.002	0.001	0.004
Other C9's	0.054	0.027	0.128
n-Nonane	0.008	0.004	0.019
Other C10's	0.010	0.006	0.026
n-Decane	0.006	0.004	0.016
Undecanes (11)	0.013	0.008	0.037
Totals	100.000	30.562	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.894	(Air=1)
Compressibility (Z)	0.9723	
Molecular Weight	53.34	
Gross Heating Value		
Dry Basis	3075	BTU/CF
Saturated Basis	3022	BTU/CF

ATTACHMENT N
TABLE 14

POTENTIAL EMISSIONS SUMMARY
HERO FLARE G30U4 (C01)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Pollutant	Emission Factors [1] (lb/MMBtu)	Potential Tank Losses [2]		Combustor Destruction Efficiency (%)	Total Potential Emission Rates [3]	
		(lb/hr)	(T/yr)		(lb/hr)	(T/yr)
NO_X	0.068	---	---	---	1.42	6.20
CO	0.310	---	---	---	6.46	28.28
PM [4]	7.60	---	---	---	0.02	0.08
VOC	---	4.61	20.21	98%	0.09	0.40
Benzene	---	0.0005	0.002	98%	0.00001	0.00004
Toluene	---	0.0001	0.0004	98%	0.000002	0.00001
n-Hexane	---	0.001	0.003	98%	0.00001	0.0001

Notes:

1. Emission factors for NOx and CO obtained from AP-42 Table 13.5-1 (4/15) for industrial flares.
2. Potential tank emissions are estimated based on the breathing, working, and flash losses from the storage tank(s) and a 98% capture efficiency at the flare (refer to Table 12).
3. Potential emissions for NOx and CO are based on AP-42 emission factors, an estimated heat value of 20.83 MMBtu/hr, and 8,760 hours of operation per year.
   Potential emissions for VOC are based on a 98% capture efficiency from the storage tank(s), a 98% destruction efficiency from the flare, and 8,760 hrs of operation per year.
4. lb/MMscf: Criteria Pollutant Emission Factors obtained from AP-42 Nat Gas Combustion, Table 1.4-1, (7/98) < 100 MMBtu/hr heat input; & Table 1.4-2, (7/98).
5. Flare Tip Velocity (ft/sec) = (Flare Volume (CFD) x 1 day/24 hr x 1 hr/60 min x 1 min/60 sec)) / (3.1416 x (Flare Diameter (ft)2 /4))

GOR	56.61	scf/bbl
Flare Volume	442	CFD
Flare Diameter	0.33	ft
Flare Tip Velocity	0.06	ft/sec

ATTACHMENT N
TABLE 15

POTENTIAL EMISSIONS SUMMARY
CONDENSATE TRUCK LOADING (E19)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Material Name	Constituent	Saturation Factor [1] (S)	True Vapor Pressure (P)	MW of Vapors (M) (lb/lb-mole)	Temp of Loaded Liquid (°F)	Emission Factor [1] (lb VOC/10^3 gal)	Maximum Hourly Throughput [2] (gals)	Annual Throughput [3] (gals)	Uncontrolled VOC Emissions	
									Hourly Emissions [4] (lb/hr)	Annual Emissions [5] (T/yr)
Condensate	VOC	0.6	6.98	65.00	57.22	6.559	8,000	91,980	52.47	0.30

Notes:

1. Per AP-42, 5th Edition (6/08), Section 5.2, Equation 1

$$Emission\ Factor\left(\frac{lb\ VOC}{10^3 gal}\right) = \left(\frac{S \times P \times M}{°F + 460}\right) \times 12.46$$

2. Maximum hourly throughput is the amount of condensate loaded out from the storage tank(s).
3. Annual Throughput is the amount of condensate loaded out from the storage tank(s).
4. Uncontrolled Hourly Emissions = Hourly Throughput / 1000 x Emission Factor
5. Uncontrolled Annual Emissions = Annual Throughput / 1000 x Emission Factor / 2000 lb/T

Estimated HAP Composition (% by Weight)**

		Uncontrolled Emissions	
Pollutant	**Wt%**	**(lb/hr)**	**(tpy)**
Benzene	0.929%	0.49	0.003
Toluene	0.249%	0.13	0.001
n-Hexane	1.380%	0.72	0.004
Total HAPs	**2.558%**	**1.34**	**0.01**

