July 21, 2017

Mr. William F. Durham
Director
WVDEP, Division of Air Quality
601 – 57th Street SE
Charleston, West Virginia 25304

Re: CONE Midstream Devco III LP, 45CSR13 Permit Modification Application – Cain Run Station – Facility ID # 017-00166

Dear Mr. Durham,

CONE Midstream Devco III LP (CONE) and SLR International Corporation (SLR) have prepared the attached 45CSR13 Permit Modification Application for the Cain Run Station located in Doddridge County, West Virginia. This modification will reflect an increase to the capacity of the dehydration column from 20 mmscf/d to 50 mmscf/d and an increase in the capacity of the dehydration unit reboiler from 0.375 mmBtu/hr to 0.75 mmBtu/hr. Also through this modification CONE is correcting the manufacturing date of the engine (CE-1) from 4/6/2012 to 11/17/2014 as well as making a change to the catalyst manufacturer used for engine control.

The public notice was delivered to *The Doddridge Independent* for publication. The legal advertisement will be forwarded to your office as soon as SLR receives the original affidavit from the newspaper.

If any additional information is needed, please feel free to contact me by telephone at (304) 545-8563 or by e-mail at jhanshaw@slrconsulting.com

Sincerely,
SLR International Corporation

Jesse Hanshaw

Jesse Hanshaw, P.E.
Principal Engineer

CONE Midstream Devco III LP

Cain Run Station

New Milton, West Virginia

45CSR13 Permit Modification Application

SLR Ref: 116.00894.00069

July 2017

Cain Run Station 45CSR13 Permit Modification Application

Prepared for:

CONE Midstream Partners LP
1000 Consol Energy Drive
Canonsburg, PA 15317

This document has been prepared by SLR International Corporation. The material and data in this permit application were prepared under the supervision and direction of the undersigned.

Chris Boggess
Associate Engineer

Jesse Hanshaw, P.E.
Principal Engineer

CONTENTS

ATTACHMENTS

Notes:

ATTACHMENT H - SDS included in previous permit application
ATTACHMENT K - No change in fugitive emissions associated with this permit modification
ATTACHMENT Q - No information contained within this application is claimed confidential
ATTACHMENT R - No delegation of authority
ATTACHMENT S - Not a Title V Permit Revision

APPLICATION FOR PERMIT

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

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 Midstream Devco III LP

2. Federal Employer ID No. ***(FEIN):***
47-1054194

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

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

5A. Applicant's mailing address:
1000 Consol Energy Drive
Canonsburg, PA 15317

5B. Facility's present physical address:
Access road off S. Fork of Hughes River (See Coordinates)

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 Compression and Dehydration Facility

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

11A. DAQ Plant ID No. (for existing facilities only):
017-00166

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
R13-3358

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

12A.

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

From the intersection of WV-Hwy. 18 and Co. Rte. 25 near New Milton, WV, travel south on WV-Hwy. 18 for 3 miles. Turn right on Porto Rico Rd. for 0.7 miles, then continue straight onto Toms Fork Road for another 0.7 miles. Take slight right onto Co. Rte. 54/1 for 2.5 miles, then turns right and becomes Cain Run for 0.3 miles. Then take sharp left onto S. Fork of Hughes River for 1.0 mile. Take access road to left and to the top of the hill and stay to the left to arrive at site

12.B. New site address (if applicable):	12C. Nearest city or town: New Milton	12D. County: Doddridge
12.E. UTM Northing (KM): 4,335.746	12F. UTM Easting (KM): 520.430	12G. UTM Zone: 17T

13. Briefly describe the proposed change(s) at the facility:
CONE would like to increase the capacity of the dehydration unit from 20 MMSCFD to 50 MMSCFD and implement an administrative change to the 4SLB Cat 3516 compressor engine manufacture date.

14A. Provide the date of anticipated installation or change: Upon Permit Issuance – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen:	14B. Date of anticipated Start-Up if a permit is granted: 4th Quarter 2017

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

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

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

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

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

Section II. Additional attachments and supporting documents.

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

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

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

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

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 : TEG Dehydration Emission Unit Data Sheet (EUDS), SI RICE Engine Data Sheet

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: OxCat.

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: 6/26/17 *(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: Engineer Air Permitting and Compliance
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

BUSINESS CERTIFICATE

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

State of West Virginia

Certificate

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

CONE MIDSTREAM DEVCO III LP

Control Number: 9A6SN

has filed its application for "Certificate of Registration" in my office according to the provisions of the West Virginia Code. I hereby declare the organization to be registered as a foreign limited partnership from its effective date of August 12, 2014 until a certificate of cancellation has been filed with Secretary of State.

Therefore, I hereby issue this

CERTIFICATE OF REGISTRATION

Given under my hand and the Great Seal of the State of West Virginia on this day of August 12, 2014

Natalie E. Tennant

Secretary of State

ATTACHMENT B

MAP

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

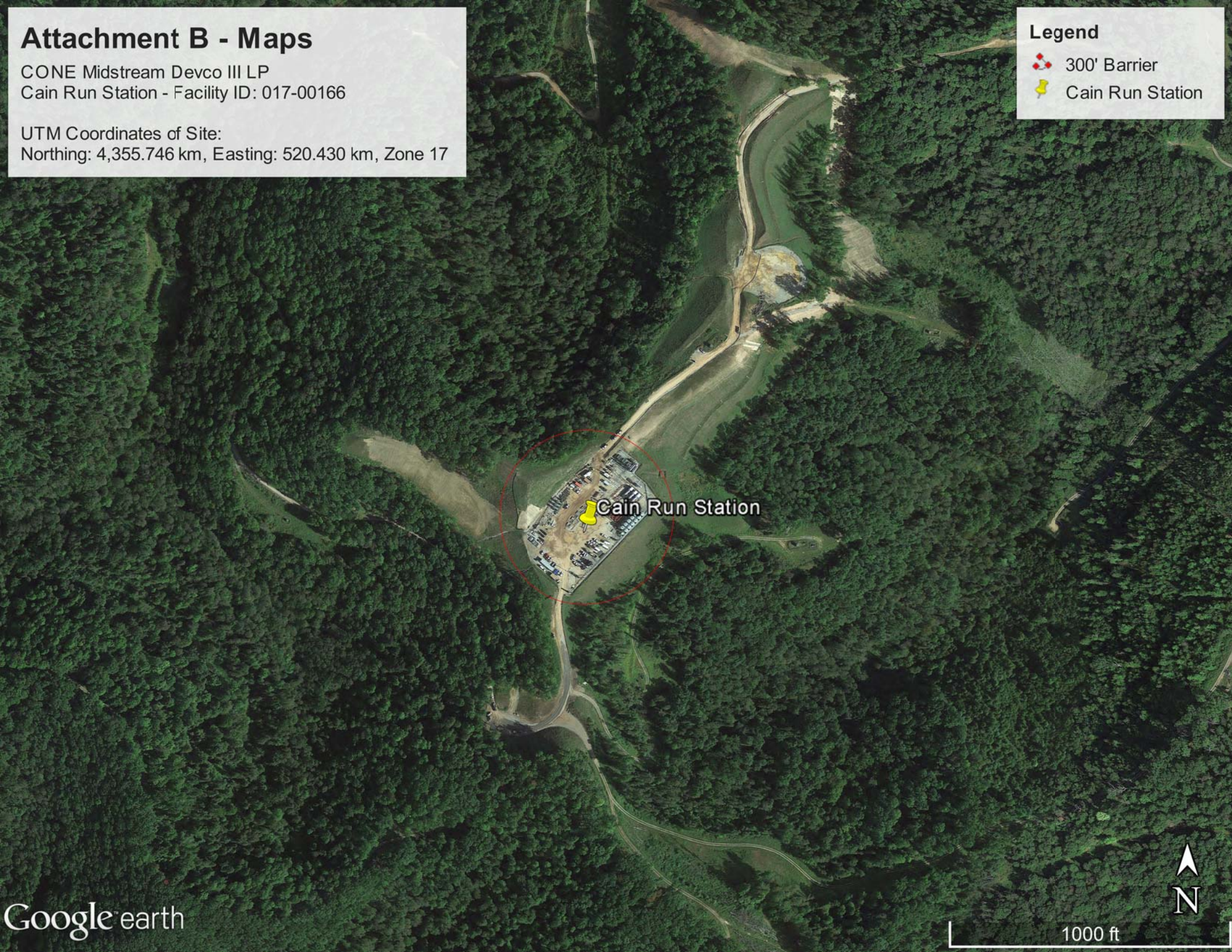
CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

Attachment B - Maps

CONE Midstream Devco III LP
Cain Run Station - Facility ID: 017-00166

UTM Coordinates of Site:
Northing: 4,355.746 km, Easting: 520.430 km, Zone 17



ATTACHMENT C

INSTALLATION AND START-UP SCHEDULE

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

INSTALLATION AND STARTUP SCHEDULE

CONE expects to install the proposed equipment and startup in the 4th quarter of 2017.

