R-13 PERMIT APPLICATION

CONE Midstream Partners, LP > Majorsville Station

Modification

R13-3081B

Prepared By:

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Project 153901.0019

Environmental solutions delivered uncommonly well

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CONE Midstream Partners, LP (CONE) is submitting this modification application to the West Virginia Department of Environmental Protection (WVDEP) for a natural gas gathering facility located in Marshall County, West Virginia, (Majorsville Station). Specifically, this application seeks to authorize an increase in the current permit throughputs for the existing dehydration units at the site (permitted under Permit no. R13-3081B), remove three (3) existing natural gas fired compressor engines and install three (3) new electric-driven compressors, as well as installation of one (1) blowdown flare, one (1) additional dehydration unit with associated reboiler and vapor combustor.

1.1. FACILITY AND PROJECT DESCRIPTION

The Majorsville is a natural gas gathering facility. Natural gas and liquids (condensate and water) from nearby wells will undergo compression and dehydration before it is transported to a gathering line for additional processing. The station currently consists of the following equipment:

- Two (2) 150 million standard cubic feet per day (MMSCFD) triethylene glycol (TEG) dehydration unit with associated reboilers (each rated at 2.86 MMBtu/hr) and enclosed ground flares (each rated at 6.0 MMBtu/hr)
- Four (4) Caterpillar G3608LE compressor engines (each rated at 2,370 horsepower [hp]), each controlled by an oxidation catalyst for carbon monoxide (CO) , volatile organic compounds (VOC), and formaldehyde emission control
- One (1) Caterpillar 3606 compressor engine (rated at 1,775 bhp) controlled by an oxidation catalyst
- One (1) Condensate Stabilizer Reboiler (rated at 0.75 MMBtu/hr)
- One (1) Hot Oil heater rated at 7.13 MMBtu/hr
- Eleven (11) miscellaneous storage tanks (21,000 gallons or less)
- One (1) 755 hp Cummins emergency generator

In anticipation of increased gas flow to the facility, CONE is proposing to:

- Install one (1) 200 MMSCFD dehydration unit with associated reboiler (rated at 2.86 MMBtu/hr) and ground flares (rated at 6.0 MMBtu/hr)
- Increase the current permit throughput of the existing dehydration units (DEHY-1, DEHY-2) at the facility from 150 MMSCFD to 200 MMSCFD.
- Remove three (3) existing permitted natural gas fired compressor engines (EG-1, E-2, and EG-5) and replace them with three (3) electric compressors (each motor is rated at 4,500 hp).

Additionally, this application:

- Request that the department revise the control device description for the 2,370 HP Caterpillar G3608 LE compressor engines in Table 1.0 of the permit. The engine is currently controlled by an oxidation catalysts and not a selective catalyst reduction (SCR) device as incorrectly listed in the permit
- Request that the department revise the heat input rating (MMBtu/hr) for the dehydration unit enclosed ground flare (FL-1) in Table 1.0 of the permit. The rating of the enclosed ground flare is 6.0 MMBtu/hr.
- Incorporate one (1) existing station blowdown and emergency flare (nominally rated at 173.5 MMBtu/hr) for station gas blowdown activities into the permit.
- Request that the department limit the estimated blowdown volume (scf/yr) to the proposed blowdown flare at 25 million standard cubic feet per yr (25 MMSCF/yr) in the permit.

A process flow diagram is included as Attachment F.

The current permit, R13-3081B, was issued with no sources aggregated with the Majorsville Station. No changes have been made with respect to nearby sources and/or wells feeding the station since that time. Therefore, the stationary source determination is the same for the facility

1.2. R-13 APPLICATION ORGANIZATION

This R-13 permit application is organized as follows:

- Section 2: Sample Emission Source Calculations;
- Section 3: R-13 Application Forms;
- Attachment A: Business Certificate;
- Attachment B: Map;
- Attachment C: Installation and Start Up Schedule;
- Attachment D: Regulatory Discussion;
- Attachment E: Plot Plan;
- Attachment F: Detailed Process Flow Diagram;
- Attachment G: Process Description;
- Attachment I: Emission Units Table;
- Attachment J: Emission Points Data Summary Sheet;
- Attachment K: Fugitive Emissions Data Summary Sheet;
- Attachment L: Emissions Unit Data Sheets;
- Attachment M: Air Pollution Control Device Sheet;
- Attachment N: Supporting Emission Calculations;
- Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans
- Attachment P: Public Notice; and
- Application Fee.

2. SAMPLE EMISSION SOURCE CALCULATIONS

The characteristics of air emissions from the Majorsville Station, along with the methodology used for calculating emissions from the proposed new sources, are described in narrative form below. Detailed supporting calculations are also provided in Attachment N.

Emissions from the proposed project will result from the TEG dehydration unit, and natural gas combustion in the reboiler and blowdown flare. In addition, fugitive emissions from component leaks will result from the increase associated piping components from the additional dehydration unit and operation of the station. There will be no emission increases associated with the three (3) compressor motors, as they are electrically powered. The methodologies employed in calculating emissions from these sources have been summarized below.

- **Reboiler:** Potential emissions from the proposed natural gas-fired reboiler of all criteria pollutants and HAPs are calculated using U.S. EPA's AP-42 factors for natural gas combustion equipment.[1] Greenhouse gas emissions are calculated according to 40 CFR 98 Subpart C.[2]

- **Dehydration Unit and Enclosed Ground Flare:** Potential emissions of HAPs, VOC, and methane from the dehydration units are calculated using GRI-GLYCalc. Note that the maximum pump rate is utilized in accordance with recent revisions in Subpart HH. Emissions of other criteria pollutants are calculated for natural gas combustion in the enclosed ground flare using U.S. EPA's AP-42 factors for external combustion of natural gas.[1] Greenhouse gas emissions from combustion in the combustor are calculated according to the procedures in 40 CFR 98 Subpart C.

- **Blowdown Flare:** Potential emissions of nitrogen oxides (NOx), CO, and other criteria pollutants from the pilot were calculated using AP-42 factors for natural gas combustion equipment assuming full time operation (i.e., 8760 hrs/yr) . VOC and HAP emissions from the flare were estimated using mass balance equations based on the volume of gas sent to the flare. Flare emissions of other criteria pollutants were calculated using AP-42 emission factors for Industrial flares. Short-term emissions were calculated using the nominal rating of the flare, while annual emissions were calculated using the volume of gas vented and the heating value of the gas. Greenhouse gas emissions from combustion in the flare are calculated according to the procedures in 40 CFR 98 Subpart C.

[1] U.S. EPA, AP 42, Fifth Edition, Volume I, Chapter 1.4, *Natural Gas Combustion,* Supplement D, July 1998.
[2] 40 CFR 98 Subpart C, *General Stationary Fuel combustion Sources*, Tables C-1 and C-2.

3. R13 APPLICATION FORM

The WVDEP permit application forms contained in this application include all applicable R13 application forms including the required attachments.

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):*
CONE Gathering LLC

2. Federal Employer ID No. ***(FEIN):***
45-3344658

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

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

5A. Applicant's mailing address:
200 Evergreen Drive
Waynesburg, PA

5B. Facility's present physical address:
3700 Number Two Ridge Road
Dallas, WV 26036

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: Owner

- 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 Dehydration Facility

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

11A. DAQ Plant ID No. (for existing facilities only):
051-00143

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
R13-3081B

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 Wheeling: Travel east on I-70 for approximately 9.3 miles. Take Exit 11 onto Dallas Pike. Turn right onto Dallas Pike and travel approximately 1.7 miles. Take a slight left onto Middle Wheeling Creek Road (Old Co. 39) for 0.4 miles. Continue onto Dallas Pike and travel 3.0 miles. Turn right onto Number 2 Ridge Road and travel 3.6 miles. Turn right and the facility will be 0.5 miles on the right.

12.B. New site address (if applicable):	12C. Nearest city or town: Majorsville	12D. County: Marshall
12.E. UTM Northing (KM): 4,424.302	12F. UTM Easting (KM): 539.827	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:
CONE is proposing to increase the throughput of the existing dehydration units (150 MMSCFD to 200 MMSCFD) and installation of additional equipment that includes: One (1) blowdown flare, one (1) 200 MMSCFD dehydration unit, associated reboiler (2.86 MMbtu/hr), and enclosed combustor (6.0 MMBtu/hr). Additionally, CONE is proposing to remove three (3) natural gas fired compressor engines and replace with three (3) electric compressor motors (each rated at 4,500 HP).

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: Blowdown Flare Only – April 2013	14B. Date of anticipated Start-Up if a permit is granted: As soon as permitted

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 Year52

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

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

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

Section II. Additional attachments and supporting documents.

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

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

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

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

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

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

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

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

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

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

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

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

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

☒ General Emission Unit, specify, Dehydration unit,

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: 8/25/2015 *(Please use blue ink)*

35B. Printed name of signee: Joseph Fink		35C. Title: Chief Operating Officer
35D. E-mail: joefink@consolenergy.com	36E. Phone: 724-485-3524	36F. FAX:
36A. Printed name of contact person (if different from above): Patrick Flynn		36B. Title: Air Quality Engineer
36C. E-mail: PatrickFlynn@consolenergy.com	36D. Phone: 724-485-3156	36E. FAX:

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

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

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

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

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

ATTACHMENT A

Current Business Certificate

State of West Virginia

Certificate

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

CONE GATHERING LLC

was duly authorized under the laws of this state to transact business in West Virginia as a foreign limited liability company on September 23, 2011.

The company is filed as an at-will company, for an indefinite period.

I further certify that the LLC (PLLC) has not been revoked by the State of West Virginia nor has a Certificate of Cancellation been issued.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORIZATION

Validation ID:8WV1H_5P568

Given under my hand and the Great Seal of the State of West Virginia on this day of April 09, 2014

Natalie E. Tennant

Secretary of State

ATTACHMENT B

Map

Figure 1 - Map of Majorsville Compressor Station

ATTACHMENT C

Startup and Installation Schedule

Attachment C

Schedule of Planned Installation and Start-Up

Unit	Installation Schedule	Startup Schedule
200 MMSCFD Dehydration Unit – Throughput Increase (DEHY-1)	2015	Upon issuance of permit
200 MMSCFD Dehydration Unit – Throughput Increase (DEHY-2)	2015	Upon issuance of permit
Two (2) 2,370 HP Caterpillar Compressor Engine (E1, E2) – to be removed	2015	Removed in 2015
1,775 HP Caterpillar Compressor Engine (E-5) to be removed	2014	Removed in 2014
Enclosed Ground Flare (FL-1) – Heat Input Rating Corrected to 6.0 MMBtu/hr	2012	Upon issuance of permit
200 MMSCFD Dehydration Unit (DEHY-3)	2015	Upon issuance of permit
173.5 MMBtu/hr Blowdown Flare (BDF-1)	2013	2013
Reboiler (BLR-4)	2015	Upon issuance of permit
Enclosed Ground Flare (FL-3)	2015	Upon issuance of permit

ATTACHMENT D

Regulatory Discussion

ATTACHMENT D – REGULATORY APPLICABILITY

This section documents the applicability determinations made for Federal and State air quality regulations. The monitoring, recordkeeping, reporting, and testing plan is presented in Attachment O. In this section, applicability or non-applicability of the following regulatory programs is addressed:

- Prevention of Significant Deterioration (PSD) permitting;
- Title V of the 1990 Clean Air Act Amendments;
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants (NESHAP); and
- West Virginia State Implementation Plan (SIP) regulations.

This review is presented to supplement and/or add clarification to the information provided in the WVDEP R13A permit application forms. In addition to providing a summary of applicable requirements, this section of the application also provides non-applicability determinations for certain regulations, allowing the WVDEP to confirm that identified regulations are not applicable to the Majorsville Station. Note that explanations of non-applicability are limited to those regulations for which there may be some question of applicability specific to the operations at the Majorsville Station. Regulations that are categorically non-applicable are not discussed (e.g., NSPS Subpart J, Standards of Performance for Petroleum Refineries).

Prevention of Significant Deterioration (PSD) Source Classification

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration (PSD) and new and modified sources of non-attainment pollutants under Non-Attainment New Source Review (NNSR). PSD and NNSR regulations apply when a major source makes a change, such as installing new equipment or modifying existing equipment, and a significant increase in emissions results from the change. The Majorsville Station is not a major source with respect to these programs since its potential emissions are below all the NNSR/PSD thresholds. As such, NNSR/PSD permitting is not triggered by this construction activity. CNX will monitor future construction activities at the site closely and will compare any future increase in emissions with the NSR/PSD thresholds to ensure these activities will not trigger this program.