** Estimated HAP Composition based on Promax.

ATTACHMENT N
TABLE 16

POTENTIAL EMISSIONS SUMMARY
PRODUCED WATER TRUCK LOADING (E20)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Material Name	Constituent	Saturation Factor [1] (S)	True Vapor Pressure (P)	MW of Vapors (M) (lb/lb-mole)	Temp of Loaded Liquid (°F)	Emission Factor [1] (lb VOC/10^3 gal)	Maximum Hourly Throughput [2] (gals)	Annual Throughput [3] (gals)	Uncontrolled VOC Emissions	
									Hourly Emissions [4] (lb/hr)	Annual Emissions [5] (T/yr)
Condensate [6]	VOC	0.6	6.98	65.00	57.22	6.559	8,000	2,759,400	0.52	0.09

Notes:

1. Per AP-42, 5th Edition (6/08), Section 5.2, Equation 1

$$Emission\ Factor\left(\frac{lb\ VOC}{10^3 gal}\right) = \left(\frac{S \times P \times M}{°F + 460}\right) \times 12.46$$

2. Maximum hourly throughput is the amount of produced water loaded out from the storage tank(s).
3. Annual Throughput is the amount of produced water loaded out from the storage tank(s).
4. Uncontrolled Hourly Emissions = Hourly Throughput / 1000 x Emission Factor
5. Uncontrolled Annual Emissions = Annual Throughput / 1000 x Emission Factor / 2000 lb/T
6. Loading emissions for produced water were calculated using condensate, assuming 1% is emitted.

Estimated HAP Composition (% by Weight)**

		Uncontrolled Emissions	
Pollutant	Wt%	(lb/hr)	(tpy)
Benzene	0.929%	0.005	0.001
Toluene	0.249%	0.001	0.0002
n-Hexane	1.380%	0.01	0.001
Total HAPs	**2.558%**	**0.01**	**0.002**

** Estimated HAP Composition based on Promax.

ATTACHMENT N
TABLE 17

POTENTIAL EMISSIONS SUMMARY
PROCESS PIPING FUGITIVES (E22)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Component Type	Type of Service [1]	Number of Components [1]	Emission Factors (lb/hr-component) [2]	Percent VOC [3]	Potential VOC Emission Rates [4]	
					(lb/hr)	(T/yr)
Valves	Gas/Vapor	200	0.00992	19.33%	0.38	1.68
Flanges	Gas/Vapor	700	0.00086	19.33%	0.12	0.51
Relief Valves	Gas/Vapor	20	0.0194	19.33%	0.08	0.33
Connectors	Gas/Vapor	800	0.00044	19.33%	0.07	0.30
Valves	Light Liquid	200	0.0055	100.00%	1.10	4.82
Flanges	Light Liquid	25	0.000243	100.00%	0.01	0.03
Relief Valves	Light Liquid	15	0.0165	100.00%	0.25	1.08
Connectors	Light Liquid	500	0.000463	100.00%	0.23	1.01
Totals:	—	**2,460**	—	—	**2.24**	**9.76**

Notes:

1. Number of each component and type of service estimated based on a similar station.
2. Emission factors based on EPA's natural gas processing factors for process piping fugitive emissions.
3. Percent VOC for Gas/Vapor service based on gas analysis from a representative facility (refer to Table 18).
4. Emission rates based on 8,760 hours of operation per year.

Estimated HAP Composition (% by Weight)**

		Total Fugitive HAP Uncontrolled Emissions	
Pollutant	**Wt% [1]**	**(lb/hr)**	**(T/yr)**
Benzene	0.046%	0.001	0.004
Toluene	0.047%	0.001	0.005
n-Hexane	0.227%	0.01	0.02
Total HAPs	**0.336%**	**0.01**	**0.03**
Total VOCs	**19.335%**	**2.24**	**9.76**

Based on Gas Analyses. An extended analysis was unavailable, therefore, GRI GlyCalc factors for production were used to estimate C6+ breakout