ATTACHMENT D

REGULATORY DISCUSSION

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

REGULATORY DISCUSSION

APPLICABLE REGULATIONS

The newly added and modified equipment at this facility are subject to the following applicable rules and regulations:

Federal and State:

45 CSR 2 – *To Prevent and Control Particulate Air Pollution Control from Combustion of Indirect Heat Exchangers*

The indirect heat exchanger utilized as the TEG reboiler will be subject to the visible emission standard of §45-2-3 as follows:

3.1. No person shall cause, suffer, allow or permit emission of smoke and/or particulate matter into the open air from any fuel burning unit which is greater than ten (10) percent opacity based on a six minute block average.

However, in accordance with the exemptions defined with §45-2-11 this source has limited requirements as follows:

11.1. Any fuel burning unit(s) having a heat input under ten (10) million B.T.U.'s per hour will be exempt from sections 4, 5, 6, 8 and 9. However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

Therefore, the reboiler burner utilized on the dehydration system at this site is exempt from the weight emission standards of section 4 and the control of fugitive particulate matter standards of section 5. The additionally exempt sections of this rule, section 6, 8, and 9 pertain to registration, testing, monitoring, recordkeeping and reporting as well as startup, shutdown and malfunctions.

45 CSR 6 – *To Prevent and Control Air Pollution From Combustion of Refuse*

This state rule is geared towards reducing particulate matter emissions from the combustion of refuse and is specific to burning solid waste, but also includes combustion of waste gas in flares. The rule sets PM limits and establishes a 20% visible emission limit, both of which shouldn't be any problem for the natural gas fired ground flare to meet.

The weight rate of waste gas going to the ground flare is estimated based on manufacturers design rates to be 96.55 lb/hr or 0.048 tph. Therefore, the corresponding Rule 6 PM limit would be 0.262 lb/hr. [E(lb/hr) = 5.43 * 0.048]

When using emission factors for flare combustion presented in AP-42 Chapter 13 EPA's guidance specifies that combustion sources using natural gas should not have PM emissions and therefore no PM/soot factor is given.

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

The facility evaluated within this application utilizes a fuel burning unit for the TEG dehydration unit reboiler less than the exemption threshold of 10 MMBtu/hr as stated in 45CSR§10-10.1:

Any fuel burning units having a design heat input under ten (10) million BTU's per hour will be exempt from section 3 and sections 6 through 8. However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

45 CSR 13 – *Permits for Construction, Modification, Relocation, and Operation of Stationary Source of Air Pollutants*

The company has applied for a modification to its current Rule 13 permit (R13-3358) to address the installation of new equipment at the site. Under the facility's current air permit, the facility was to install a TEG dehydration column rated at 20 MMSCF/d and dehydration unit reboiler rated at 0.375 mmBtu/hr. Since the time of permit issuance and CONE's construction of the site, CONE has decided it would like to reflect an increase in the capacity of the dehydration column to 50 MMscf/d and an increase in the capacity of the dehydration unit reboiler to 0.75 mmBtu/hr. Also, through this permit modification CONE would like to correct the manufacturing date of the compressor engine (CE-1) from 4-16-2012 to 11-17-2014. Although, there will be no change to regulatory requirements or emissions associated with this engine its control device manufacturer is also being updated to reflect a DCL catalyst instead of the original Emit.

40 CFR 60 Subpart OOOOa – *Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction Commenced after September 18, 2015*

Fugitive Components at Compressor Stations and Reciprocating Compressor Packing

Since the compressor at this station will commence construction after September 18, 2015, the fugitive components will become subject to the equipment leak standards of §60.5397a. As a result, the source will be required to develop and implement a fugitive monitoring plan and conduct quarterly OGI surveys. The initial survey will be required within 60 days of startup or by June 3, 2017, whichever is later in accordance with §60.5397a(f)(2). However, on April 18, 2017 the USEPA Administrator, E. Scott Pruitt, issued a letter of reconsideration based on comments received from industry groups on August 2, 2016. This letter authorizes a 90 day stay of the compliance date for fugitive emissions monitoring requirements, which extends the compliance date to Sept. 1, 2017.

The reciprocating compressor associated with the emission unit will also be subject to the rod packing standards of §60.5385a that requires them to be replaced/rebuilt every

26,000 hrs or 3 years. Records shall be maintained based on months or hours of operations since initial startup and each subsequent rebuild or replacement of the compressor's rod packing.

40 CFR 60 Subpart JJJJ – *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*

The natural gas fueled compressor engine (CE-1) is a 1380 Hp 4SLB G3516BLE Caterpillar engine and was manufactured on 11-17-2014. This manufacturing date differs from what was proposed in the current permit and CONE is administratively correcting the error. The engine is subject to the Table 1 emission limits for SI Engines greater than 1,350 hp. Since the engine's mfg. date is after 7-1-2010 the corresponding emission limits for this unit are represented as follows:

Table 1 Emission Limits – SI 4SLB > 1350 Hp installed after 7-1-2010

g/Hp hr			ppmvd at 15% O2		
NOx	CO	VOC	NOx	CO	VOC
1	2	0.7	82	270	60

40 CFR 63 Subpart HH – *National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities*

CONE has plans to install a 50 MMscf/d TEG Dehydration Column and Reboiler to work in a parallel configuration with the existing desiccant dehydrator vessels (gas will flow either to the TEG or the desiccant dehydration system). This TEG unit will be subject to the area source requirements of Subpart HH and shall comply by utilizing a ground flare for control to maintain actual emissions below the 1 tpy benzene exemption threshold. Additionally, this facility was evaluated and found not to be located within the geographical applicability criteria associated with the 2 mile offset from the 2000 Census Urban Areas. The closest Urban Area was identified to be around the town of Weston, which is much greater than 2 miles from the proposed site.

40 CFR 63 Subpart ZZZZ – *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*

The natural gas compressor engine (CE-1) is a 4SLB G3516TALE Caterpillar engine manufactured on 11-17-2014; therefore, per 40CFR63.6590(c)(1) the requirements of this regulation are to comply with new SI engines standards in accordance with 40CFR60, Subpart JJJJ.

NON-APPLICABILITY DETERMINATIONS

The following requirements have been determined to be "not applicable" in relation to the newly added and modified equipment at this facility:

Federal and State:

45 CSR 30 – *Requirements for Operating Permits – Title V of the Clean Air Act*

This facility does not meet the emission threshold to trigger a 45 CSR 30 Title V Operating Permit nor is it subject to any Federal Standards that trigger the need for a Title V Permit.

40 CFR 63 HHH – *National Emission Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities*

This subpart is not applicable since the facility is not a major source of HAPs.

40 CFR 63 Subpart DDDDD – *NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters*

This subpart is not applicable because the facility is not a major source of HAPs.

40 CFR 63 Subpart JJJJJJ – *NESHAP for Industrial, Commercial, and Institutional Boilers Area Sources*

This subpart is not applicable because the dehy unit reboiler at this facility utilizes natural gas fuel, which is exempt from regulation under this area source GACT standard.