Title V Operating Permit Program

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in West Virginia Code of State Regulations (CSR) 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP, and 100 tpy of all other regulated pollutants.[1] The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility. Therefore, the Majorsville Station is not a major source for Title V purposes.

New Source Performance Standards

New Source Performance Standards (NSPS), located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable

[1] On June 23, 2014, the U.S Supreme Court decision in the case of *Utility Air Regulatory Group v. EPA* effectively changed the permitting procedures for GHGs under the PSD and Title V programs.

provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the proposed project at the Majorsville Station.

NSPS Subpart OOOO—Crude Oil and Natural Gas Production, Transmission, and Distribution

Subpart OOOO – *Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution*, applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011. This NSPS was published in the Federal Register on August 16, 2012, with an effective date of October 15, 2012. The list of potentially affected facilities includes:

- Gas wells
- Centrifugal compressors
- Reciprocating compressors
- Pneumatic controllers
- Storage vessels
- Equipment (as defined in §60.5430) located at onshore natural gas processing plants
- Sweetening units located onshore that process natural gas produced from either onshore or offshore wells

There are no storage tanks, reciprocating compressors, wet seal centrifugal compressors, or continuous bleed natural gas driven pneumatic controllers being proposed as part of this project. Therefore, the requirements of this subpart are not applicable.

Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas processing plants (Subpart OOOO), boilers (Subpart Dc – not applicable due to size of unit), the applicability of a particular NSPS to the Majorsville Station can be readily ascertained based on the industrial source category covered. All other NSPS are categorically not applicable to proposed operations.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

Part 63 NESHAP allowable emission limits are established on the basis of a maximum achievable control technology (MACT) determination for a particular major source. A HAP major source is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP. The Majorsville Station will be an Area (minor) source of HAP since its potential emissions of HAP are less than the 10/25 major source thresholds. NESHAP apply to sources in specifically regulated industrial source categories (Clean Air Act Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type:

- 40 CFR Part 63 Subpart HH – Oil and Natural Gas Production Facilities
- 40 CFT Part 63 HHH – Natural Gas Transmission and Storage Facilities
- 40 CFR Part 63 Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers

The applicability of these NESHAP Subparts is discussed in the following sections.

40 CFR 63 Subpart HH – Oil and Natural Gas Production Facilities

This subpart applies to affected emission points that are located at facilities that are major and area sources of HAP and either process, upgrade, or store hydrocarbon liquids prior to custody transfer or that process, upgrade, or store natural gas prior to entering the natural gas transmission and storage source category. For purposes of this subpart,

natural gas enters the natural gas transmission and storage source category after the natural gas processing plant, if present.

The Majorsville Station will be an area source of HAP emissions. The station will processes natural gas in its glycol dehydrator prior to the point of custody transfer; therefore, the provisions of NESHAP Subpart HH apply to the Majorsville Station. The benzene emissions from the glycol dehydrator vents are less than 0.90 megagrams per year (1 tpy), therefore, the Majorsville Station is exempt from the requirements of NESHAP Subpart HH pursuant to 40 CFR §63.764(e)(1)(ii), except for the requirement to keep records of the actual average natural gas flow rate or actual average benzene emissions from the dehydrator, per 40 CFR §63.774(d)(1).

40 CFR 63 Subpart HHH – Natural Gas Transmission and Storage Facilities

This standard applies to such units at natural gas transmission and storage facilities that are major sources of HAP emissions located downstream of the point of custody transfer (after processing and/or treatment in the production sector), but upstream of the distribution sector. The Majorsville Station is not a transmission facility; therefore, the provisions of NESHAP Subpart HHH do not apply to the Majorsville Station

40 CFR 63 Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers (Area Source Boiler MACT)

This MACT standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types. The proposed reboiler is a natural gas-fired and is specifically exempt from this subpart. Therefore, no sources at the Majorsville Station are subject to any requirements under 40 CFR 63 Subpart JJJJJJ

West Virginia SIP Regulations

The Majorsville Station is potentially subject to regulations contained in the West Virginia Code of State Regulations, Chapter 45 (Code of State Regulations). The Code of State Regulations fall under two main categories, those regulations that are generally applicable (e.g., permitting requirements), and those that have specific applicability (e.g., PM standards for manufacturing equipment).

45 CSR 2: Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

45 CSR 2 applies to fuel burning units, defined as equipment burning fuel "for the primary purpose of producing heat or power by indirect heat transfer". The reboiler is a fuel burning unit and therefore must comply with this regulation. Per 45 CSR 2-3, opacity of emissions from this unit shall not exceed 10 percent based on a six minute block average. Per 45 CSR 2-4, PM emissions from this unit will not exceed a level of 0.09 multiplied by the heat design input in MMBtu/hr of the unit.

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

According to 45 CSR 4-3:

No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.

The Majorsville station is generally subject to this requirement. However, due to the nature of the process at the station, production of objectionable odor from the station during normal operation is unlikely.

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

45 CSR 6 applies to activities involving incineration of refuse, defined as "the destruction of combustible refuse by burning in a furnace designed for that purpose. For the purposes of this rule, the destruction of any combustible liquid or gaseous material by burning in a flare or flare stack, thermal oxidizer or thermal catalytic oxidizer stack shall be considered incineration." The proposed enclosed combustor and blowdown flare are incinerators and therefore must comply with this regulation. Per 45 CSR 6-4.3, opacity of emissions from this unit shall not exceed 20 percent, except as provided by 6-
4.4. PM emissions from this unit will not exceed the levels calculated in accordance with 6-4.1.

45 CSR 16: Standards of Performance for New Stationary Sources

45 CSR 16-1 incorporates the federal Clean Air Act (CAA) standards of performance for new stationary sources set forth in 40 CPR Part 60 by reference. As such, by complying with all applicable requirements of 40 CFR Part 60 at the Majorsville Station, CONE will be complying with 45 CSR 16.

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

According to 45 CSR 17-3.1:

No person shall cause, suffer, allow or permit fugitive particulate matter to be discharged beyond the boundary lines of the property lines of the property on which the discharge originates or at any public or residential location, which causes or contributes to statutory air pollution.

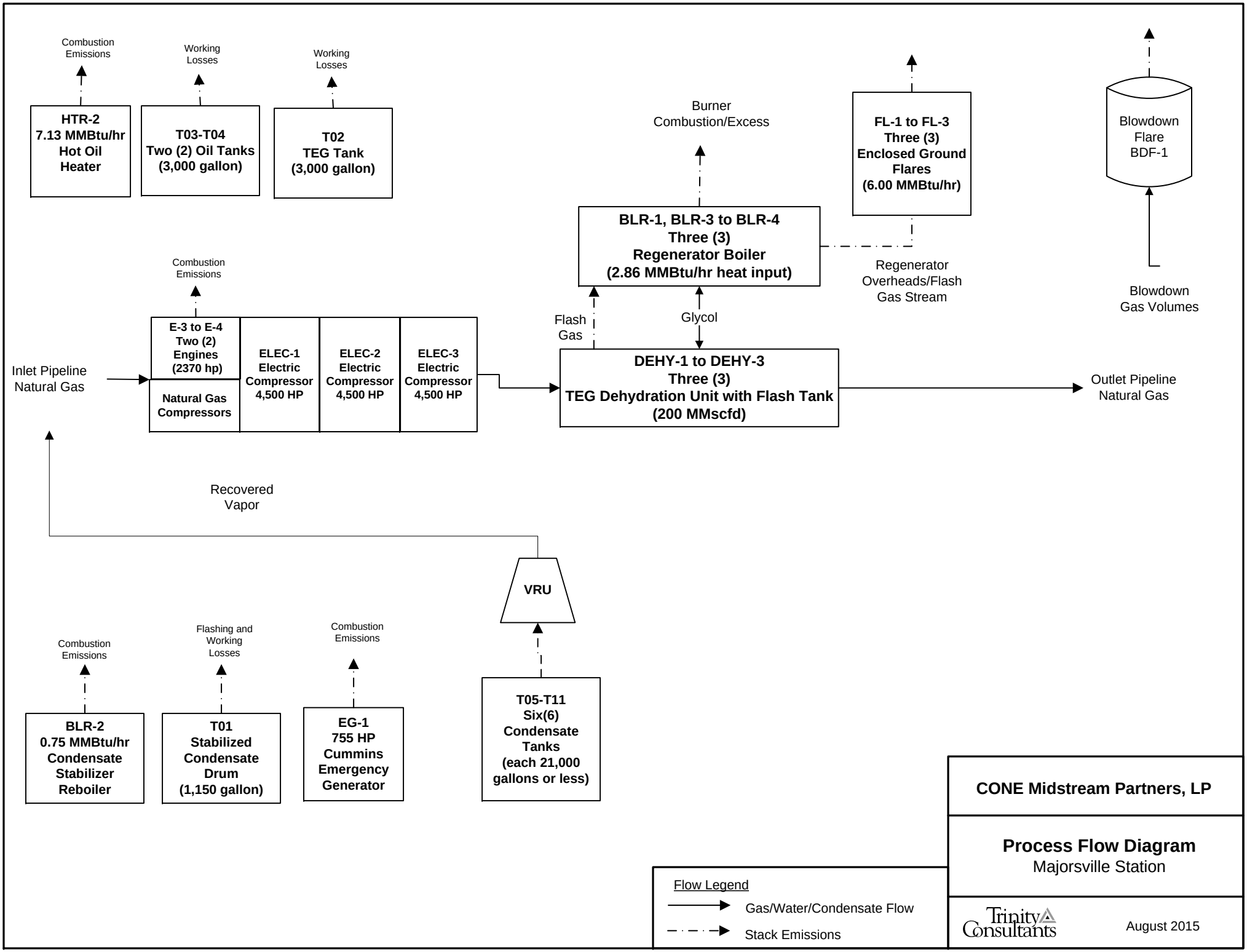
Due to the nature of the activities at the Majorsville Station it is unlikely that fugitive particulate matter emissions will be emitted under normal operating conditions. However, CNX will take measures to ensure any fugitive particulate matter emissions will not cross the property boundary should any such emissions occur.

ATTACHMENT E

Plot Plan

ATTACHMENT F

Detailed Process Flow Diagram


Combustion Emissions
Working Losses
Working Losses
HTR-2
7.13 MMBtu/hr
Hot Oil
Heater
T03-T04
Two (2) Oil Tanks
(3,000 gallon)
T02
TEG Tank
(3,000 gallon)
Burner
Combustion/Excess
FL-1 to FL-3
Three (3)
Enclosed Ground
Flares
(6.00 MMBtu/hr)
Blowdown
Flare
BDF-1
BLR-1, BLR-3 to BLR-4
Three (3)
Regenerator Boiler
(2.86 MMBtu/hr heat input)
Regenerator
Overheads/Flash
Gas Stream
Blowdown
Gas Volumes
Combustion Emissions
E-3 to E-4
Two (2)
Engines
(2370 hp)
Natural Gas
Compressors
ELEC-1
Electric
Compressor
4,500 HP
ELEC-2
Electric
Compressor
4,500 HP
ELEC-3
Electric
Compressor
4,500 HP
Flash
Gas
Glycol
Inlet Pipeline
Natural Gas
DEHY-1 to DEHY-3
Three (3)
TEG Dehydration Unit with Flash Tank
(200 MMscfd)
Outlet Pipeline
Natural Gas
Recovered
Vapor
VRU
Combustion Emissions
Flashing and Working Losses
Combustion Emissions
BLR-2
0.75 MMBtu/hr
Condensate
Stabilizer
Reboiler
T01
Stabilized
Condensate
Drum
(1,150 gallon)
EG-1
755 HP
Cummins
Emergency
Generator
T05-T11
Six(6)
Condensate
Tanks
(each 21,000
gallons or less)
Flow Legend
Gas/Water/Condensate Flow
Stack Emissions
CONE Midstream Partners, LP
Process Flow Diagram
Majorsville Station
Trinity Consultants
August 2015

ATTACHMENT G

Process Description

ATTACHMENT G – PROCESS DESCRIPTION

CONE Midstream Partners, LP (CONE) is proposing to increase the current permit limits of the existing dehydration units (150 MMSCFD to 200 MMSCFD) in addition to installing the following equipment: one (1) blowdown flare (nominal rating at 173.5 MMBtu/hr, with a maximum of 5,016.8 MMBtu/hr), one (1) 200 MMSCFD dehydration unit with associated reboiler and enclosed ground flare. Additionally, CONE is proposing to remove the three (3) existing natural gas fired compressor engines (EG-1, EG-2, and EG-5) and replace them with three (3) electric compressor units (each motor is rated at 4,500 hp) .