ATTACHMENT N
TABLE 18

GAS ANALYSIS
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Component [1]	Molecular Weight	Mol % [2]	Molar Weight [3]	Average Mass % [4]
Carbon Monoxide	28.01	0.000%	0.000	0.000%
Hydrogen Sulfide	34.08	0.000%	0.000	0.000%
Oxygen	16.04	0.004%	0.001	0.003%
Helium	4	0.000%	0.000	0.000%
Nitrogen	28.02	0.290%	0.081	0.381%
Carbon Dioxide	44.01	0.087%	0.038	0.179%
Methane	16.04	74.831%	12.003	56.391%
Ethane	30.07	16.784%	5.047	23.711%
Propane	44.09	5.221%	2.302	10.814%
i-Butane	58.12	0.642%	0.373	1.753%
n-Butane	58.12	1.213%	0.705	3.312%
i-Pentane	72.15	0.296%	0.213	1.002%
n-Pentane	72.15	0.254%	0.183	0.861%
Other Hexanes	86.17	0.242%	0.209	0.981%
n-Hexane	86.17	0.056%	0.048	0.227%
Heptanes	100.2	0.026%	0.026	0.123%
2,2,4-Trimethylpentane	114.23	0.010%	0.012	0.054%
Benzene	78.11	0.013%	0.010	0.046%
Toluene	92.14	0.011%	0.010	0.047%
Octanes +	114.23	0.018%	0.021	0.098%
e-Benzene	106.17	0.001%	0.001	0.003%
Xylenes	106.17	0.003%	0.003	0.014%
	Totals:	100.00%	21.29	100.00%
	[5] VOC Totals:	8.00%	4.12	19.33%

Notes:

1. Typical components listed in gas analysis for field gas.
2. Mol % values obtained from the gas analysis from a representative facility.
3. Molar weight = Molecular weight x Mol % /100.
4. Average mass % = Molar weight / Total molar weight.
5. VOC Totals include the following components (C3+):

Propane	n-Hexane
i-Butane	Heptanes
n-Butane	Benzene
i-Pentane	Toluene
n-Pentane	Octanes
Hexanes	e-Benzene
	Xylenes

Gas Analytical Services, Inc.
P.O. Box 1028
Bridgeport, WV 26330-0461
Phone: (304) 623-0020
FAX: (304) 624-8065

Analysis#:	99100
Run Date:	12/17/2012
Run Time:	13:14
Cylinder#:	

FRACTIONAL ANALYSIS

Customer:	HG Energy, LLC	Sample Date:	12/16/2012
Field:	Component Analysis	Sample Time:	10:30
		Collected By:	Bowens
Station:	L.S. Hoyt 402 1H	Effective Date:	12/16/2012
Meter:		Sample Pressure:	76.00 PSIG
Sample Type:	Spot	Sample Temp. (°F):	N/G

Component	MOL%	GPM
Methane	75.2959	
Ethane	15.3443	4.09
Propane	5.3256	1.46
I-Butane	0.7289	0.24
N-Butane	1.5018	0.47
I-Pentane	0.3874	0.14
N-Pentane	0.3996	0.14
Nitrogen	0.3392	
CO2	0.0990	
Oxygen	0.0000	
Hexanes+	0.5783	0.25
Total:	100.0000	6.79

Analytical Results at Base Conditions (Real)	
BTU/SCF (Dry):	1307.9756
BTU/SCF (Saturated):	1286.1473
PSIA:	14.7300
Temperature (°F):	60.00
Z Factor (Dry):	0.99614
Z Factor (Saturated):	0.99610

Analytical Results at Contract Conditions (Real)	
BTU/SCF (Dry):	1307.9756
BTU/SCF (Saturated):	1286.1473
PSIA:	14.7300
Temperature (°F):	60.00
Z Factor (Dry):	0.99614
Z Factor (Saturated):	0.99610

Calculated Specific Gravities			
Ideal Grav.:	0.7453	Real Grav.:	0.7479
Molecular Weight:			21.5842

Gross Heating Values are Based
on GPA 2145-09, 2172, 2261.
Compressibility is Calculated using AGA-8.