ATTACHMENT E

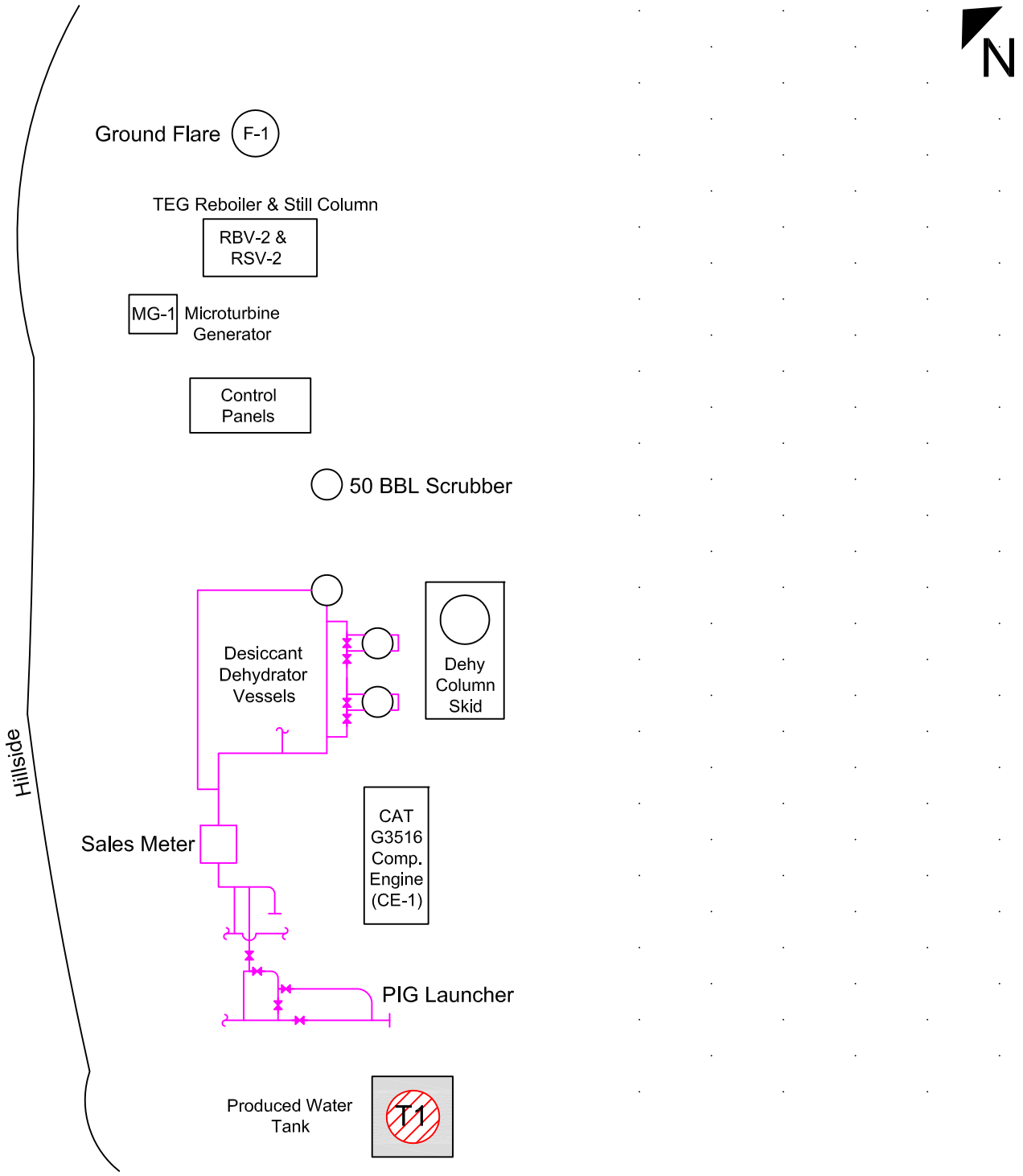
PLOT PLAN

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017



DRAWING LEGEND

- O/H Electric Line
- Utility Pole
- Piping (above ground)
- Piping (under ground)
- Valve
- Plug
- Tree/Brush line
- Crushed Stone Pad
- Storage Tank
- Secondary Containment Area
- Direction of Surface Runoff
- (W) Well Head
- (M) Meter
- (S) Separator
- (D) Drain
- (C) Compressor
- (RM) Residential Meter
- (DRIP) Drip Tank

SLR

CONE Midstream Devco III LP

1000 Consol Energy Drive
Canonsburg, PA 15317

Report:
45CSR13 Permit Modification Application
Cain Run Station

Drawing	Drawn By:
Plot Plan	CLB

Date: June 2017	ATTACHMENT E	
	Project #: 116.00894.00069	

ATTACHMENT F

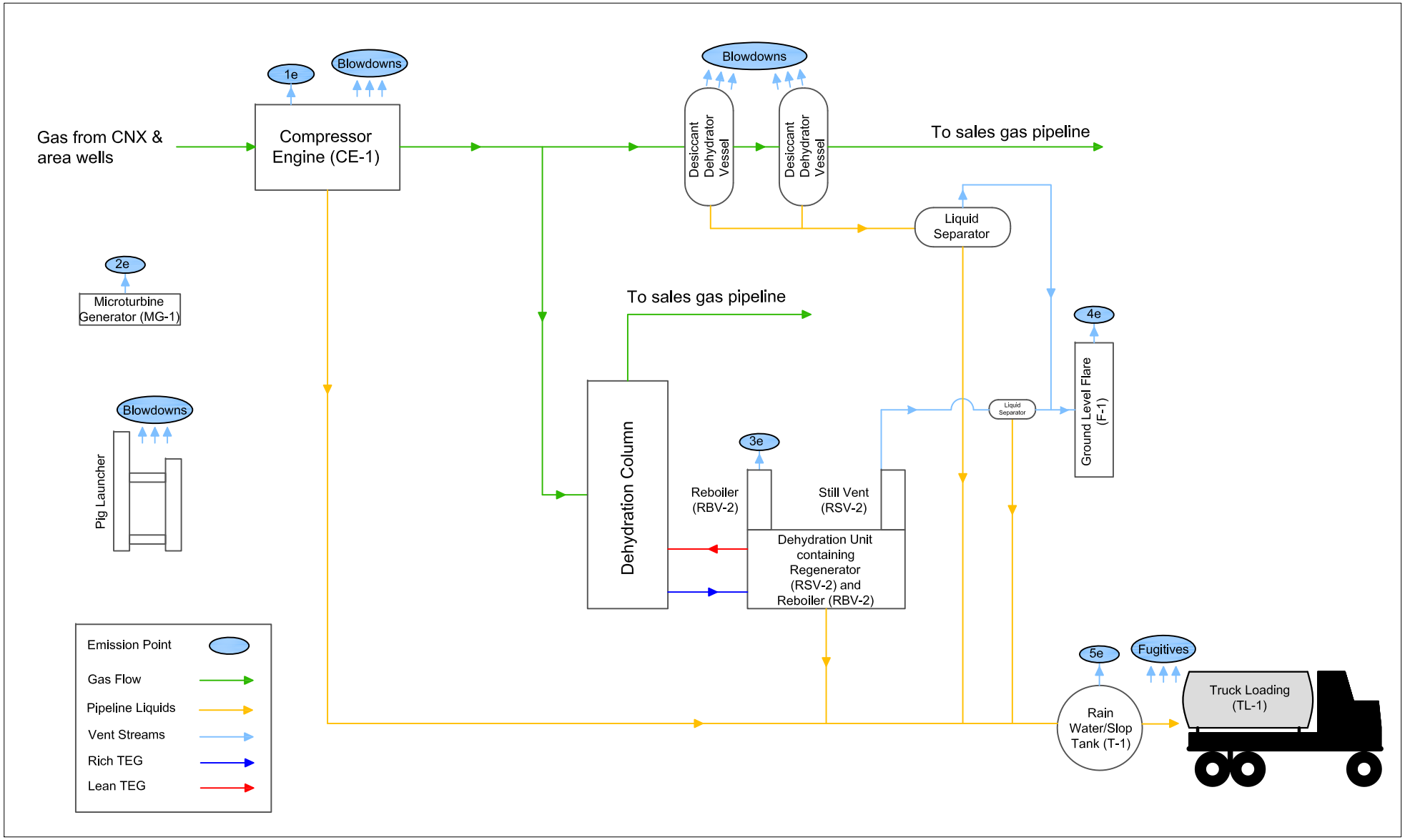
PROCESS FLOW DIAGRAM

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017



SLR

CONE Midstream Devco III LP

Attachment F - Process Flow Diagram

Cain Run Station | June 2017

ATTACHMENT G

PROCESS DESCRIPTION

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

PROCESS DESCRIPTION

The site will consist of a single compressor, TEG dehydration unit, Ground Flare, 400 bbl Process Water Tank, Salt Dryer, 30 kW MicroTurbine Generator, and a PIG Launcher.