Natural gas enters the station via a pipeline system and is compressed using the natural gas-fired compressor engines. The compressed natural gas stream is then processed by each triethylene glycol (TEG) dehydration unit (with each associated reboiler). The dehydration unit will introduce TEG to the gas stream in a contact tower to absorb water vapor from the gas to a level not exceeding 7 pounds per million standard cubic feet (lb/MMscf). The TEG is then sent to the natural gas-fired reboiler. The water is evaporated from the TEG in the reboiler and discharged, and the glycol is then sent back to the contact tower for reuse. Each dehydration unit is equipped with an enclosed ground flare which will control emissions from the dehydration still vent, and the emissions from the flash tank. The natural gas stream from the contact tower flows into the pipeline to be transported further along the pipeline system.

A process flow diagram for the proposed equipment is included as Attachment F.

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]
E-3	E-3	Caterpillar G3608 LE DM8606-02	2012	2,370 bhp	Existing	Oxidation Catalyst
E-4	E-4	Caterpillar G3608 LE DM8606-02	2012	2,370 bhp	Existing	Oxidation Catalyst
EG-1	EG-1	Cummins QSX15-G9 NR2	2012	755 bhp	Existing	None
DEHY-1	FL-1	TEG Dehydration Unit Still Vent & Flash Tank	2012	200 MMSCFD	Modified – Increase throughput	FL-1
DEHY-2	FL-2	TEG Dehydration Unit Still Vent & Flash Tank	2014	200 MMSCFD	Modified – Increase throughput	FL-2
DEHY-3	FL-3	TEG Dehydration Unit Still Vent & Flash Tank	2015	200 MMSCFD	New	FL-3
BLR-1	BLR-1	TEG Dehydration Unit Reboiler	2012	2.86 MMBtu/hr	Existing	None
BLR-2	BLR-2	Condensate Stabilizer Reboiler	2012	0.75 MMBtu/hr	Existing	None
BLR-3	BLR-3	TEG Dehydration Unit Reboiler	2014	2.86 MMBtu/hr	Existing	None
BLR-4	BLR-4	TEG Dehydration Unit Reboiler	2015	2.86 MMBtu/hr	New	None
HTR-2	HTR-2	Hot Oil Heater	2014	7.13 MMBtu/hr	Existing	None
FL-1	FL-1	Enclosed Ground Flare	2012	6.0 MMBtu/hr	Existing – Heat Input corrected	None
FL-2	FL-2	Enclosed Ground Flare	2014	6.0 MMBtu/hr	Existing	None
FL-3	FL-3	Enclosed Ground Flare	2015	6.0 MMBtu/hr	New	None
T01	T01	Stabilized Condensate Surge Drum	2012	1,150 gal	Existing	None
T02	T02	Triethylene Glycol Tank	2012	3,000 gal	Existing	None
T03	T03	Compressor Oil Tank	2012	3,000 gal	Existing	None
T04	T04	Engine Oil Tank	2012	3,000 gal	Existing	None

T05	T05	Water/Slop Tank	2014	16,800 gal	Existing	VRU
T06	VRU	Condensate – Water/Slop Separation	2014	21,000 gal	Existing	VRU
T07	VRU	Unstabilized Condensate Tank	2014	16,800 gal	Existing	VRU
T08	VRU	Condensate Tank	2014	16,800 gal	Existing	VRU
T09	VRU	Condensate Tank	2014	16,800 gal	Existing	VRU
T10	VRU	Condensate Tank and optional Water/Slop Storage	2014	16,800 gal	Existing	VRU
T11	VRU	Condensate or Water Storage Tank	2013	16,800 gal	Existing	VRU
BLT01	VRU	Bulk Liquids Transfer Loading	2013	Batch Unloading	Existing	VRU
BDF-1	BDF-1	Emergency Blowdown Flare	2013	173.5 MMBtu/hr (nominal)	New	None
E-1	E-1	Caterpillar G3608 LE DM8606-02	2012	2,370 bhp	Existing – to be removed	Oxidation Catalyst
E-2	E-2	Caterpillar G3608 LE DM8606-02	2012	2,370 bhp	Existing – to be removed	Oxidation Catalyst
E-5	E-5	Caterpillar 3606	2013	1,775 bhp	Existing – to be removed	Oxidation Catalyst
ELEC-1	None	Electric Compressors #1	2015	4,500 HP	New	None
ELEC-2	None	Electric Compressors # 2	2015	4,500 HP	New	None
ELEC-3	None	Electric Compressors #3	2015	4,500 HP	New	None

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

ATTACHMENT J

Emission Points Data Summary Sheet

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			
FL-1	Upward Vertical Stack	DEHY-1	Dehydration Unit (Emissions only)	FL-1	Enclosed Ground flare	NA	NA	VOC HAP CO2e	97.55 8.30 4,680	427.25 36.35 20,501	1.95 0.17 96.42	8.54 0.73 422.31	Gas/Vapor	O[B]	
FL-2	Upward Vertical Stack	DEHY-2	Dehydration Unit (Emissions only)	FL-2	Enclosed Ground flare	NA	NA	VOC HAP CO2e	97.55 8.30 4,680	427.25 36.35 20,501	1.95 0.17 96.42	8.54 0.73 422.31	Gas/Vapor	O[B]	
FL-3	Upward Vertical Stack	DEHY-3	Dehydration Unit (Emissions only)	FL-3	Enclosed Ground flare	NA	NA	VOC HAP CO2e	97.55 8.30 4,680	427.25 36.35 20,501	1.95 0.17 96.42	8.54 0.73 422.31	Gas/Vapor	O[B]	
BLR-4	Upward Vertical Stack	BLR-4	TEG Dehy Unit Reboiler	NA	NA	NA	NA	NOx CO PM/PM10/PM2.5 SO2 VOC CO2e	0.23 0.20 0.02 0.001 0.01 335	1.02 0.85 0.08 0.006 0.06 1,467	0.23 0.20 0.02 0.001 0.01 335	1.02 0.85 0.08 0.006 0.06 1,467	Gas/Vapor	O[C] O[C] O[C] O[C] O[C] O[A]	
BDF-1	Upward Vertical Stack	BDF-1	Blowdown Flare (Includes Pilot Emissions)	NA	NA	NA	NA	NOx CO PM/PM10/PM2.5 SO2 VOC HAP CO2e	11.81 53.80 0.00 0.00 430.12 6.62 42,812	1.10 4.82 0.00 0.00 105.34 1.62 10,485	11.81 53.80 0.00 0.00 8.60 0.13 21,195	1.10 4.82 0.00 0.00 2.11 0.03 2,094	Gas/Vapor	O[C,D] O[C,D] O[C,D] O[C,D] O[E] O[E] O[A,E]	
FL-1 to FL-3 (Each flare)	Upward Vertical Stack	FL-1 to FL-3 (Each flare)	Enclosed Ground Flare	NA	NA	NA	NA	NOx CO PM/PM10/PM2.5 SO2 CO2e	0.52 0.43 0.04 0.003 744	2.26 1.90 0.17 0.01 3,257	0.52 0.43 0.04 0.003 744	2.26 1.90 0.17 0.01 3,257	Gas/Vapor	O[C] O[C] O[C] O[C] O[A]	

A- 40 CFR 98, Subpart C for natural gas fired combustion.
B- GRI-GLYCalc
C- AP-42 Section 1.4 Tables 1.4-1, 1.4-2 and 1.4-3, July 1998.

D- AP-42 Section 13.5
E- Mass Balance

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. (^{o}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

[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	NA	--	--	--	--	--
Unpaved Haul Roads	NA	--	--	--	--	--
Storage Pile Emissions	NA	---	---	---	---	---
Loading/Unloading Operations	NA	N/A	---	---	---	---
Wastewater Treatment Evaporation & Operations	NA	---	---	---	---	---
Equipment Leaks	VOC HAP CO2e	N/A	10.82 0.92 261	N/A	10.82 0.92 261	O^A O^A O^B
General Clean-up VOC Emissions	NA	---	---	---	---	---
Other	NA	---	---	---	---	---

A –Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995.

B – 40 CFR 98 Subpart W

[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).

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	2281	0		16,455
	Light Liquid VOC				
	Heavy Liquid VOC				
	Non-VOC				
Safety Relief Valves[11]	Gas VOC				
	Non VOC				
Open-ended Lines[12]	VOC	34	0		70
	Non-VOC				
Sampling Connections[13]	VOC	2233	0		4,938
	Non-VOC				
Compressors	VOC				
	Non-VOC				
Flanges	VOC				
	Non-VOC				
Other	VOC	17	0		181
	Non-VOC				

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

Notes for Leak Source Data Sheet

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

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

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

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

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

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

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

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

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

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

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

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

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

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

13. Do not include closed-purge sampling connections.

ATTACHMENT L

Emission Unit Data Sheet

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

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

Identification Number (as assigned on *Equipment List Form*): DEHY-1, DEHY-2, DEHY-3

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

200 MMSCFD dehydration units with 2.86 MMbtu/hr duty (Heat Input rated) reboiler

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:

200 million standard cubic feet per day of natural gas, each

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

Does not produce a material – removes water from wet natural gas

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

External combustion of natural gas in reboiler

* 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:

Reboiler - Natural gas – 2,322 scf/hr 20.35 MMscf/yr (Assumes 1231 Btu/scf)

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

Natural gas

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

Unknown @ °F and psia.

(d) Percent excess air: Unknown

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

natural gas fired external combustion heater – 2.86 MMbtu/hr input rating

(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:

NA

(g) Proposed maximum design heat input: 2.86 × 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:

@ Unknown °F and psia

a.	NO_X	0.23	lb/hr	grains/ACF
b.	SO_2	0.001	lb/hr	grains/ACF
c.	CO	0.20	lb/hr	grains/ACF
d.	PM_{10}	0.02	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	97.55	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	HAP	8.30	lb/hr	grains/ACF
	Benzene	0.92	lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
Throughput of wet natural gas. Operating parameters of dehydration unit for GLYCalc (temperature, pressure, glycol flow rate) Conduct visual inspections one per month confirming the pilot is lit.	Annual benzene emissions calculated with GLYCalc. Maintain records of all potential to emit (PTE) HAP calculations for the entire affected facility Maintain records of the times and duration of all periods which the pilot flame was absent Maintain records of the visible emission opacity tests
REPORTING	**TESTING**
None.	Conduct a Method 22 opacity test for at least two hours on a quarterly basis

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

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

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

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

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

ATTACHMENT M

Air Pollution Control Device Sheet

Attachment M
Air Pollution Control Device Sheet
(FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): FL-3

Equipment Information

1. Manufacturer:

   Model No.

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

   Describe Enclosed Ground Flare

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:
   6.0 MMBtu/hr
   scf/min
   scf/hr

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

7. Estimated combustion efficiency:
   (Waste gas destruction efficiency)
   Estimated: > 99 %
   Minimum guaranteed: 98 %

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

9. Number of burners:
   Rating: 6 MMBTU/hr

10. Will preheat be used? ☐ Yes ☐ No

11. Describe method of controlling flame:

12. Flare height: 38 ft

13. Flare tip inside diameter: 2.93 ft

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

15. Number of pilot lights: One (1) Pilot Light
    Total 0.35 MMBTU/hr

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

17. If automatic re-ignition will be used, describe the method:

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: 8760

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
See attached emissions calculations			

30. Estimate total combustible to flare:	LB/hr
(Maximum mass flow rate of waste gas)	scfm
31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.:	
32. Give composition of carrier gases:	
33. Temperature of emission stream: °F Heating value of emission stream: Variable 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 BTU/scf
35. Temperature of flare gas: °F	36. Flare gas flow rate: 10,115 scf/min
37. Flare gas heat content: 300 BTU/ft^3	38. Flare gas exit velocity: 25 ft/s scf/min
39. Maximum rate during emergency for one major piece of equipment or process unit:	scf/min
40. Maximum rate during emergency for one major piece of equipment or process unit:	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: N/A	
43. Have you included ***Flare Control Device*** in the Emissions Points Data Summary Sheet?	