Gas Analytical Services, Inc.
P.O. Box 1028
Bridgeport, WV 26330-0461
Phone: (304) 623-0020
FAX: (304) 624-8065

Analysis#:	99099
Run Date:	12/17/2012
Run Time:	13:14
Cylinder#:	

FRACTIONAL ANALYSIS

Customer:	HG Energy, LLC	Sample Date:	12/15/2012
Field:	Component Analysis	Sample Time:	10:00
		Collected By:	Bowens
Station:	L.S. Hoyt 402 3H	Effective Date:	12/15/2012
Meter:		Sample Pressure:	90.00 PSIG
Sample Type:	Spot	Sample Temp. (°F):	N/G

Component	MOL%	GPM
Methane	77.2416	
Ethane	15.0017	4.00
Propane	4.7544	1.31
I-Butane	0.6131	0.20
N-Butane	1.1004	0.35
I-Pentane	0.2940	0.11
N-Pentane	0.2116	0.08
Nitrogen	0.3159	
CO2	0.1304	
Oxygen	0.0000	
Hexanes+	0.3369	0.15
Total:	100.0000	6.20

Analytical Results at Base Conditions (Real)	
BTU/SCF (Dry):	1266.0459
BTU/SCF (Saturated):	1244.9457
PSIA:	14.7300
Temperature (°F):	60.00
Z Factor (Dry):	0.99643
Z Factor (Saturated):	0.99639

Analytical Results at Contract Conditions (Real)	
BTU/SCF (Dry):	1266.0459
BTU/SCF (Saturated):	1244.9457
PSIA:	14.7300
Temperature (°F):	60.00
Z Factor (Dry):	0.99643
Z Factor (Saturated):	0.99639

Calculated Specific Gravities			
Ideal Grav.:	0.7188	Real Grav.:	0.7211
Molecular Weight:			20.8201

Gross Heating Values are Based
on GPA 2145-09, 2172, 2261.
Compressibility is Calculated using AGA-8.

Gas Analytical Services, Inc.
P.O. Box 1028
Bridgeport, WV 26330-0461
Phone: (304) 623-0020
FAX: (304) 624-8065

Analysis#:	99103
Run Date:	12/17/2012
Run Time:	13:29
Cylinder#:	

FRACTIONAL ANALYSIS

Customer:	HG Energy, LLC	Sample Date:	12/15/2012
Field:	Component Analysis	Sample Time:	16:15
		Collected By:	Bowers
Station:	L.S. Hoyt 402 5H	Effective Date:	12/15/2012
Meter:		Sample Pressure:	66.00 PSIG
Sample Type:	Spot	Sample Temp. (°F):	N/G

Component	MOL%	GPM
Methane	71.9554	
Ethane	20.0050	5.34
Propane	5.5821	1.53
I-Butane	0.5845	0.19
N-Butane	1.0371	0.33
I-Pentane	0.2052	0.07
N-Pentane	0.1504	0.05
Nitrogen	0.2134	
CO2	0.0306	
Oxygen	0.0128	
Hexanes+	0.2235	0.10
Total:	100.0000	7.61

Analytical Results at Base Conditions (Real)	
BTU/SCF (Dry):	1307.8561
BTU/SCF (Saturated):	1286.0244
PSIA:	14.7300
Temperature (°F):	60.00
Z Factor (Dry):	0.99613
Z Factor (Saturated):	0.99609

Analytical Results at Contract Conditions (Real)	
BTU/SCF (Dry):	1307.8561
BTU/SCF (Saturated):	1286.0244
PSIA:	14.7300
Temperature (°F):	60.00
Z Factor (Dry):	0.99612
Z Factor (Saturated):	0.99609

Calculated Specific Gravities			
Ideal Grav.:	0.7425	Real Grav.:	0.7451
Molecular Weight:			21.5056

Gross Heating Values are Based
on GPA 2145-09, 2172, 2261.
Compressibility is Calculated using AGA-8.