The Cain Run Station collects gas from unconventional wells and provides compression and dehydration services. The dehydration capabilities at Cain Run will consist of two options, a salt dryer which can be operated in parallel with a TEG Dehydration Column. The TEG dehydration unit will utilize a ground flare control device to minimize emissions. The salt dryer produces brine liquids but no direct emissions to the atmosphere. The liquids removed from the process by the salt dryer and TEG Dehydrator will be stored in a single 400 barrel (bbl) storage vessel. The tank's resulting emissions will be uncontrolled as a result of containing mostly water.

PROPOSED PROCESS CHANGES

CONE Midstream Devco III LP has applied for a modification to its current Rule 13 permit (R13-3358) to address the installation of new equipment at the site. Under the facility's current air permit, the facility was to install a TEG dehydration column rated at 20 MMSCF/d and dehydration unit reboiler rated at 0.375 mmBtu/hr as well as a 1,380 hp 4SLB engine. Since the time of permit issuance and CONE's construction of the site, CONE has decided it would like to reflect in the permit an increase to the capacity of the dehydration column to 50 MMSCF/d and an increase in the capacity of the dehydration unit reboiler to 0.75 mmBtu/hr. Also, through this permit modification CONE would like to correct the manufacturing date of the compressor engine (CE-1) from 4-16-2012 to 11-17-2014, as well as make a change to the oxidation catalyst manufacturer used for engine control.

ATTACHMENT H

SAFETY DATA SHEETS (SDS)

NOT APPLICABLE - SDS included in previous permit application

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

ATTACHMENT I

EMISSION UNITS TABLE

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

Attachment I

Emission Units Table

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

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
CE-1	1e	Cat G3516BLE Compressor Engine	2017	1380 Hp	Modified	C-1
RBV-1	3e	TEG Reboiler	2017	0.375 MMBtu/hr	Removed	None
RSV-1	4e	TEG Dehy Still Vent	2017	20 MMscf/d	Removed	F-1
RBV-2	3e	TEG Reboiler	2017	0.75 MMBtu/hr	New	None
RSV-2	4e	TEG Dehy Still Vent	2017	50 MMscf/d	New	F-1
F-1	4e	Ground Flare	2017	2 MMBtu/hr	Modified	APCD

[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

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

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			
1e	Vertical Stack	CE-1	4SLB RICE CAT G3516BLE	C-1	OC	C	8760	NO_X CO VOC SO_2 PM_{10} CH2O HAPs CO2e	3.04 8.82 2.19 0.01 0.11 1.19 1.43 1745.52	13.33 38.64 9.59 0.03 0.49 5.20 6.24 6950.63	6.08 2.13	26.65 9.33	Gas/ Vapor	EE	Can Supply Upon Request
3e	Vertical Stack	RBV-2	TEG Reboiler	NA	NA	C	8760	NO_X CO VOC SO_2 PM_{10} CO2e	0.07 0.06 <0.01 <0.01 0.01 87.76	0.32 0.27 0.02 <0.01 0.02 384.38	--	--	Gas/ Vapor	EE	Can Supply Upon Request
4e	Vertical Stack	RSV-2	TEG Still Vent	F-1	Flare	C	8760	Benzene Toluene Ethylbenzene Xylene n-Hexane HAPs VOCs	1.80 7.38 0.13 8.41 1.85 19.57 68.65	7.90 32.33 0.56 36.82 8.11 85.71 300.67	0.04 0.15 <0.01 0.17 0.04 0.39 1.37	0.16 0.65 0.01 0.74 0.16 1.71 6.01	Gas/ Vapor	EE	Can Supply Upon Request

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 K

FUGITIVE EMISSIONS DATA SHEET

NOT APPLICABLE - No change in fugitive emissions associated with this permit modification

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

ATTACHMENT L

EMISSION UNIT DATA SHEET

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

GLYCOL DEHYDRATION UNIT DATA SHEET

Complete this data sheet for each Glycol Dehydration Unit, Reboiler, Flash Tank and/or Regenerator at the facility. Include gas sample analysis and GRI- GLYCalc™ input and aggregate report. Use extra pages if necessary.

Manufacturer: Frederick Logan Company, Inc	Model: NA
Max. Dry Gas Flow Rate: 50 mmscf/day	Reboiler Design Heat Input: 0.75 MMBTU/hr
Design Type: ☒ TEG ☐ DEG ☐ EG	Source Status[1]: MS
Date Installed/Modified/Removed[2]: 2017	Regenerator Still Vent APCD/ERD[3]: FL (Flare)
Control Device/ERD ID#[3]: F-1	Fuel HV (BTU/scf): 1,171
H_2S Content (gr/100 scf): 0.25	Operation (hours/year): 8760
Pump Rate (scfm): 15 GPM TEG	
Water Content (wt %) in: Wet Gas: Saturated lbs H20/MMscf Dry Gas: 7.0 lbs H2O/MMSCF	

Is the glycol dehydration unit exempt from 40CFR63 Section 764(d)? ☒ Yes ☐ No: If Yes, answer the following:

The actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters per day, as determined by the procedures specified in §63.772(b)(1) of this subpart. ☐ Yes ☒ No

The actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram per year (1 ton per year), as determined by the procedures specified in §63.772(b)(2) of this subpart. ☒ Yes ☐ No

Is the glycol dehydration unit located within an Urbanized Area (UA) or Urban Cluster (UC)? ☐ Yes ☒ No

Is a lean glycol pump optimization plan being utilized? ☐ Yes ☒ No

Recycling the glycol dehydration unit back to the flame zone of the reboiler.
☐ Yes ☒ No

Recycling the glycol dehydration unit back to the flame zone of the reboiler and mixed with fuel.
☐ Yes ☒ No

What happens when temperature controller shuts off fuel to the reboiler?
☐ Still vent emissions to the atmosphere.
☐ Still vent emissions stopped with valve.
☐ Still vent emissions to glow plug.

Please indicate if the following equipment is present.
☒ Flash Tank
☒ Burner management system that continuously burns condenser or flash tank vapors

Control Device Technical Data

Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)
VOCs and HAPs	98.0

Emissions Data

Emission Unit ID / Emission Point ID[4]	Description	Calculation Methodology[5]	PTE[6]	Controlled Maximum Hourly Emissions (lb/hr)	Controlled Maximum Annual Emissions (tpy)
RBV-2 / 3e	Reboiler Vent	AP	NOx	0.07	0.32
		AP	CO	0.06	0.27
		AP	VOC	<0.01	0.02
		AP	SO2	<0.01	<0.01
		AP	PM10	<0.01	0.02
		AP	GHG (CO2e)	87.86	384.38

RSV-2 /4e	Glycol Reboiler Still Vent Controlled by Flare	GR	VOC	1.37	6.01
		GR	Benzene	0.04	0.16
		GR	Toluene	0.15	0.65
		GR	Ethylbenzene	<0.01	0.01
		GR	Xylenes	0.17	0.74
		GR	n-Hexane	0.04	0.16

1 Enter the Source Status using the following codes:
NS Construction of New Source ES Existing Source
MS Modification of Existing Source

2 Enter the date (or anticipated date) of the glycol dehydration unit's installation (construction of source), modification or removal.

3 Enter the Air Pollution Control Device (APCD)/Emission Reduction Device (ERD) type designation using the following codes and the device ID number:
NA None CD Condenser FL Flare CC Condenser/Combustion Combination TO Thermal Oxidizer
O Other (please list)

4 Enter the appropriate Emission Unit ID Numbers and Emission Point ID Numbers for the glycol dehydration unit reboiler vent and glycol regenerator still vent. The glycol dehydration unit reboiler vent and glycol regenerator still vent should be designated RBV-1 and RSV-1, respectively. If the compressor station incorporates multiple glycol dehydration units, a Glycol Dehydration Emission Unit Data Sheet shall be completed for each, using Source Identification RBV-2 and RSV-2, RBV-3 and RSV-3, etc.

5 Enter the Potential Emissions Data Reference designation using the following codes:
MD Manufacturer's Data AP AP-42
GR GRI-GLYCalc™ OT Other ProMax EOS Simulator (please list)

6 Enter the Reboiler Vent and Glycol Regenerator Still Vent Potential to Emit (PTE) for the listed regulated pollutants in lbs per hour and tons per year. The Glycol Regenerator Still Vent potential emissions may be determined using the most recent version of the thermodynamic software model GRI-GLYCalc™ (Radian International LLC & Gas Research Institute). **Attach all referenced Potential Emissions Data (or calculations) and the GRI-GLYCalc™ Aggregate Calculations Report (shall include emissions reports, equipment reports, and stream reports) to this Glycol Dehydration Emission Unit Data Sheet(s). Backup pumps do not have to be considered as operating for purposes of PTE.** This PTE data shall be incorporated in the Emissions Summary Sheet.