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:
Presence of pilot (temperature)	Maintain records of the presence of when the pilot flame in the flare is not detected including date, time and duration of event.
REPORTING:	TESTING:
None	Conduct a Method 22 opacity test 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.
VOC – 100%
HAP – 100%

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

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

Attachment M
Air Pollution Control Device Sheet
(FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): BDF-1

Equipment Information

1. Manufacturer: Zeeco

   Model No.

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

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
   145,833 scf/hr

6. Dimensions of stack:
   Diameter 3 ft.
   Height 20 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: 173.5 MMBtu/hr (nomial)
   5,016.8 (peak)

10. Will preheat be used? ☐ Yes ☒ No

11. Describe method of controlling flame:
    A thermocouple is present

12. Flare height: 100 ft

13. Flare tip inside diameter: ft

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

15. Number of pilot lights: 2
    Total ~ 0.16 MMBTU/hr

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

17. If automatic re-ignition will be used, describe the method:
    Electrical restart

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: 8760 (pilot only)

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
See attached emissions calculations			

30. Estimate total combustible to flare: ~240,000 (design value) LB/hr (Maximum mass flow rate of waste gas) scfm	
31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.:	
32. Give composition of carrier gases: See attached design information	
33. Temperature of emission stream: 50 °F Heating value of emission stream: ~1200 BTU/ft^3 Mean molecular weight of emission stream: MW = 22	34. Identify and describe all auxiliary fuels to be burned. BTU/scf BTU/scf BTU/scf BTU/scf BTU/scf
35. Temperature of flare gas: °F	36. Flare gas flow rate: scf/min
37. Flare gas heat content: ~1,189 (design) BTU/ft^3	38. Flare gas exit velocity: scf/min
39. Maximum rate during emergency for one major piece of equipment or process unit: scf/min	
40. Maximum rate during emergency for one major piece of equipment or process unit: BTU/min	
41. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):	
42. Describe the collection material disposal system:	
43. Have you included ***Flare Control Device*** in the Emissions Points Data Summary Sheet?	

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:
Presence of pilot (temperature) Blowdown Volumes (scf/yr)	None
REPORTING:	**TESTING:**
None	None

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.
VOC – 98%
HAP – 98%

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

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

• Burners
• Flares
• Incinerators
• Combustion Systems

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5 June 2015

Mr. Andres Zapata
NGL Process Engineer
CONSOL Energy

Reference: T50599F

Dear Mr. Zapata

Per our understanding of the defined process conditions, the flare referenced under T50599F is understood to be an emergency flare and such as we confirm that this system is compliance with 40 CFR 60.18. This means that for any continuous flaring which we understand is purge only and will have an exit velocity of 21 ft/s. The exit area is proprietary and cannot be provided. The lower heating value for the flare gas is 44.3MJ/scm. Using the maximum permitted velocity equation provided in 40 CFR 60.18, Log10(Vmax)=(Ht+28.8)/31.7 results in 202.3m/s or 663.7 ft/s. The maximum velocity for an un-assisted flare cannot exceed 400 ft/s per 40 CFR 60.18 and will be the limit for continuous operation velocity. 400 ft/s exit velocity corresponds with 35% of the maximum design flow rate and any flow rate above this will be in violation of 40 CFR 60.18. The flare is compliance with 40 CFR 60.18 since the 21 ft/s purge velocity is less than the requirement of 400 ft/s. The system is not designed to meet 40 CFR 60.18 velocity limits for the maximum design rate which is acceptable per 40 CFR 60.18 if it is an upset or emergency flaring condition.

In addition, the flare is designed for a maximum heat release of 173.5 MMBTU/hr associated with a flow rate of 3.5MMSCFD based on 330 psig, 50°F, 21.88 Molecular Weight and a lower heating value of 1,189 BTU/SCFT.

Best Regards,

Michael Potwora
Applications Engineer, Flare Division
Zeeco Inc

ATTACHMENT N

Supporting Emission Calculations

CONE Midstream Partners, LP - Majorsville Station
Facility-Wide Emissions Summary

	Majorsville Station									Majorsville Station Post Project TOTAL	
	Caterpillar 3608LE Compressor Engines	Cummins Emergency Generator	Hot Oil Heater	Condensate Stabilizer Reboiler	Dehydration Units & Enclosed Ground Flares	Six (6) Condensate Storage Tanks	Blowdown Flare	Station Fugitives	Reboiler		
Emissions Unit ID	**E-3 to E-4**	**EG-1**	**HTR-2**	**BLR-2**	**DEHY-1. DEHY-2, DEHY-3 FL-1, FL-2, FL-3**	**T05-T11**	**BDF-1**	**FUG**	**BLR-1, BLR-3, BLR-4**		
Emissions Point ID	**E-3 to E-4**	**EG-1**	**HTR-2**	**BLR-2**	**FL-1, FL-2, FL-3**	**VRU**	**BDF-1**		**BLR-1, BLR-3, BLR-4**		
Equipment Status	***Existing***	***Existing***	***Existing***	***Existing***	**2 Existing/Modified 1 New**	**Existing**	**New**	**Existing**	**2 Existing 1 New**		
Capacity	**2,730**	**755**	**7.13**	**0.75**	**200**	**Five (5) 16,800 One (1) 21,000**	**174**	**ALL**	**2.86**		
Unit	**HP**	**HP**	**MMBtu/hr**	**MMBtu/hr**	**MMSCFD**	**gallon**	**MMBtu/hr**	**N/A**	**MMBtu/hr**		
# of Emission Units	**2**	**1**	**1**	**1**	**3**	**6**	**1**	**N/A**	**3**		
Hours per Year	**8,760**	**500**	**8,760**	**8,760**	**8,760**	**8,760**	**NA**	**8,760**	**8,760**		
Pollutant	**tpy**	**tpy**	**tpy**	**tpy**	**tpy**	**tpy**	**tpy**	**tpy**	**tpy**	**lb/hr**	**tpy**
PM_{10}	1.38	0.02	0.19	0.02	0.51	---	0.00	---	0.23	**0.54**	**2.4**
$PM_{2.5}$	1.38	0.02	0.19	0.02	0.51	---	0.00	---	0.23	**0.54**	**2.4**
SO_X	0.08	0.01	0.02	0.00	0.04	---	0.00	---	0.02	**0.04**	**0.2**
CO	8.80	0.12	2.13	0.22	5.69	---	4.82	---	2.56	**5.56**	**24.3**
NO_X	22.88	1.95	2.54	0.27	6.78	---	1.10	---	3.05	**8.80**	**38.6**
VOC	14.42	0.04	0.14	0.01	25.63	42.20	2.11	10.82	0.17	**21.81**	**95.5**
CO_2e	16,156	195	3,658	385	11,039	---	2,094	261	4,401	**8,719**	**38,189**
Formaldehyde	1.92	0.00	0.00	0.00	---	---	---	---	0.002	**0.44**	**1.9**
Total HAPs	5.62	0.00	0.05	0.01	2.18	1.19	0.03	3.96	0.06	**2.99**	**13.1**

Dehydration Unit & Combustor Emissions (DEHY-1, DEHY-2, DEHY-3 & FL-3)

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY

Controlled Regenerator Emissions

Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon dioxide	1.7700	42.48	7.753
Methane	3.0617	73.48	13.410
Ethane	1.1249	27.00	4.927
Propane	0.5898	14.16	2.583
Isobutane	0.1157	2.78	0.507
n-Butane	0.2517	6.04	1.102
Isopentane	0.0736	1.77	0.322
n-Pentane	0.0773	1.86	0.339
Cyclopentane	0.0135	0.32	0.059
n-Hexane*	0.0327	0.78	0.143
Cyclohexane	0.0116	0.28	0.051
Other Hexanes	0.0455	1.09	0.199
Heptanes	0.0447	1.07	0.196
Methylcyclohexane	0.0211	0.51	0.092
2,2,4-Trimethylpentane*	0.0001	0.00	0.000
Benzene*	0.0183	0.44	0.080
Toluene*	0.0554	1.33	0.243
Xylenes*	0.0531	1.27	0.233
C8+ Heavier Hydrocarbons	0.0779	1.87	0.341
Total Emissions	5.6686	136.05	24.828
Total Hydrocarbon Emissions	5.6686	136.05	24.828
Total VOC Emissions	1.4820	35.57	6.491
Total HAP Emissions	0.1596	3.83	0.699

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY

Flash Gas Emissions

Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon dioxide	1.0400	24.96	4.555
Methane	0.6827	16.38	2.990
Ethane	0.5317	12.76	2.329
Propane	0.2638	6.33	1.155
Isobutane	0.0453	1.09	0.198
n-Butane	0.0910	2.18	0.399
Isopentane	0.0223	0.54	0.098
n-Pentane	0.0213	0.51	0.093
Cyclopentane	0.0016	0.04	0.007
n-Hexane*	0.0059	0.14	0.026
Cyclohexane	0.0008	0.02	0.004
Other Hexanes	0.0099	0.24	0.043
Heptanes	0.0044	0.11	0.019
Methylcyclohexane	0.0010	0.02	0.004
2,2,4-Trimethylpentane*	0.0001	0.00	0.000
Benzene*	0.0001	0.00	0.000
Toluene*	0.0003	0.01	0.001
Xylenes*	0.0001	0.00	0.000
C8+ Heavier Hydrocarbons	0.0010	0.02	0.004
Total Emissions	1.6832	40.40	7.372
Total Hydrocarbon Emissions	1.6832	40.40	7.372
Total VOC Emissions	0.4689	11.254	2.054
Total HAP Emissions	0.0064	0.15	0.028

Dehydration Unit & Combustor Emissions (DEHY-1, DEHY-2, DEHY-3 & FL-3)

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY [1]

Combined Regenerator and Flash Gas Emissions [2]

Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon dioxide	2.8100	67.4400	12.3078
Methane	3.7444	89.8656	16.4005
Ethane	1.6566	39.7584	7.2559
Propane	0.8536	20.4864	3.7388
Isobutane	0.1610	3.8640	0.7052
n-Butane	0.3427	8.2248	1.5010
Isopentane	0.0959	2.3016	0.4200
n-Pentane	0.0986	2.3664	0.4319
Cyclopentane	0.0151	0.3624	0.0661
n-Hexane*	0.0386	0.9264	0.1691
Cyclohexane	0.0124	0.2976	0.0543
Other Hexanes	0.0554	1.3296	0.2427
Heptanes	0.0491	1.1784	0.2151
Methylcyclohexane	0.0221	0.5304	0.0968
2,2,4-Trimethylpentane*	0.0002	0.0048	0.0009
Benzene*	0.0184	0.4416	0.0806
Toluene*	0.0557	1.3368	0.2440
Xylenes*	0.0532	1.2768	0.2330
C8+ Heavier Hydrocarbons	0.0789	1.8936	0.3456
Total Emissions	7.3518	176.4432	32.2009
Total Hydrocarbon Emissions	7.3518	176.4432	32.2009
Total VOC Emissions	1.9509	46.8216	8.5449
Total HAP Emissions	0.1660	3.9840	0.7271

*HAPs

Enclosed Ground Flare (FL-3) Emissions Calculations:

Combustor Rating	6.0	MMbtu/hr
Pilot Rating	0.35	MMbtu/hr
Higher Heating Value (HHV)	1,231	btu/scf

Pollutant	Emission Factors [a] (lb/MMBtu)	Combustor Potential Emissions (lb/hr)	Combustor Potential Emissions (tpy)	Pilot Potential Emissions (lb/hr)	Pilot Potential Emissions (tpy)
NO_x	0.081	0.487	2.134	0.028	0.124
CO	0.068	0.409	1.793	0.024	0.105
PM/PM_{10}	0.006	0.037	0.162	0.0022	0.009
SO_2	0.000	0.003	0.013	1.71E-04	7.47E-04
CO_2 [b] (Natural Gas Firing)	116.997	701.984	3074.689	40.949	179.357
CH_4 [b] (Natural Gas Firing)	0.002	0.013	0.058	7.72E-04	3.38E-03
N_2O [b] (Natural Gas Firing)	0.000	0.001	0.006	7.72E-05	3.38E-04

[a] Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, 1.4-3 & 1.4-4.