ATTACHMENT N
TABLE 19

POTENTIAL EMISSIONS SUMMARY
UNPAVED ROADS (E23)
HOYT 401
ASCENT RESOURCES – MARCELLUS, LLC

Name	Vehicle Miles Traveled [1]		Emission Factor [2]			Control Efficiency [3]	PM Emissions [4]					
			$PM_{2.5}$	PM_{10}	PM_{TOT}		$PM_{2.5}$		PM_{10}		PM_{TOT}	
	(VMT/hr)	(VMT/yr)	(lb/VMT)	(lb/VMT)	(lb/VMT)	(%)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
Unpaved Roads	0.33	2,920.0	0.15	1.46	4.93	55%	0.02	0.10	0.22	0.96	0.74	3.24
Total							0.02	0.10	0.22	0.96	0.74	3.24

Notes:

1. Facility vehicle data based on estimates, GP5.1 and AP-42 Section 13.2.2 (11/06) defaults for industrial unpaved roads.

	Light Vehicles (Pick-up Trucks and Cars)	Heavy Trucks (Tanker Trucks)
Average vehicle weight (tons):	2.5	23.7
Number of wheels per vehicle type:	4	18
Average number of round trips/day:	2.0	2.0
Distance per round trip (miles/trip)	2	2
Number of days operational (days/yr):	365	365
Vehicle miles travelled VMT (miles/yr):	1460.0	1460.0

13.1
11

Vehicle miles traveled was calculated with the following equation:

$$VMT = \sum_{Vehicle\ Types} \left(\frac{avg.\ number\ of\ round\ trips}{day} \times \frac{vehicle\ miles\ traveled}{round\ trip} \times \frac{days\ of\ operation}{year} \right)$$

2. Emission factor obtained from AP-42 Section 13.2.2 Table 13.2.2-1 (11/06), formula (1a) and formula (2).

$$E_{ext} = E\left[\frac{(365 - P)}{365}\right]$$

$$E = k\left(\frac{s}{12}\right)^{a}\left(\frac{W}{3}\right)^{b}\ (lb/VMT)$$

where:

E_{ext} = annual size-specific emission factor extrapolated for natural mitigation (lb/VMT)
E = emission factor (lb/VMT)
P = number of days in a year with at least 0.01 in of precipitation
s = surface material silt content (%)
W = mean vehicle weight (tons)
k, a, b = empirical constants

P (days/year): 150
s (%): 10
W (tons): 13.10

where: $W_{avg} = \left(\frac{W_{empty} + W_{loaded}}{2}\right)$

	Constants		
	PM-2.5	PM-10	PM-30 (TSP)
k:	0.15	1.5	4.9
a:	0.9	0.9	0.7
b:	0.45	0.45	0.45

3. Natural control efficiency based on moisture ratio and AP-42 Section 13.2.2 Figure 13.2.2-2 (11/06). Controlled emissions are based on the natural rainfall cycles and no plant control.

Moisture Ratio: 2 Estimated based on 0.4% controlled and 0.2% uncontrolled surface water content
Natural Control Efficiency (%): 55

4. Potential emissions based on AP-42 Section 13.2.2 Table 13.2.2-1 (11/06) emission factors and the listed control efficiecy.

$$Total\ Annual\ Emissions\ \left(T/_{yr}\right) = \left(\frac{VMT/_{yr} \times Emission\ Factor}{2000}\right) \times (1 - Control\ Efficiency)$$

Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans

Monitoring/Recordkeeping/Reporting/Testing Plans

Ascent will monitor, record, report, and test as required by 45CSR6 and 45CSR13.

Attachment P: Public Notice

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Ascent Resources – Marcellus, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit for the Hoyt 401 facility located near Wileyville, in Wetzel County, West Virginia. The latitude and longitude coordinates are: 39.60223°N, 80.64115°W

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

NO_x = 10.68 TPY
CO = 32.06 TPY
VOC = 11.05 TPY
PM_{10} = 2.04 TPY
SO_2 = <0.01 TPY
HAPs = 0.14 TPY

Startup of operation is planned to begin on or about the 5th day of October, 2016. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the 5th day of October, 2016.

By: Ascent Resources – Marcellus, LLC
Tim Cummings
VP - Operations
PO Box 13678
Oklahoma City, OK 73113

Attachment Q: Business Confidential Claims (Not Applicable)

Attachment R: Authority Forms (Not Applicable)

Attachment S: Title V Permit Revision Information (Not Applicable)

Application Fee