June 14, 2017

CONE MIDSTREAM
1000 Consol Energy Drive
Canonsburg, PA 15317-6506

Attention: Mr. Andres Zapata, Process Engineer IV

Reference: 50MMSCFD Dehydration System Specs

Dear Mr. Zapata,

In reference to your request for information, we are pleased to provide the following capacities for your equipment:

CNX Dehydration System

Process Fluid	Natural Gas
Process Flow	50 MMSCFD
Min/Max Inlet Gas Temperature	60-110°F
Operating Pressure Range	850-950 PSIG
Specific Gravity used	0.6
Max. Inlet Water Content	Theoretically saturated at 950 PSIG & 110 DEG F
Outlet Water Content	< 7lbs H20 / MMSCF
Electrical Service Available at Site	Unknown
Electrical Classification	Class I Div. II
Reboiler Size	750M BTU/HR
Contact Tower Size (Structured Packed)	36” ID x 21’-6” S/S

The Dehydrator is sufficient for these rates. The unit has (2) Kimray Model: 45020PV capable of pumping 450 gallons per hour max each. Please let us know if you need any further information

Best Regards,

Harley German

Harley German
Engineer
724-776-9300
HGerman@floco.com

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name:
File Name: N:\West Virginia\CONE Midstream\2017\Projects\Air Permitting\Cain Run Station\GLYCalc\CainRun R13_PTEReport.ddf
Date: June 22, 2017

DESCRIPTION:

Description:

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 110.00 deg. F
Pressure: 950.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.1770
Hydrogen Sulfide	0.0001
Nitrogen	0.4480
Methane	81.9120
Ethane	12.1410
Propane	3.1640
Isobutane	0.4500
n-Butane	0.7480
Isopentane	0.2310
n-Pentane	0.1840
Cyclopentane	0.0001
n-Hexane	0.0980
Cyclohexane	0.0130
Other Hexanes	0.1770
Heptanes	0.1350
Methylcyclohexane	0.0290
2,2,4-Trimethylpentane	0.0001
Benzene	0.0030
Toluene	0.0080
Ethylbenzene	0.0001
Xylenes	0.0050
C8+ Heavies	0.0770

DRY GAS:

Flow Rate: 50.0 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Flow Rate: 15.0 gpm

PUMP:

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

Flash Control:	Combustion device
Flash Control Efficiency:	98.00 %
Temperature:	149.0 deg. F
Pressure:	60.0 psig

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device:	Combustion Device
Destruction Efficiency:	98.0 %
Excess Oxygen:	150.0 %
Ambient Air Temperature:	70.0 deg. F

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name:
File Name: N:\West Virginia\CONE Midstream\2017\Projects\Air Permitting\Cain Run Station\GLYCalc\CainRun R13_PTEReport.ddf
Date: June 23, 2017

DESCRIPTION:

Description:

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0001	0.002	0.0003
Methane	0.0286	0.687	0.1255
Ethane	0.0658	1.579	0.2882
Propane	0.0639	1.535	0.2801
Isobutane	0.0196	0.470	0.0857
n-Butane	0.0482	1.157	0.2112
Isopentane	0.0184	0.442	0.0807
n-Pentane	0.0205	0.493	0.0900
Cyclopentane	0.0001	0.002	0.0003
n-Hexane	0.0244	0.585	0.1067
Cyclohexane	0.0192	0.460	0.0840
Other Hexanes	0.0313	0.752	0.1372
Heptanes	0.0790	1.897	0.3462
Methylcyclohexane	0.0520	1.247	0.2276
2,2,4-Trimethylpentane	<0.0001	0.001	0.0001
Benzene	0.0353	0.846	0.1545
Toluene	0.1456	3.494	0.6377
Ethylbenzene	0.0025	0.061	0.0111
Xylenes	0.1671	4.012	0.7321
C8+ Heavies	0.2974	7.136	1.3024
Total Emissions	1.1191	26.858	4.9015
Total Hydrocarbon Emissions	1.1190	26.856	4.9012
Total VOC Emissions	1.0246	24.590	4.4876
Total HAP Emissions	0.3749	8.998	1.6422
Total BTEX Emissions	0.3505	8.413	1.5354

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0033	0.079	0.0144
Methane	1.4321	34.371	6.2727
Ethane	3.2899	78.957	14.4097
Propane	3.1973	76.736	14.0043
Isobutane	0.9784	23.482	4.2855
n-Butane	2.4113	57.871	10.5614
Isopentane	0.9216	22.119	4.0366
n-Pentane	1.0270	24.649	4.4985

Cyclopentane	0.0036	0.087	0.0159
n-Hexane	1.2184	29.242	5.3367
Cyclohexane	0.9584	23.001	4.1978
Other Hexanes	1.5663	37.591	6.8604
Heptanes	3.9522	94.853	17.3107
Methylcyclohexane	2.5980	62.351	11.3791
2,2,4-Trimethylpentane	0.0012	0.029	0.0053
Benzene	1.7635	42.323	7.7239
Toluene	7.2793	174.704	31.8835
Ethylbenzene	0.1268	3.042	0.5552
Xylenes	8.3573	200.575	36.6050
C8+ Heavies	14.8675	356.820	65.1197
Total Emissions	55.9535	1342.883	245.0762
Total Hydrocarbon Emissions	55.9502	1342.804	245.0618
Total VOC Emissions	51.2282	1229.476	224.3794
Total HAP Emissions	18.7465	449.916	82.1096
Total BTEX Emissions	17.5269	420.645	76.7676

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	<0.0001	<0.001	0.0001
Methane	0.4347	10.433	1.9040
Ethane	0.3034	7.282	1.3290
Propane	0.1429	3.430	0.6260
Isobutane	0.0304	0.729	0.1331
n-Butane	0.0584	1.403	0.2560
Isopentane	0.0201	0.483	0.0882
n-Pentane	0.0183	0.439	0.0801
Cyclopentane	<0.0001	<0.001	0.0001
n-Hexane	0.0127	0.304	0.0554
Cyclohexane	0.0025	0.060	0.0110
Other Hexanes	0.0211	0.506	0.0923
Heptanes	0.0211	0.507	0.0925
Methylcyclohexane	0.0055	0.132	0.0241
2,2,4-Trimethylpentane	<0.0001	<0.001	0.0001
Benzene	0.0007	0.017	0.0032
Toluene	0.0020	0.048	0.0088
Ethylbenzene	<0.0001	0.001	0.0001
Xylenes	0.0010	0.024	0.0043
C8+ Heavies	0.0115	0.276	0.0505
Total Emissions	1.0865	26.076	4.7589
Total Hydrocarbon Emissions	1.0865	26.076	4.7588
Total VOC Emissions	0.3483	8.360	1.5258
Total HAP Emissions	0.0164	0.394	0.0719
Total BTEX Emissions	0.0037	0.090	0.0164

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0008	0.020	0.0037
Methane	21.7350	521.640	95.1993
Ethane	15.1715	364.116	66.4511
Propane	7.1465	171.517	31.3019
Isobutane	1.5189	36.454	6.6528

n-Butane	2.9225	70.139	12.8004
Isopentane	1.0070	24.169	4.4108
n-Pentane	0.9147	21.953	4.0064
Cyclopentane	0.0008	0.020	0.0036
n-Hexane	0.6327	15.184	2.7711
Cyclohexane	0.1256	3.014	0.5501
Other Hexanes	1.0535	25.284	4.6143
Heptanes	1.0556	25.335	4.6237
Methylcyclohexane	0.2756	6.614	1.2070
2,2,4-Trimethylpentane	0.0006	0.015	0.0027
Benzene	0.0362	0.868	0.1585
Toluene	0.1008	2.420	0.4417
Ethylbenzene	0.0011	0.025	0.0046
Xylenes	0.0493	1.184	0.2161
C8+ Heavies	0.5760	13.825	2.5230
Total Emissions	54.3248	1303.795	237.9426
Total Hydrocarbon Emissions	54.3240	1303.775	237.9389
Total VOC Emissions	17.4175	418.020	76.2886
Total HAP Emissions	0.8207	19.697	3.5947
Total BTEX Emissions	0.1874	4.498	0.8208