[b] GHG Emission factors from Tables C-1 and C-2, 40 CFR 98, Subpart C.

[1] Based on GRI GLYCalc 4.0 run at dry gas flowrate of 200 MMSCFD and T and P of 115°F and 1000 psig, respectively and stripping gas at 75 scfm. Still and flash tank emissions are controlled by the enclosed combustor (regen) or reboiler with flare backup (flash tank) at a destruction efficiency of 98%.

Reboiler
BLR-4

Source Designation:	
Manufacturer:	TBD
Year Installed:	TBD
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,231
Heat Input (MMBtu/hr)	2.86
Fuel Consumption (MMscf/hr):	2.32E-03
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[a]	Potential Emissions (lb/hr)[b]	Potential Emissions (tons/yr)[c]
NO_x	100	0.23	1.02
CO	84	0.20	0.85
SO_2	0.6	0.001	0.006
PM Total	7.6	0.02	0.08
PM Condensable	5.7	0.01	0.06
PM_{10} (Filterable)	1.9	0.00	0.02
$PM_{2.5}$ (Filterable)	1.9	0.00	0.02
VOC	5.5	0.01	0.06
CO_2 [d] (Natural Gas Firing)	144,065	334.61	1465.60
CH_4 [d] (Natural Gas Firing)	2.7	0.01	0.03
N_2O [d] (Natural Gas Firing)	0.27	0.00	0.00

Reboiler
BLR-4

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[a]	Potential Emissions	
		(lb/hr)[b]	(tons/yr)[c]
HAPs:			
3-Methylchloranthrene	1.8E-06	4.18E-09	1.83E-08
7,12-Dimethylbenz(a)anthracene	1.6E-05	3.72E-08	1.63E-07
Acenaphthene	1.8E-06	4.18E-09	1.83E-08
Acenaphthylene	1.8E-06	4.18E-09	1.83E-08
Anthracene	2.4E-06	5.57E-09	2.44E-08
Benz(a)anthracene	1.8E-06	4.18E-09	1.83E-08
Benzene	2.1E-03	4.88E-06	2.14E-05
Benzo(a)pyrene	1.2E-06	2.79E-09	1.22E-08
Benzo(b)fluoranthene	1.8E-06	4.18E-09	1.83E-08
Benzo(g,h,i)perylene	1.2E-06	2.79E-09	1.22E-08
Benzo(k)fluoranthene	1.8E-06	4.18E-09	1.83E-08
Chrysene	1.8E-06	4.18E-09	1.83E-08
Dibenzo(a,h) anthracene	1.2E-06	2.79E-09	1.22E-08
Dichlorobenzene	1.2E-03	2.79E-06	1.22E-05
Fluoranthene	3.0E-06	6.97E-09	3.05E-08
Fluorene	2.8E-06	6.50E-09	2.85E-08
Formaldehyde	7.5E-02	1.74E-04	7.63E-04
Hexane	1.8E+00	4.18E-03	1.83E-02
Indo(1,2,3-cd)pyrene	1.8E-06	4.18E-09	1.83E-08
Phenanthrene	1.7E-05	3.95E-08	1.73E-07
Pyrene	5.0E-06	1.16E-08	5.09E-08
Toluene	3.4E-03	7.90E-06	3.46E-05
Arsenic	2.0E-04	4.65E-07	2.03E-06
Beryllium	1.2E-05	2.79E-08	1.22E-07
Cadmium	1.1E-03	2.55E-06	1.12E-05
Chromium	1.4E-03	3.25E-06	1.42E-05
Cobalt	8.4E-05	1.95E-07	8.55E-07
Lead	5.0E-04	1.16E-06	5.09E-06
Manganese	3.8E-04	8.83E-07	3.87E-06
Mercury	2.6E-04	6.04E-07	2.65E-06
Nickel	2.1E-03	4.88E-06	2.14E-05
Selenium	2.4E-05	5.57E-08	2.44E-07
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.4E-05	5.57E-08	2.44E-07
Naphthalene	6.1E-04	1.42E-06	6.21E-06
Total HAP		**4.39E-03**	**1.92E-02**

[a] Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, 1.4-3 & 1.4-4.

[b] Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).

[c] Annual Emissions $(tons/yr)_{Potential}$ = $(lb/hr)_{Emissions}$ × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

Reboiler
BLR-4

[d] GHG Emission factors from Tables C-1 and C-2, 40 CFR 98, Subpart C.

Hot Oil Heater
HTR-2

Source Designation:	
Year Installed:	2014
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,231
Heat Input (MMBtu/hr)	7.13
Fuel Consumption (MMscf/hr):	5.79E-03
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[a]	Potential Emissions (lb/hr)[b]	Potential Emissions (tons/yr)[c]
NO_x	100	0.58	2.54
CO	84	0.49	2.13
SO_2	0.6	0.003	0.015
PM Total	7.6	0.04	0.19
PM Condensable	5.7	0.03	0.14
PM_{10} (Filterable)	1.9	0.01	0.05
$PM_{2.5}$ (Filterable)	1.9	0.01	0.05
VOC	5.5	0.03	0.14
CO_2 [d] (Natural Gas Firing)	144,065	834.19	3653.76
CH_4 [d] (Natural Gas Firing)	2.7	0.02	0.07
N_2O [d] (Natural Gas Firing)	0.27	0.00	0.01

Hot Oil Heater
HTR-2

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[a]	Potential Emissions (lb/hr)[b]	Potential Emissions (tons/yr)[c]
HAPs:			
3-Methylchloranthrene	1.8E-06	1.04E-08	4.57E-08
7,12-Dimethylbenz(a)anthracene	1.6E-05	9.26E-08	4.06E-07
Acenaphthene	1.8E-06	1.04E-08	4.57E-08
Acenaphthylene	1.8E-06	1.04E-08	4.57E-08
Anthracene	2.4E-06	1.39E-08	6.09E-08
Benz(a)anthracene	1.8E-06	1.04E-08	4.57E-08
Benzene	2.1E-03	1.22E-05	5.33E-05
Benzo(a)pyrene	1.2E-06	6.95E-09	3.04E-08
Benzo(b)fluoranthene	1.8E-06	1.04E-08	4.57E-08
Benzo(g,h,i)perylene	1.2E-06	6.95E-09	3.04E-08
Benzo(k)fluoranthene	1.8E-06	1.04E-08	4.57E-08
Chrysene	1.8E-06	1.04E-08	4.57E-08
Dibenzo(a,h) anthracene	1.2E-06	6.95E-09	3.04E-08
Dichlorobenzene	1.2E-03	6.95E-06	3.04E-05
Fluoranthene	3.0E-06	1.74E-08	7.61E-08
Fluorene	2.8E-06	1.62E-08	7.10E-08
Formaldehyde	7.5E-02	4.34E-04	1.90E-03
Hexane	1.8E+00	1.04E-02	4.57E-02
Indo(1,2,3-cd)pyrene	1.8E-06	1.04E-08	4.57E-08
Phenanthrene	1.7E-05	9.84E-08	4.31E-07
Pyrene	5.0E-06	2.90E-08	1.27E-07
Toluene	3.4E-03	1.97E-05	8.62E-05
Arsenic	2.0E-04	1.16E-06	5.07E-06
Beryllium	1.2E-05	6.95E-08	3.04E-07
Cadmium	1.1E-03	6.37E-06	2.79E-05
Chromium	1.4E-03	8.11E-06	3.55E-05
Cobalt	8.4E-05	4.86E-07	2.13E-06
Lead	5.0E-04	2.90E-06	1.27E-05
Manganese	3.8E-04	2.20E-06	9.64E-06
Mercury	2.6E-04	1.51E-06	6.59E-06
Nickel	2.1E-03	1.22E-05	5.33E-05
Selenium	2.4E-05	1.39E-07	6.09E-07
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.4E-05	1.39E-07	6.09E-07
Naphthalene	6.1E-04	3.53E-06	1.55E-05
Total HAP		**1.09E-02**	**4.79E-02**

[a] Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, 1.4-3 & 1.4-4.

[b] Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).

[c] Annual Emissions $(tons/yr)_{Potential}$ = $(lb/hr)_{Emissions}$ × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

[d] GHG Emission factors from Tables C-1 and C-2, 40 CFR 98, Subpart C.

Condensate Stabilizer Reboiler
BLR-2

Source Designation:	
Year Installed:	2014
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,231
Heat Input (MMBtu/hr)	0.75
Fuel Consumption (MMscf/hr):	6.09E-04
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[a]	Potential Emissions (lb/hr)[b]	Potential Emissions (tons/yr)[c]
NO_x	100	0.06	0.27
CO	84	0.05	0.22
SO_2	0.6	0.000	0.002
PM Total	7.6	0.00	0.02
PM Condensable	5.7	0.00	0.02
PM_{10} (Filterable)	1.9	0.00	0.01
$PM_{2.5}$ (Filterable)	1.9	0.00	0.01
VOC	5.5	0.00	0.01
CO_2 [d] (Natural Gas Firing)	144,065	87.75	384.34
CH_4 [d] (Natural Gas Firing)	2.7	0.00	0.01
N_2O [d] (Natural Gas Firing)	0.27	0.00	0.00

Condensate Stabilizer Reboiler
BLR-2

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[a]	Potential Emissions (lb/hr)[b]	Potential Emissions (tons/yr)[c]
HAPs:			
3-Methylchloranthrene	1.8E-06	1.10E-09	4.80E-09
7,12-Dimethylbenz(a)anthracene	1.6E-05	9.75E-09	4.27E-08
Acenaphthene	1.8E-06	1.10E-09	4.80E-09
Acenaphthylene	1.8E-06	1.10E-09	4.80E-09
Anthracene	2.4E-06	1.46E-09	6.40E-09
Benz(a)anthracene	1.8E-06	1.10E-09	4.80E-09
Benzene	2.1E-03	1.28E-06	5.60E-06
Benzo(a)pyrene	1.2E-06	7.31E-10	3.20E-09
Benzo(b)fluoranthene	1.8E-06	1.10E-09	4.80E-09
Benzo(g,h,i)perylene	1.2E-06	7.31E-10	3.20E-09
Benzo(k)fluoranthene	1.8E-06	1.10E-09	4.80E-09
Chrysene	1.8E-06	1.10E-09	4.80E-09
Dibenzo(a,h) anthracene	1.2E-06	7.31E-10	3.20E-09
Dichlorobenzene	1.2E-03	7.31E-07	3.20E-06
Fluoranthene	3.0E-06	1.83E-09	8.00E-09
Fluorene	2.8E-06	1.71E-09	7.47E-09
Formaldehyde	7.5E-02	4.57E-05	2.00E-04
Hexane	1.8E+00	1.10E-03	4.80E-03
Indo(1,2,3-cd)pyrene	1.8E-06	1.10E-09	4.80E-09
Phenanthrene	1.7E-05	1.04E-08	4.54E-08
Pyrene	5.0E-06	3.05E-09	1.33E-08
Toluene	3.4E-03	2.07E-06	9.07E-06
Arsenic	2.0E-04	1.22E-07	5.34E-07
Beryllium	1.2E-05	7.31E-09	3.20E-08
Cadmium	1.1E-03	6.70E-07	2.93E-06
Chromium	1.4E-03	8.53E-07	3.73E-06
Cobalt	8.4E-05	5.12E-08	2.24E-07
Lead	5.0E-04	3.05E-07	1.33E-06
Manganese	3.8E-04	2.31E-07	1.01E-06
Mercury	2.6E-04	1.58E-07	6.94E-07
Nickel	2.1E-03	1.28E-06	5.60E-06
Selenium	2.4E-05	1.46E-08	6.40E-08
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.4E-05	1.46E-08	6.40E-08
Naphthalene	6.1E-04	3.72E-07	1.63E-06
Total HAP		**1.15E-03**	**5.04E-03**

[a] Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, 1.4-3 & 1.4-4.

[b] Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).

[c] Annual Emissions $(tons/yr)_{Potential}$ = $(lb/hr)_{Emissions}$ × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

[d] GHG Emission factors from Tables C-1 and C-2, 40 CFR 98, Subpart C.