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0001	0.002	0.0004
Methane	0.4633	11.120	2.0294
Ethane	0.3692	8.861	1.6172
Propane	0.2069	4.965	0.9061
Isobutane	0.0499	1.199	0.2188
n-Butane	0.1067	2.560	0.4672
Isopentane	0.0386	0.926	0.1689
n-Pentane	0.0388	0.932	0.1701
Cyclopentane	0.0001	0.002	0.0004
n-Hexane	0.0370	0.889	0.1622
Cyclohexane	0.0217	0.520	0.0950
Other Hexanes	0.0524	1.258	0.2295
Heptanes	0.1002	2.404	0.4387
Methylcyclohexane	0.0575	1.379	0.2517
2,2,4-Trimethylpentane	<0.0001	0.001	0.0002
Benzene	0.0360	0.864	0.1576
Toluene	0.1476	3.542	0.6465
Ethylbenzene	0.0026	0.061	0.0112
Xylenes	0.1681	4.035	0.7364
C8+ Heavies	0.3089	7.413	1.3529
Total Emissions	2.2056	52.934	9.6604
Total Hydrocarbon Emissions	2.2055	52.932	9.6600
Total VOC Emissions	1.3729	32.950	6.0134
Total HAP Emissions	0.3913	9.392	1.7141
Total BTEX Emissions	0.3543	8.503	1.5518

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled	Controlled	% Reduction

	tons/yr	tons/yr	
Hydrogen Sulfide	0.0181	0.0004	98.00
Methane	101.4719	2.0294	98.00
Ethane	80.8608	1.6172	98.00
Propane	45.3062	0.9061	98.00
Isobutane	10.9382	0.2188	98.00
n-Butane	23.3618	0.4672	98.00
Isopentane	8.4475	0.1689	98.00
n-Pentane	8.5048	0.1701	98.00
Cyclopentane	0.0195	0.0004	98.00
n-Hexane	8.1078	0.1622	98.00
Cyclohexane	4.7478	0.0950	98.00
Other Hexanes	11.4747	0.2295	98.00
Heptanes	21.9344	0.4387	98.00
Methylcyclohexane	12.5861	0.2517	98.00
2,2,4-Trimethylpentane	0.0080	0.0002	98.00
Benzene	7.8824	0.1576	98.00
Toluene	32.3252	0.6465	98.00
Ethylbenzene	0.5599	0.0112	98.00
Xylenes	36.8211	0.7364	98.00
C8+ Heavies	67.6427	1.3529	98.00
Total Emissions	483.0189	9.6604	98.00
Total Hydrocarbon Emissions	483.0007	9.6600	98.00
Total VOC Emissions	300.6680	6.0134	98.00
Total HAP Emissions	85.7043	1.7141	98.00
Total BTEX Emissions	77.5885	1.5518	98.00

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 70.00 deg. F
Excess Oxygen: 150.00 %
Combustion Efficiency: 98.00 %
Supplemental Fuel Requirement: 5.58e-001 MM BTU/hr

Component	Emitted	Destroyed
Hydrogen Sulfide	2.00%	98.00%
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%
Ethylbenzene	2.00%	98.00%
Xylenes	2.00%	98.00%
C8+ Heavies	2.00%	98.00%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages:	1.25
Calculated Dry Gas Dew Point:	4.24 lbs. H2O/MMSCF
Temperature:	110.0 deg. F
Pressure:	950.0 psig
Dry Gas Flow Rate:	50.0000 MMSCF/day
Glycol Losses with Dry Gas:	1.4106 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	80.56 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	5.66 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.26%	94.74%
Carbon Dioxide	99.62%	0.38%
Hydrogen Sulfide	97.79%	2.21%
Nitrogen	99.96%	0.04%
Methane	99.97%	0.03%
Ethane	99.91%	0.09%
Propane	99.87%	0.13%
Isobutane	99.83%	0.17%
n-Butane	99.78%	0.22%
Isopentane	99.79%	0.21%
n-Pentane	99.73%	0.27%
Cyclopentane	98.84%	1.16%
n-Hexane	99.60%	0.40%
Cyclohexane	98.20%	1.80%
Other Hexanes	99.69%	0.31%
Heptanes	99.33%	0.67%
Methylcyclohexane	98.16%	1.84%
2,2,4-Trimethylpentane	99.71%	0.29%
Benzene	86.02%	13.98%
Toluene	81.77%	18.23%
Ethylbenzene	78.08%	21.92%
Xylenes	71.17%	28.83%
C8+ Heavies	97.86%	2.14%

FLASH TANK

Flash Control:	Combustion device
Flash Control Efficiency:	98.00 %
Flash Temperature:	149.0 deg. F
Flash Pressure:	60.0 psig

Component	Left in Glycol	Removed in Flash Gas

Water	99.94%	0.06%
Carbon Dioxide	40.06%	59.94%
Hydrogen Sulfide	79.61%	20.39%
Nitrogen	6.00%	94.00%
Methane	6.18%	93.82%
Ethane	17.82%	82.18%
Propane	30.91%	69.09%
Isobutane	39.18%	60.82%
n-Butane	45.21%	54.79%
Isopentane	48.05%	51.95%
n-Pentane	53.13%	46.87%
Cyclopentane	81.64%	18.36%
n-Hexane	65.99%	34.01%
Cyclohexane	88.79%	11.21%
Other Hexanes	60.19%	39.81%
Heptanes	79.03%	20.97%
Methylcyclohexane	90.79%	9.21%
2,2,4-Trimethylpentane	66.50%	33.50%
Benzene	98.09%	1.91%
Toluene	98.74%	1.26%
Ethylbenzene	99.26%	0.74%
Xylenes	99.49%	0.51%
C8+ Heavies	96.72%	3.28%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	44.30%	55.70%
Carbon Dioxide	0.00%	100.00%
Hydrogen Sulfide	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	1.04%	98.96%
n-Pentane	0.94%	99.06%
Cyclopentane	0.61%	99.39%
n-Hexane	0.76%	99.24%
Cyclohexane	3.60%	96.40%
Other Hexanes	1.66%	98.34%
Heptanes	0.63%	99.37%
Methylcyclohexane	4.41%	95.59%
2,2,4-Trimethylpentane	2.26%	97.74%
Benzene	5.10%	94.90%
Toluene	8.00%	92.00%
Ethylbenzene	10.49%	89.51%
Xylenes	12.98%	87.02%
C8+ Heavies	12.42%	87.58%

STREAM REPORTS:

WET GAS STREAM

Temperature: 110.00 deg. F
Pressure: 964.70 psia
Flow Rate: 2.09e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.70e-001	1.68e+002
Carbon Dioxide	1.77e-001	4.28e+002
Hydrogen Sulfide	9.98e-005	1.87e-001
Nitrogen	4.47e-001	6.89e+002
Methane	8.18e+001	7.22e+004
Ethane	1.21e+001	2.01e+004
Propane	3.16e+000	7.67e+003
Isobutane	4.49e-001	1.44e+003
n-Butane	7.47e-001	2.39e+003
Isopentane	2.31e-001	9.16e+002
n-Pentane	1.84e-001	7.29e+002
Cyclopentane	9.98e-005	3.85e-001
n-Hexane	9.78e-002	4.64e+002
Cyclohexane	1.30e-002	6.01e+001
Other Hexanes	1.77e-001	8.38e+002
Heptanes	1.35e-001	7.43e+002
Methylcyclohexane	2.90e-002	1.56e+002
2,2,4-Trimethylpentane	9.98e-005	6.28e-001
Benzene	2.99e-003	1.29e+001
Toluene	7.99e-003	4.05e+001
Ethylbenzene	9.98e-005	5.83e-001
Xylenes	4.99e-003	2.92e+001
C8+ Heavies	7.69e-002	7.21e+002
Total Components	100.00	1.10e+005

DRY GAS STREAM

Temperature: 110.00 deg. F
Pressure: 964.70 psia
Flow Rate: 2.08e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	8.94e-003	8.84e+000
Carbon Dioxide	1.76e-001	4.26e+002
Hydrogen Sulfide	9.78e-005	1.83e-001
Nitrogen	4.48e-001	6.89e+002
Methane	8.19e+001	7.22e+004
Ethane	1.21e+001	2.00e+004
Propane	3.16e+000	7.65e+003
Isobutane	4.49e-001	1.43e+003
n-Butane	7.47e-001	2.38e+003
Isopentane	2.31e-001	9.14e+002
n-Pentane	1.84e-001	7.27e+002
Cyclopentane	9.89e-005	3.81e-001
n-Hexane	9.77e-002	4.62e+002
Cyclohexane	1.28e-002	5.90e+001