Fugitives

VOC Fugitive Emissions from Component Leaks

Equipment Type	Service	Emission Factors [1] (kg/hr/source)	Facility Equipment Count [2] (units)	Fraction VOC [3]	Hourly Fugitive VOC Emissions (lb/hr)	Annual Fugitive VOC Emissions (tpy)	Fraction VOC [3]	Hourly Fugitive HAP Emissions (lb/hr)	Annual Fugitive HAP Emissions (tpy)
Valves	Gas	0.0060	2281	0.06	1.88	8.23	0.00	0.02	0.07
Compressor Seals/Other	Gas	0.0088	17	0.06	0.02	0.09	0.00	0.00	0.00
Open ended Lines	Gas	0.0017	34	0.06	0.01	0.03	0.00	0.00	0.00
Connectors	Gas	0.00183	2233	0.06	0.56	2.47	0.00	0.19	0.84
				Emission Totals:	**2.47**	**10.82**		**0.21**	**0.92**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-1 for all types except compressors/other, which are from Table 2.1. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995).

[2] Assumes 10% increase in existing count. Assumes two OEL per "other equipment."

[3] Based on gas analysis sample. HAP emissions will retain existing permit limits.

GHG Fugitive Emissions from Component Leaks

Component	Component Count [1]	GHG Emission Factor [2] (scf/hr/component)	CH_4 Emissions [3,4] (tpy)	CO_2 Emissions [3,4] (tpy)	CO_2e Emissions [5] (tpy)
Valves	2,281	0.027	9.05	0.04	226.34
Compressor Seals/Other	17	0.040	0.10	0.00	2.50
Open ended Lines	34	0.061	0.30	0.00	7.62
Connectors	2,233	0.003	0.98	0.00	24.62
Total			**10.44**	**0.05**	**261**

[1] The component count for pneumatics is estimated based on component counts at similar facilities.

[2] Population emission factors for gas service in the Eastern U.S. from *Table W-1A of Subpart W - Default Whole Gas Emission Factors for Onshore Production*, 40 CFR 98, Subpart W, except for pneumatics, which are set at NSPS OOOO limits.

[3] Calculated in accordance with Equations W-31, W-35 and W-36 in Subpart W of 40 CFR 98.

[4] Fractions of CH_4 and CO_2 based on gas analysis:

CH_4: 0.793 CO_2: 0.001

[5] Carbon equivalent emissions (CO_2e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98:

Carbon Dioxide (CO_2): 1

Methane (CH_4): 25

Blowdown Flare (BDF-1) Emissions Calculations:

Volume of Blowdown Event	1.2	MMscfd
Maximum Blowdown Volume (pigging, compressors, etc.)	25.0	MMSCF/yr
Nominal Design Heat Input Capacity	173.5	MMBtu/hr
Pilot Rating	65	scfh (each 2 total)
Higher Heating Value (HHV)	1,231	btu/scf
Control Efficiency	98%	
HAP MW in Gas Analysis	0.05	lb VOC/lbmole total gas
VOC MW in Gas Analysis	3.19	lb VOC/lbmole total gas
CH_4 MW in Gas Analysis	12.72	lb CH4/lbmole total gas

Blowdown Flare VOC Mass Flow Rate (BDF-1)

$$\frac{51{,}042\ \text{scf}}{\text{hr}} * \frac{1\ \text{lbmole}}{379\ \text{scf}} * \frac{3.19\ \text{lb}}{\text{lbmole}} * (1\text{-}98\%) = \mathbf{8.60}\ \frac{\text{lb}}{\text{hr}}$$

Mass flow rate (lb/hr) = Maximum Rated total flow capacity (scf/hr) * Vapor Molecular Weight (lb/lbmole) * (1-98% control)
Molar Gas Volume (scf/lbmole)

Blowdown Flare VOC Mass Flow Rate (BDF-1)

$$\frac{25{,}000{,}000\ \text{scf}}{\text{yr}} * \frac{1\ \text{lbmole}}{379\ \text{scf}} * \frac{3.19\ \text{lb}}{\text{lbmole}} * \frac{1\ \text{ton}}{2000\ \text{lbs}} * (1\text{-}98\%) = \mathbf{2.11}\ \frac{\text{ton}}{\text{yr}}$$

Mass flow rate (ton/yr) = Maximum Rated total flow capacity (scf/hr) * Vapor Molecular Weight (lb/lbmole) * (1-98% control)
Molar Gas Volume (scf/lbmole) * 2000 (lbs/ton)

Pollutant	Pilot Emission Factors[1] (lb/MMBtu)	Flare Emission Factors[2] (lb/MMBtu)	Pilot Combustion Potential Emissions (lb/hr)	Pilot Combustion Potential Emissions (tpy)	Flare Potential Emissions (lb/hr)	Flare Potential Emissions (tpy)
VOC			---	---	8.60	2.11
HAP			---	---	0.13	0.03
NO_x	0.081	0.068	0.01	0.06	11.80	1.05
CO	0.068	0.310	0.01	0.05	53.79	4.77
PM/PM_{10}	0.006	0.000	0.00	0.00	0.00	0.00
SO_2	0.000	0.000	0.00	0.00	0.00	0.00
CO_2[3] (Natural Gas Firing)	116.997		18.73	82	20,299	1,801
CH_4[3] (Natural Gas Firing)	0.002		0.00	0.00	0.38	0.03
N_2O[3] (Natural Gas Firing)	0.000		0.00	0.000	0.04	0.00
CH_4 (Vented Emissions)					34.25	8.39
CO2e			19	82	21,176	2,012

1. Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, 1.4-3 & 1.4-4.
2. Emission factors from AP-42 Section 13.5 "Industrial Flares" - assumes smokeless and negligible sulfur content.
3. GHG Emission factors from Tables C-1 and C-2, 40 CFR 98, Subpart C.
4. Maximum Blowdown Volume conservatively accounts for compressor blowdowns and pipeline pigging events at the station.

Flare Gas Combustion Sample Calculations:
Combustion Emissions (lb/hr): Nominal Heat Input Rating (MMBtu/hr) x Emission Factor (lb/MMBtu)
Combustion Emissions (tpy): Volume of Gas Vented (MMscf/yr) x Heat Content of Gas (Btu/scf) x Emission Factor (lb/MMBtu) / 2000 (lb/ton)

Gas Analysis

Higher Heating Value 1,231 btu/scf

Constituent	Concentration (Vol %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.1390%	44.01	0.06	0.00	0.30
Nitrogen	0.3490%	14.01	0.05	0.00	0.24
Methane	79.2756%	16.04	12.72	0.63	62.88
Ethane	13.9757%	30.07	4.20	0.21	20.78
Propane	4.1061%	44.10	1.81	0.09	8.95
Isobutane	0.5241%	58.12	0.30	0.02	1.51
n-Butane	0.9673%	58.12	0.56	0.03	2.78
Isopentane	0.2300%	72.15	0.17	0.01	0.82
n-Pentane	0.2056%	72.15	0.15	0.01	0.73
Cyclopentane	0.0107%	70.1	0.01	0.00	0.04
n-Hexane*	0.0526%	86.18	0.05	0.00	0.22
Cyclohexane	0.0050%	84.16	0.00	0.00	0.02
Other Hexanes	0.0890%	86.18	0.08	0.00	0.38
Heptanes	0.0398%	100.20	0.04	0.00	0.20
Methylcyclohexane	0.0077%	98.19	0.01	0.00	0.04
2,2,4-Trimethylpentane*	0.0001%	114.23	0.00	0.00	0.00
Benzene*	0.0010%	78.11	0.00	0.00	0.00
Toluene*	0.0020%	92.14	0.00	0.00	0.01
Ethylbenzene*	0.0000%	106.17	0.00	0.00	0.00
Xylenes*	0.0010%	106.16	0.00	0.00	0.01
C8+ Heavies	0.0148%	114.23	0.02	0.00	0.08
Totals	100%		20.22	1.00	100.00

*HAPs

TOC (Total)	99.51%	20.11	99.46
VOC (Total)	6.26%	3.19	15.79
HAP (Total)	0.06%	0.05	0.24

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: 2015 Majorsville
File Name: Z:\Client\CONSOL\Corporate\Projects\153901.0019 Majorsville R-13\04 Draft\Attachment N - Emission Calculations\201506183 Majorsville Dehy v2.0.ddf
Date: June 18, 2015

DESCRIPTION:

Description: 200 MMSCFD DEHY UNIT
5/7/14 Sample
75 scf stripping gas
98% control

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	3.0617	73.480	13.4100
Ethane	1.1249	26.997	4.9270
Propane	0.5898	14.156	2.5835
Isobutane	0.1157	2.778	0.5069
n-Butane	0.2517	6.041	1.1025
Isopentane	0.0736	1.765	0.3222
n-Pentane	0.0773	1.856	0.3387
Cyclopentane	0.0135	0.325	0.0592
n-Hexane	0.0327	0.785	0.1433
Cyclohexane	0.0116	0.279	0.0510
Other Hexanes	0.0455	1.091	0.1991
Heptanes	0.0447	1.072	0.1956
Methylcyclohexane	0.0211	0.507	0.0925
2,2,4-Trimethylpentane	0.0001	0.002	0.0003
Benzene	0.0183	0.439	0.0800
Toluene	0.0554	1.331	0.2429
Xylenes	0.0531	1.274	0.2326
C8+ Heavies	0.0779	1.869	0.3411
Total Emissions	5.6686	136.046	24.8284
Total Hydrocarbon Emissions	5.6686	136.046	24.8284
Total VOC Emissions	1.4820	35.569	6.4914
Total HAP Emissions	0.1596	3.830	0.6990
Total BTEX Emissions	0.1268	3.044	0.5555

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	153.0826	3673.983	670.5019
Ethane	56.2441	1349.859	246.3493
Propane	29.4921	707.811	129.1756
Isobutane	5.7869	138.885	25.3466
n-Butane	12.5853	302.047	55.1237
Isopentane	3.6775	88.260	16.1075
n-Pentane	3.8660	92.785	16.9333

Cyclopentane	0.6762	16.228	2.9616
n-Hexane	1.6356	39.255	7.1640
Cyclohexane	0.5822	13.974	2.5502
Other Hexanes	2.2732	54.556	9.9565
Heptanes	2.2329	53.589	9.7800
Methylcyclohexane	1.0562	25.348	4.6260
2,2,4-Trimethylpentane	0.0033	0.079	0.0144
Benzene	0.9138	21.931	4.0024
Toluene	2.7723	66.536	12.1428
Xylenes	2.6547	63.713	11.6277
C8+ Heavies	3.8941	93.458	17.0561
Total Emissions	283.4291	6802.298	1241.4194
Total Hydrocarbon Emissions	283.4291	6802.298	1241.4194
Total VOC Emissions	74.1023	1778.456	324.5682
Total HAP Emissions	7.9797	191.514	34.9513
Total BTEX Emissions	6.3408	152.180	27.7729

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.6827	16.384	2.9901
Ethane	0.5317	12.761	2.3288
Propane	0.2638	6.332	1.1555
Isobutane	0.0453	1.086	0.1983
n-Butane	0.0910	2.185	0.3987
Isopentane	0.0223	0.534	0.0975
n-Pentane	0.0213	0.512	0.0935
Cyclopentane	0.0016	0.040	0.0072
n-Hexane	0.0059	0.142	0.0258
Cyclohexane	0.0008	0.018	0.0033
Other Hexanes	0.0099	0.238	0.0435
Heptanes	0.0044	0.107	0.0195
Methylcyclohexane	0.0010	0.025	0.0045
2,2,4-Trimethylpentane	<0.0001	<0.001	<0.0001
Benzene	0.0001	0.003	0.0006
Toluene	0.0003	0.006	0.0011
Xylenes	0.0001	0.002	0.0004
C8+ Heavies	0.0010	0.023	0.0042
Total Emissions	1.6832	40.398	7.3726
Total Hydrocarbon Emissions	1.6832	40.398	7.3726
Total VOC Emissions	0.4689	11.253	2.0537
Total HAP Emissions	0.0064	0.154	0.0281
Total BTEX Emissions	0.0005	0.012	0.0022

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	34.1332	819.198	149.5036
Ethane	26.5849	638.039	116.4420
Propane	13.1907	316.577	57.7753
Isobutane	2.2632	54.316	9.9127
n-Butane	4.5516	109.238	19.9360
Isopentane	1.1131	26.714	4.8753
n-Pentane	1.0674	25.617	4.6751

Cyclopentane	0.0825	1.979	0.3612
n-Hexane	0.2951	7.082	1.2925
Cyclohexane	0.0382	0.918	0.1675
Other Hexanes	0.4961	11.907	2.1731
Heptanes	0.2222	5.333	0.9733
Methylcyclohexane	0.0515	1.237	0.2257
2,2,4-Trimethylpentane	0.0005	0.012	0.0022
Benzene	0.0070	0.168	0.0306
Toluene	0.0131	0.314	0.0574
Xylenes	0.0045	0.109	0.0199
C8+ Heavies	0.0475	1.140	0.2081
Total Emissions	84.1625	2019.899	368.6316
Total Hydrocarbon Emissions	84.1625	2019.899	368.6316
Total VOC Emissions	23.4443	562.663	102.6860
Total HAP Emissions	0.3202	7.685	1.4026
Total BTEX Emissions	0.0246	0.591	0.1078

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	3.7443	89.864	16.4001
Ethane	1.6566	39.758	7.2558
Propane	0.8537	20.488	3.7390
Isobutane	0.1610	3.864	0.7052
n-Butane	0.3427	8.226	1.5012
Isopentane	0.0958	2.299	0.4197
n-Pentane	0.0987	2.368	0.4322
Cyclopentane	0.0152	0.364	0.0665
n-Hexane	0.0386	0.927	0.1691
Cyclohexane	0.0124	0.298	0.0544
Other Hexanes	0.0554	1.329	0.2426
Heptanes	0.0491	1.178	0.2151
Methylcyclohexane	0.0222	0.532	0.0970
2,2,4-Trimethylpentane	0.0001	0.002	0.0003
Benzene	0.0184	0.442	0.0807
Toluene	0.0557	1.337	0.2440
Xylenes	0.0532	1.276	0.2330
C8+ Heavies	0.0788	1.892	0.3453
Total Emissions	7.3518	176.444	32.2010
Total Hydrocarbon Emissions	7.3518	176.444	32.2010
Total VOC Emissions	1.9509	46.822	8.5451
Total HAP Emissions	0.1660	3.984	0.7271
Total BTEX Emissions	0.1273	3.055	0.5576

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction
Methane	820.0055	16.4001	98.00
Ethane	362.7913	7.2558	98.00
Propane	186.9509	3.7390	98.00
Isobutane	35.2593	0.7052	98.00
n-Butane	75.0596	1.5012	98.00

Isopentane	20.9828	0.4197	98.00
n-Pentane	21.6084	0.4322	98.00
Cyclopentane	3.3228	0.0665	98.00
n-Hexane	8.4565	0.1691	98.00
Cyclohexane	2.7177	0.0544	98.00
Other Hexanes	12.1296	0.2426	98.00
Heptanes	10.7533	0.2151	98.00
Methylcyclohexane	4.8516	0.0970	98.00
2,2,4-Trimethylpentane	0.0167	0.0003	98.00
Benzene	4.0330	0.0807	98.00
Toluene	12.2002	0.2440	98.00
Xylenes	11.6475	0.2330	98.00
C8+ Heavies	17.2642	0.3453	98.00
Total Emissions	1610.0511	32.2010	98.00
Total Hydrocarbon Emissions	1610.0511	32.2010	98.00
Total VOC Emissions	427.2542	8.5451	98.00
Total HAP Emissions	36.3539	0.7271	98.00
Total BTEX Emissions	27.8807	0.5576	98.00

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 70.00 deg. F
Excess Oxygen: 2.00 %
Combustion Efficiency: 98.00 %
Supplemental Fuel Requirement: 1.51e+000 MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	2.00%	98.00%
Isobutane	2.00%	98.00%
n-Butane	2.00%	98.00%
Isopentane	2.00%	98.00%
n-Pentane	2.00%	98.00%
Cyclopentane	2.00%	98.00%
n-Hexane	2.00%	98.00%
Cyclohexane	2.00%	98.00%
Other Hexanes	2.00%	98.00%
Heptanes	2.00%	98.00%
Methylcyclohexane	2.00%	98.00%
2,2,4-Trimethylpentane	2.00%	98.00%
Benzene	2.00%	98.00%
Toluene	2.00%	98.00%
Xylenes	2.00%	98.00%
C8+ Heavies	2.00%	98.00%

ABSORBER

Calculated Absorber Stages: 1.39

Specified Dry Gas Dew Point:	7.00 lbs. H2O/MMSCF
Temperature:	115.0 deg. F
Pressure:	1000.0 psig
Dry Gas Flow Rate:	200.0000 MMSCF/day
Glycol Losses with Dry Gas:	7.9691 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	88.97 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	2.20 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	7.85%	92.15%
Carbon Dioxide	99.84%	0.16%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.96%	0.04%
Propane	99.95%	0.05%
Isobutane	99.93%	0.07%
n-Butane	99.92%	0.08%
Isopentane	99.92%	0.08%
n-Pentane	99.90%	0.10%
Cyclopentane	99.59%	0.41%
n-Hexane	99.86%	0.14%
Cyclohexane	99.38%	0.62%
Other Hexanes	99.89%	0.11%
Heptanes	99.77%	0.23%
Methylcyclohexane	99.39%	0.61%
2,2,4-Trimethylpentane	99.90%	0.10%
Benzene	94.68%	5.32%
Toluene	93.17%	6.83%
Xylenes	88.64%	11.36%
C8+ Heavies	99.34%	0.66%

FLASH TANK

Flash Control:	Combustion device
Flash Control Efficiency:	98.00 %
Flash Temperature:	100.0 deg. F
Flash Pressure:	62.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.99%	0.01%
Carbon Dioxide	50.06%	49.94%
Nitrogen	5.86%	94.14%
Methane	6.27%	93.73%
Ethane	19.45%	80.55%
Propane	37.83%	62.17%
Isobutane	49.02%	50.98%
n-Butane	56.55%	43.45%
Isopentane	60.78%	39.22%
n-Pentane	66.56%	33.44%
Cyclopentane	87.75%	12.25%
n-Hexane	78.93%	21.07%
Cyclohexane	93.52%	6.48%
Other Hexanes	73.60%	26.40%
Heptanes	88.85%	11.15%
Methylcyclohexane	95.14%	4.86%

2,2,4-Trimethylpentane	79.39%	20.61%
Benzene	99.27%	0.73%
Toluene	99.56%	0.44%
Xylenes	99.85%	0.15%
C8+ Heavies	98.85%	1.15%

REGENERATOR

Regenerator Stripping Gas:
Dry Product Gas
Stripping Gas Flow Rate: 75.0000 scfm

Component	Remaining in Glycol	Distilled Overhead
Water	23.57%	76.43%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.82%	99.18%
n-Pentane	0.75%	99.25%
Cyclopentane	0.57%	99.43%
n-Hexane	0.63%	99.37%
Cyclohexane	3.42%	96.58%
Other Hexanes	1.36%	98.64%
Heptanes	0.56%	99.44%
Methylcyclohexane	4.20%	95.80%
2,2,4-Trimethylpentane	1.89%	98.11%
Benzene	5.04%	94.96%
Toluene	7.94%	92.06%
Xylenes	12.97%	87.03%
C8+ Heavies	12.19%	87.81%

STREAM REPORTS:

WET GAS STREAM

Temperature: 115.00 deg. F
Pressure: 1014.70 psia
Flow Rate: 8.35e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.87e-001	7.43e+002
Carbon Dioxide	1.39e-001	1.34e+003
Nitrogen	3.48e-001	2.15e+003
Methane	7.91e+001	2.79e+005
Ethane	1.40e+001	9.23e+004
Propane	4.10e+000	3.98e+004
Isobutane	5.23e-001	6.69e+003

n-Butane	9.66e-001	1.23e+004
Isopentane	2.30e-001	3.65e+003
n-Pentane	2.05e-001	3.26e+003
Cyclopentane	1.07e-002	1.65e+002
n-Hexane	5.25e-002	9.96e+002
Cyclohexane	4.99e-003	9.24e+001
Other Hexanes	8.88e-002	1.68e+003
Heptanes	3.97e-002	8.76e+002
Methylcyclohexane	7.69e-003	1.66e+002
2,2,4-Trimethylpentane	9.98e-005	2.51e+000
Benzene	9.98e-004	1.72e+001
Toluene	2.00e-003	4.05e+001
Xylenes	9.98e-004	2.33e+001
C8+ Heavies	1.48e-002	5.54e+002
Total Components	100.00	4.46e+005

DRY GAS STREAM

Temperature: 115.00 deg. F
Pressure: 1014.70 psia
Flow Rate: 8.33e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.47e-002	5.83e+001
Carbon Dioxide	1.39e-001	1.34e+003
Nitrogen	3.49e-001	2.15e+003
Methane	7.93e+001	2.79e+005
Ethane	1.40e+001	9.23e+004
Propane	4.10e+000	3.98e+004
Isobutane	5.24e-001	6.69e+003
n-Butane	9.67e-001	1.23e+004
Isopentane	2.30e-001	3.64e+003
n-Pentane	2.05e-001	3.26e+003
Cyclopentane	1.07e-002	1.64e+002
n-Hexane	5.25e-002	9.94e+002
Cyclohexane	4.97e-003	9.19e+001
Other Hexanes	8.89e-002	1.68e+003
Heptanes	3.97e-002	8.74e+002
Methylcyclohexane	7.65e-003	1.65e+002
2,2,4-Trimethylpentane	9.99e-005	2.51e+000
Benzene	9.47e-004	1.62e+001
Toluene	1.86e-003	3.77e+001
Xylenes	8.86e-004	2.07e+001
C8+ Heavies	1.47e-002	5.50e+002
Total Components	100.00	4.45e+005

LEAN GLYCOL STREAM

Temperature: 115.00 deg. F
Flow Rate: 2.50e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	1.39e+004

Water	1.50e+000	2.11e+002
Carbon Dioxide	1.48e-012	2.09e-010
Nitrogen	2.28e-013	3.21e-011
Methane	8.69e-018	1.22e-015
Ethane	1.11e-007	1.56e-005
Propane	6.14e-009	8.64e-007
Isobutane	9.46e-010	1.33e-007
n-Butane	1.85e-009	2.60e-007
Isopentane	1.01e-004	1.42e-002
n-Pentane	1.13e-004	1.60e-002
Cyclopentane	2.39e-005	3.37e-003
n-Hexane	4.98e-005	7.00e-003
Cyclohexane	1.34e-004	1.89e-002
Other Hexanes	1.34e-004	1.88e-002
Heptanes	7.08e-005	9.97e-003
Methylcyclohexane	3.02e-004	4.24e-002
2,2,4-Trimethylpentane	2.65e-007	3.73e-005
Benzene	3.41e-004	4.80e-002
Toluene	1.69e-003	2.37e-001
Xylenes	2.80e-003	3.94e-001
C8+ Heavies	3.55e-003	4.99e-001
Total Components	100.00	1.41e+004

RICH GLYCOL STREAM

Temperature: 115.00 deg. F
Pressure: 1014.70 psia
Flow Rate: 2.66e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.31e+001	1.39e+004
Water	6.02e+000	8.96e+002
Carbon Dioxide	1.40e-002	2.09e+000
Nitrogen	2.15e-003	3.20e-001
Methane	2.45e-001	3.64e+001
Ethane	2.22e-001	3.30e+001
Propane	1.43e-001	2.12e+001
Isobutane	2.98e-002	4.44e+000
n-Butane	7.04e-002	1.05e+001
Isopentane	1.91e-002	2.84e+000
n-Pentane	2.15e-002	3.19e+000
Cyclopentane	4.53e-003	6.73e-001
n-Hexane	9.41e-003	1.40e+000
Cyclohexane	3.96e-003	5.90e-001
Other Hexanes	1.26e-002	1.88e+000
Heptanes	1.34e-002	1.99e+000
Methylcyclohexane	7.13e-003	1.06e+000
2,2,4-Trimethylpentane	1.67e-005	2.49e-003
Benzene	6.45e-003	9.60e-001
Toluene	2.02e-002	3.00e+000
Xylenes	2.04e-002	3.04e+000
C8+ Heavies	2.79e-002	4.14e+000
Total Components	100.00	1.49e+004