Other Hexanes	1.77e-001	8.35e+002
Heptanes	1.34e-001	7.38e+002
Methylcyclohexane	2.85e-002	1.54e+002
2,2,4-Trimethylpentane	9.98e-005	6.26e-001
Benzene	2.58e-003	1.11e+001
Toluene	6.54e-003	3.31e+001
Ethylbenzene	7.81e-005	4.55e-001
Xylenes	3.56e-003	2.08e+001
C8+ Heavies	7.54e-002	7.05e+002
Total Components	100.00	1.09e+005

LEAN GLYCOL STREAM

Temperature: 110.00 deg. F
Flow Rate: 1.50e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.84e+001	8.31e+003
Water	1.50e+000	1.27e+002
Carbon Dioxide	1.92e-012	1.62e-010
Hydrogen Sulfide	4.90e-015	4.14e-013
Nitrogen	3.00e-013	2.53e-011
Methane	9.22e-018	7.78e-016
Ethane	1.03e-007	8.71e-006
Propane	4.99e-009	4.21e-007
Isobutane	8.88e-010	7.49e-008
n-Butane	1.57e-009	1.32e-007
Isopentane	1.15e-004	9.69e-003
n-Pentane	1.16e-004	9.76e-003
Cyclopentane	2.65e-007	2.24e-005
n-Hexane	1.10e-004	9.30e-003
Cyclohexane	4.25e-004	3.58e-002
Other Hexanes	3.14e-004	2.65e-002
Heptanes	2.98e-004	2.52e-002
Methylcyclohexane	1.42e-003	1.20e-001
2,2,4-Trimethylpentane	3.30e-007	2.79e-005
Benzene	1.12e-003	9.47e-002
Toluene	7.50e-003	6.33e-001
Ethylbenzene	1.76e-004	1.48e-002
Xylenes	1.48e-002	1.25e+000
C8+ Heavies	2.50e-002	2.11e+000
Total Components	100.00	8.44e+003

RICH GLYCOL STREAM

Temperature: 110.00 deg. F
Pressure: 964.70 psia
Flow Rate: 1.55e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.54e+001	8.31e+003
Water	3.28e+000	2.86e+002
Carbon Dioxide	1.86e-002	1.62e+000

Hydrogen Sulfide	4.75e-005	4.14e-003
Nitrogen	2.91e-003	2.53e-001
Methane	2.66e-001	2.32e+001
Ethane	2.12e-001	1.85e+001
Propane	1.19e-001	1.03e+001
Isobutane	2.87e-002	2.50e+000
n-Butane	6.12e-002	5.33e+000
Isopentane	2.23e-002	1.94e+000
n-Pentane	2.24e-002	1.95e+000
Cyclopentane	5.14e-005	4.47e-003
n-Hexane	2.14e-002	1.86e+000
Cyclohexane	1.29e-002	1.12e+000
Other Hexanes	3.04e-002	2.65e+000
Heptanes	5.78e-002	5.03e+000
Methylcyclohexane	3.44e-002	2.99e+000
2,2,4-Trimethylpentane	2.13e-005	1.86e-003
Benzene	2.18e-002	1.89e+000
Toluene	9.20e-002	8.01e+000
Ethylbenzene	1.64e-003	1.43e-001
Xylenes	1.11e-001	9.65e+000
C8+ Heavies	2.02e-001	1.76e+001
Total Components	100.00	8.71e+003

FLASH TANK OFF GAS STREAM

Temperature: 149.00 deg. F
Pressure: 74.70 psia
Flow Rate: 8.36e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	4.01e-001	1.59e-001
Carbon Dioxide	1.00e+000	9.72e-001
Hydrogen Sulfide	1.12e-003	8.44e-004
Nitrogen	3.86e-001	2.38e-001
Methane	6.15e+001	2.17e+001
Ethane	2.29e+001	1.52e+001
Propane	7.35e+000	7.15e+000
Isobutane	1.19e+000	1.52e+000
n-Butane	2.28e+000	2.92e+000
Isopentane	6.33e-001	1.01e+000
n-Pentane	5.75e-001	9.15e-001
Cyclopentane	5.31e-004	8.21e-004
n-Hexane	3.33e-001	6.33e-001
Cyclohexane	6.77e-002	1.26e-001
Other Hexanes	5.55e-001	1.05e+000
Heptanes	4.78e-001	1.06e+000
Methylcyclohexane	1.27e-001	2.76e-001
2,2,4-Trimethylpentane	2.47e-004	6.23e-004
Benzene	2.10e-002	3.62e-002
Toluene	4.97e-002	1.01e-001
Ethylbenzene	4.54e-004	1.06e-003
Xylenes	2.11e-002	4.93e-002
C8+ Heavies	1.53e-001	5.76e-001
Total Components	100.00	5.57e+001

FLASH TANK GLYCOL STREAM

Temperature: 149.00 deg. F
Flow Rate: 1.54e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.60e+001	8.31e+003
Water	3.30e+000	2.86e+002
Carbon Dioxide	7.51e-003	6.50e-001
Hydrogen Sulfide	3.81e-005	3.30e-003
Nitrogen	1.76e-004	1.52e-002
Methane	1.66e-002	1.43e+000
Ethane	3.80e-002	3.29e+000
Propane	3.70e-002	3.20e+000
Isobutane	1.13e-002	9.78e-001
n-Butane	2.79e-002	2.41e+000
Isopentane	1.08e-002	9.31e-001
n-Pentane	1.20e-002	1.04e+000
Cyclopentane	4.22e-005	3.65e-003
n-Hexane	1.42e-002	1.23e+000
Cyclohexane	1.15e-002	9.94e-001
Other Hexanes	1.84e-002	1.59e+000
Heptanes	4.60e-002	3.98e+000
Methylcyclohexane	3.14e-002	2.72e+000
2,2,4-Trimethylpentane	1.43e-005	1.24e-003
Benzene	2.15e-002	1.86e+000
Toluene	9.14e-002	7.91e+000
Ethylbenzene	1.64e-003	1.42e-001
Xylenes	1.11e-001	9.60e+000
C8+ Heavies	1.96e-001	1.70e+001
Total Components	100.00	8.65e+003

FLASH GAS EMISSIONS

Flow Rate: 3.48e+003 scfh
Control Method: Combustion Device
Control Efficiency: 98.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.11e+001	1.01e+002
Carbon Dioxide	3.83e+001	1.55e+002
Hydrogen Sulfide	5.40e-006	1.69e-005
Nitrogen	9.26e-002	2.38e-001
Methane	2.95e-001	4.35e-001
Ethane	1.10e-001	3.03e-001
Propane	3.53e-002	1.43e-001
Isobutane	5.70e-003	3.04e-002
n-Butane	1.10e-002	5.84e-002
Isopentane	3.04e-003	2.01e-002
n-Pentane	2.76e-003	1.83e-002
Cyclopentane	2.55e-006	1.64e-005
n-Hexane	1.60e-003	1.27e-002
Cyclohexane	3.25e-004	2.51e-003
Other Hexanes	2.66e-003	2.11e-002
Heptanes	2.30e-003	2.11e-002

Methylcyclohexane	6.12e-004	5.51e-003
2,2,4-Trimethylpentane	1.19e-006	1.25e-005
Benzene	1.01e-004	7.24e-004
Toluene	2.39e-004	2.02e-003
Ethylbenzene	2.18e-006	2.12e-005
Xylenes	1.01e-004	9.87e-004
C8+ Heavies	7.37e-004	1.15e-002
Total Components	100.00	2.57e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 3.64e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.22e+001	1.59e+002
Carbon Dioxide	1.54e-001	6.50e-001
Hydrogen Sulfide	1.01e-003	3.30e-003
Nitrogen	5.66e-003	1.52e-002
Methane	9.31e-001	1.43e+000
Ethane	1.14e+000	3.29e+000
Propane	7.56e-001	3.20e+000
Isobutane	1.76e-001	9.78e-001
n-Butane	4.33e-001	2.41e+000
Isopentane	1.33e-001	9.22e-001
n-Pentane	1.48e-001	1.03e+000
Cyclopentane	5.40e-004	3.63e-003
n-Hexane	1.47e-001	1.22e+000
Cyclohexane	1.19e-001	9.58e-001
Other Hexanes	1.90e-001	1.57e+000
Heptanes	4.11e-001	3.95e+000
Methylcyclohexane	2.76e-001	2.60e+000
2,2,4-Trimethylpentane	1.10e-004	1.21e-003
Benzene	2.35e-001	1.76e+000
Toluene	8.24e-001	7.28e+000
Ethylbenzene	1.25e-002	1.27e-001
Xylenes	8.21e-001	8.36e+000
C8+ Heavies	9.10e-001	1.49e+001
Total Components	100.00	2.16e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 5.58e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Hydrogen Sulfide	1.32e-002	6.59e-005
Methane	1.21e+001	2.86e-002
Ethane	1.49e+001	6.58e-002
Propane	9.86e+000	6.39e-002
Isobutane	2.29e+000	1.96e-002
n-Butane	5.64e+000	4.82e-002