FLASH TANK OFF GAS STREAM

Temperature: 100.00 deg. F
Pressure: 76.70 psia
Flow Rate: 1.33e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.79e-001	1.13e-001
Carbon Dioxide	6.73e-001	1.04e+000
Nitrogen	3.06e-001	3.01e-001
Methane	6.06e+001	3.41e+001
Ethane	2.52e+001	2.66e+001
Propane	8.51e+000	1.32e+001
Isobutane	1.11e+000	2.26e+000
n-Butane	2.23e+000	4.55e+000
Isopentane	4.39e-001	1.11e+000
n-Pentane	4.21e-001	1.07e+000
Cyclopentane	3.35e-002	8.25e-002
n-Hexane	9.75e-002	2.95e-001
Cyclohexane	1.29e-002	3.82e-002
Other Hexanes	1.64e-001	4.96e-001
Heptanes	6.31e-002	2.22e-001
Methylcyclohexane	1.49e-002	5.15e-002
2,2,4-Trimethylpentane	1.28e-004	5.12e-004
Benzene	2.55e-003	6.99e-003
Toluene	4.05e-003	1.31e-002
Xylenes	1.22e-003	4.54e-003
C8+ Heavies	7.94e-003	4.75e-002
Total Components	100.00	8.56e+001

FLASH TANK GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 2.64e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.36e+001	1.39e+004
Water	6.05e+000	8.96e+002
Carbon Dioxide	7.06e-003	1.04e+000
Nitrogen	1.27e-004	1.88e-002
Methane	1.54e-002	2.28e+000
Ethane	4.34e-002	6.42e+000
Propane	5.43e-002	8.03e+000
Isobutane	1.47e-002	2.18e+000
n-Butane	4.00e-002	5.92e+000
Isopentane	1.17e-002	1.73e+000
n-Pentane	1.44e-002	2.12e+000
Cyclopentane	3.99e-003	5.91e-001
n-Hexane	7.47e-003	1.11e+000
Cyclohexane	3.73e-003	5.52e-001
Other Hexanes	9.35e-003	1.38e+000
Heptanes	1.20e-002	1.77e+000
Methylcyclohexane	6.82e-003	1.01e+000
2,2,4-Trimethylpentane	1.33e-005	1.97e-003
Benzene	6.44e-003	9.53e-001

Toluene	2.02e-002	2.99e+000
Xylenes	2.05e-002	3.04e+000
C8+ Heavies	2.77e-002	4.10e+000
Total Components	100.00	1.48e+004

FLASH GAS EMISSIONS

Flow Rate: 5.42e+003 scfh
Control Method: Combustion Device
Control Efficiency: 98.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.16e+001	1.58e+002
Carbon Dioxide	3.79e+001	2.38e+002
Nitrogen	7.53e-002	3.01e-001
Methane	2.98e-001	6.83e-001
Ethane	1.24e-001	5.32e-001
Propane	4.19e-002	2.64e-001
Isobutane	5.45e-003	4.53e-002
n-Butane	1.10e-002	9.10e-002
Isopentane	2.16e-003	2.23e-002
n-Pentane	2.07e-003	2.13e-002
Cyclopentane	1.65e-004	1.65e-003
n-Hexane	4.79e-004	5.90e-003
Cyclohexane	6.36e-005	7.65e-004
Other Hexanes	8.06e-004	9.92e-003
Heptanes	3.10e-004	4.44e-003
Methylcyclohexane	7.34e-005	1.03e-003
2,2,4-Trimethylpentane	6.27e-007	1.02e-005
Benzene	1.25e-005	1.40e-004
Toluene	1.99e-005	2.62e-004
Xylenes	5.98e-006	9.07e-005
C8+ Heavies	3.90e-005	9.50e-004
Total Components	100.00	3.99e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.93e+004 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.49e+001	6.85e+002
Carbon Dioxide	7.91e-002	1.77e+000
Nitrogen	8.28e-002	1.18e+000
Methane	1.88e+001	1.53e+002
Ethane	3.68e+000	5.62e+001
Propane	1.32e+000	2.95e+001
Isobutane	1.96e-001	5.79e+000
n-Butane	4.26e-001	1.26e+001
Isopentane	1.00e-001	3.68e+000
n-Pentane	1.06e-001	3.87e+000
Cyclopentane	1.90e-002	6.76e-001

n-Hexane	3.74e-002	1.64e+000
Cyclohexane	1.36e-002	5.82e-001
Other Hexanes	5.19e-002	2.27e+000
Heptanes	4.39e-002	2.23e+000
Methylcyclohexane	2.12e-002	1.06e+000
2,2,4-Trimethylpentane	5.67e-005	3.29e-003
Benzene	2.30e-002	9.14e-001
Toluene	5.93e-002	2.77e+000
Xylenes	4.92e-002	2.65e+000
C8+ Heavies	4.50e-002	3.89e+000
Total Components	100.00	9.71e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 9.63e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	7.52e+001	3.06e+000
Ethane	1.47e+001	1.12e+000
Propane	5.27e+000	5.90e-001
Isobutane	7.85e-001	1.16e-001
n-Butane	1.71e+000	2.52e-001
Isopentane	4.02e-001	7.36e-002
n-Pentane	4.22e-001	7.73e-002
Cyclopentane	7.60e-002	1.35e-002
n-Hexane	1.50e-001	3.27e-002
Cyclohexane	5.45e-002	1.16e-002
Other Hexanes	2.08e-001	4.55e-002
Heptanes	1.76e-001	4.47e-002
Methylcyclohexane	8.48e-002	2.11e-002
2,2,4-Trimethylpentane	2.27e-004	6.58e-005
Benzene	9.22e-002	1.83e-002
Toluene	2.37e-001	5.54e-002
Xylenes	1.97e-001	5.31e-002
C8+ Heavies	1.80e-001	7.79e-002
Total Components	100.00	5.67e+000

Legacy Measurement Solutions

Good

Shreveport, LA

318-226-7237

Customer	: 2325 - CNX GAS COMPANY LLC	**Date Sampled**	: 05/07/2014
Station ID	: 4205	**Date Analyzed**	: 05/14/2014
Cylinder ID	: 4620	**Effective Date**	: 06/01/2014
Producer	:	**Cyl Pressure**	: 450
Lease	: MAJORVILLE COMP STATION INLET	**Temp**	: 56
Area	: 420 - MAJORVILLE	**Cylinder Type**	: Spot
State	: WV	**Sample By**	: JM

COMPONENT	MOL%	GPM@14.73(PSIA)
Methane	79.2756	0.000
Ethane	13.9757	3.749
Propane	4.1061	1.135
Iso-Butane	0.5241	0.172
Normal-Butane	0.9673	0.306
Iso-Pentane	0.2300	0.084
Normal-Pentane	0.2056	0.075
Nitrogen	0.3490	0.000
Carbon-Dioxide	0.1390	0.000
Oxygen	0.0039	0.000
BENZENE	0.0010	0.000
TOLUENE	0.0020	0.001
ETHYLBENZENE	0.0000	0.000
2,2-Dimethylbutane	0.0076	0.003
2,3-Dimethylbutane/CycloC5	0.0107	0.004
2-methylpentane	0.0466	0.019
3-methylpentane	0.0284	0.012
Normal-Hexane	0.0526	0.022
2,2-Dimethylpentane	0.0007	0.000
Methylcyclopentane	0.0064	0.002
3,3-Dimethylpentane	0.0011	0.001
CYCLOHEXANE	0.0050	0.002
2-Methylhexane	0.0108	0.005
2,3-Dimethylpentane	0.0030	0.001
3-Methylhexane	0.0109	0.005
1,t3-Dimethylcyclopentane	0.0002	0.000
1,t2-DMCYC5 / 2,2,4-TMC5	0.0001	0.000
N-Heptane	0.0131	0.006
METHYLCYCLOHEXANE	0.0077	0.004
2,5-Dimethylhexane	0.0007	0.000
2,3-Dimethylhexane	0.0011	0.001
2-Methylheptane	0.0026	0.001
4-Methylheptane	0.0010	0.001
3-Methylheptane	0.0022	0.001
1,t4-Dimethylcyclohexane	0.0010	0.000
N-OCTANE / 1,T2-DMCYC6	0.0033	0.002
1,t3-DMCYC6/1,C4-DMCYC6/1,C2,C3-TMCYC5	0.0000	0.000
2,4,4 TMC6	0.0000	0.000

2,6-Dimethylheptane / 1,C2-DMCYC6	0.0000	0.000
Ethylcyclohexane	0.0000	0.000
M-Xylene/P-Xylene	0.0010	0.000
O-XYLENE	0.0000	0.000
NONANE	0.0015	0.001
N-DECANE	0.0009	0.001
N-UNDECANE	0.0005	0.000
TOTAL	**100.0000**	**5.616**

Compressibility Factor (Z) @ 14.73 @ 60 Deg. F = 0.9966 **C5+ GPM** : 0.16052

Ideal Gravity: 0.7001 **Real Gravity:** 0.7021 **C5+ Mole %** : 0.6593

BTU @ (PSIA)	**@14.65**	**@14.696**	**@14.73**	**@15.025**
Ideal GPM	5.566	5.584	5.596	5.709
Ideal BTU Dry	1,224.66	1,228.51	1,231.35	1,256.01
Ideal BTU Sat	1,203.23	1,207.08	1,209.92	1,234.58
Real GPM	5.585	5.602	5.615	5.728
Real BTU Dry	1,228.79	1,232.66	1,235.52	1,260.35
Real BTU Sat	1,207.76	1,211.64	1,214.50	1,239.34

Comments:

Gas Analysis performed in accordance with GPA 2261 **Sample Count** : 210000007

Analytical Calculations performed in accordance with GPA 2172 **COC** :

Lab Technician: _____ **DEBORAH J MURPHY**

ATTACHMENT O

Monitoring/Recordkeeping/Reporting/Testing Plans

ATTACHMENT O - MONITORING, RECORDING, REPORTING, AND TESTING PLANS

Plan Type	Emission unit	Pollutant	Requirements	Frequency	Method of Measurement	Regulatory Reference
Recordkeeping	Dehydration Unit (DEHY-3)	HAP	Maintain benzene emissions below 0.9 megagrams/yr	Annual	GRI-GLYCalc with actual operating parameters	40 CFR 63 Subpart HH
Testing	Enclosed Ground Flare (FL-3), Blowdown Flare (BDF-1)	VOC HAP	Conduct visible emissions observations	Initial	Method 22	Condition 11.3.1
Monitoring, Recordkeeping	Dehydration Unit (DEHY-3)	VOC HAP	Monitor and record wet gas natural throughput	Monthly		Condition 11.4.6
Monitoring, Recordkeeping	Enclosed Ground Flare (FL-3) Blowdown Flare (BDF-1)	VOC HAP	Monitor and record the presence or absence of flare pilot flame		Thermocouple	Condition 11.2.2
Monitoring	Blowdown Flare (BDF-1)		Monitor and record blowdown volumes (scf/yr)	Annual		
Monitoring, Recordkeeping, Testing	BLR-4	ALL	Comply with requirements in Section 12 of permit			

ATTACHMENT P

Public Notice

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that CONE Midstream Partners, LP has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Modification (R-13) for a Natural Gas Compressor Station (Majorsville Station) located near the Town of Majorsville, in Marshall County, West Virginia. The site latitude and longitude coordinates are: 39.96750 N, -80.53310 W.

The applicant estimates the potential increase to discharge the following Regulated Air Pollutants as a result of the change will be:

Particulate Matter (PM) = <0.01tpy
Sulfur Dioxide (SO2) = <0.01tpy
Volatile Organic Compounds (VOC) = 3.15 tpy
Carbon Monoxide (CO) = <0.01 tpy
Nitrogen Oxides (NOx) = <0.01tpy
Hazardous Air Pollutants (HAPs) = <0.01 tpy
Carbon Dioxide Equivalents (CO_2e) = <0.01 tpy

This facility is currently in operation and is seeking to increase the current throughput for the existing dehydration units and add one (1) emergency blowdown flare, one (1) additional dehydration unit with associated reboiler, and enclosed flare. Additionally, CONE is proposing to remove three (3) existing natural gas fired compressor engines and replace them with three (3) electric compressor units. Startup of operations is planned to begin upon permit issuance. 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 XX day of September, 2015.

By: CONE Midstream Partners, LP
David Morris
1000 CONSOL Energy Drive
Canonsburg, PA 15317