Isopentane	1.74e+000	1.84e-002
n-Pentane	1.94e+000	2.05e-002
Cyclopentane	7.04e-003	7.26e-005
n-Hexane	1.92e+000	2.44e-002
Cyclohexane	1.55e+000	1.92e-002
Other Hexanes	2.47e+000	3.13e-002
Heptanes	5.37e+000	7.90e-002
Methylcyclohexane	3.60e+000	5.20e-002
2,2,4-Trimethylpentane	1.44e-003	2.42e-005
Benzene	3.07e+000	3.53e-002
Toluene	1.07e+001	1.46e-001
Ethylbenzene	1.62e-001	2.54e-003
Xylenes	1.07e+001	1.67e-001
C8+ Heavies	1.19e+001	2.97e-001
Total Components	100.00	1.12e+000

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

Sample: Oxford Pad 11-K
GPU Outlet Gas
Sampled @ 986 psig & 72 °F

Date Sampled: 06/10/16 Job Number: 62455.001

GLYCALC FORMAT

COMPONENT	MOL%	GPM	Wt %
Carbon Dioxide	0.177		0.391
Hydrogen Sulfide	----		----
Nitrogen	0.448		0.631
Methane	81.912		66.028
Ethane	12.141	3.239	18.344
Propane	3.164	0.870	7.010
Isobutane	0.450	0.147	1.314
n-Butane	0.748	0.236	2.191
Isopentane	0.231	0.084	0.837
n-Pentane	0.184	0.067	0.667
Cyclopentane	0.000	0.000	0.000
n-Hexane	0.098	0.040	0.424
Cyclohexane	0.013	0.004	0.055
Other C6's	0.177	0.073	0.767
Heptanes	0.135	0.060	0.670
Methylcyclohexane	0.029	0.012	0.143
2,2,4 Trimethylpentane	0.000	0.000	0.000
Benzene	0.003	0.001	0.012
Toluene	0.008	0.003	0.037
Ethylbenzene	0.000	0.000	0.000
Xylenes	0.005	0.002	0.027
Octanes Plus	0.077	0.038	0.452
Totals	100.000	4.875	100.000

Real Characteristics Of Octanes Plus:

Specific Gravity	4.045	(Air=1)
Molecular Weight	116.78	
Gross Heating Value	5995	BTU/CF

Real Characteristics Of Total Sample:

Specific Gravity	0.689	(Air=1)
Compressibility (Z)	0.9968	
Molecular Weight	19.90	
Gross Heating Value		
Dry Basis	1205	BTU/CF
Saturated Basis	1185	BTU/CF

INTERNAL COMBUSTION ENGINE DATA SHEET

Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form.*

Emission Unit ID#[1]	CE-1		
Engine Manufacturer/Model	Caterpillar/G3516BLE		
Manufacturers Rated bhp/rpm	1380/ 1400		
Source Status[2]	MS		
Date Installed/ Modified/Removed/Relocated[3]	2017		
Engine Manufactured /Reconstruction Date[4]	11/17/2014		
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable)[5]	☒40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☒40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources
Engine Type[6]	4SLB		
APCD Type[7]	OxCat.-A/F		
Fuel Type[8]	RG		
H_2S (gr/100 scf)	0.25		
Operating bhp/rpm	1380/1400		
BSFC (BTU/bhp-hr)	8,200 HHV		
Hourly Fuel Throughput	9,391 ft^3/hr	ft^3/hr	ft^3/hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	82.27 $MMft^3$/yr	$MMft^3$/yr	$MMft^3$/yr gal/yr
Fuel Usage or Hours of Operation Metered	Yes ☒ No ☐	Yes ☒ No ☐	Yes ☐ No ☐

Calculation Methodology[9]	Pollutant[10]	Hourly PTE (lb/hr)[11]	Annual PTE (tons/year)[11]	Hourly PTE (lb/hr)[11]	Annual PTE (tons/year)[11]	Hourly PTE (lb/hr)[11]	Annual PTE (tons/year)[11]
MD	NO_x	3.04	13.33				
MD	CO	6.08	26.65				
MD	VOC*	3.38	14.79				
AP	SO_2	0.01	0.03				
AP	PM_{10}	0.11	0.49				
MD	Formaldehyde	1.25	5.46				
AP	Total HAPs	1.43	6.24				
MD	GHG (CO_2e)	1745.52	6950.63				

***VOCs include Formaldehyde.**

1 Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion engine/generator engine located at the well site. Multiple engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. Microturbine generator engines should be designated MT-1, MT-2, MT-3 etc. If more than three (3) engines exist, please use additional sheets.

2 Enter the Source Status using the following codes:

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

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

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

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

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

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

2SLB	Two Stroke Lean Burn	4SRB	Four Stroke Rich Burn
4SLB	Four Stroke Lean Burn		

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

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

8 Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas /Production Gas	D	Diesel

9 Enter the Potential Emissions Data Reference designation using the following codes. Attach all reference data used.

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

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

11 PTE for engines shall be calculated from manufacturer's data unless unavailable.

USA COMPRESSION

USA Compression Unit 1543 Caterpillar G3516BLE Engine Emissions

Date of Manufacture	11/17/2014	Engine Serial Number	JEF03169	Date Modified/Reconstructed	Not Any
Driver Rated HP	1380	Rated Speed in RPM	1400	Combustion Type	Spark Ignited 4 Stroke
Number of Cylinders	16	Compression Ratio	8:1	Combustion Setting	Ultra Lean Burn
Total Displacement (in^3)	4211	Fuel Delivery Method	Carburetor	Combustion Air Treatment	T.C./Aftercooled

Raw Engine Emissions (Customer Supplied Fuel Gas with H2S < 10 PPM)

Fuel Consumption *7427 LHV BTU/bhp-hr or 8200 HHV BTU/bhp-hr*
Altitude *1200 ft*
Maximum Air Inlet Temp *90 F*

	g/bhp-hr [1]	lb/MMBTU [2]	lb/hr	TPY
Nitrogen Oxides (NOx)	0.5		1.52	6.66
Carbon Monoxide (CO)	2.9		8.82	38.64
Volatile Organic Compounds (VOC or NMNEHC excluding CH2O)	0.72		2.19	9.59
Formaldehyde (CH2O)	0.41		1.25	5.46
Particulate Matter (PM) Filterable+Condensable		9.99E-03	1.13E-01	4.95E-01
Sulfur Dioxide (SO2)		5.88E-04	6.65E-03	2.91E-02

	g/bhp-hr [1]	lb/hr	Metric Tonne/yr
Carbon Dioxide (CO2)	499	1518	6031
Methane (CH4)	2.98	9.07	36.02

[1] g/bhp-hr are based on Caterpillar Specifications (GERP) assuming 905 LHV BTU/SCF fuel gas, 1200 ft elevation, and 105 F Max Air Inlet Temperature. Note that g/bhp-hr values are based on 100% Load Operation. It is recommended to add a safety margin to CO, VOC, and Formaldehyde to account for variations in fuel gas composition and load.

[2] Emission Factor obtained from EPA's AP-42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combution Sources (Section 3.2 Natural Gas-Fired Reciprocating Engines, Table 3.2-2).

Catalytic Converter Emissions

Catalytic Converter Make and Model: *DCL DC64L2-16*
Element Type: *Oxidation*
Number of Elements in Housing: *2*
Air/Fuel Ratio Control *Caterpillar ADEM3, NOx Feedback*

	% Reduction	g/bhp-hr	lb/hr	TPY
Nitrogen Oxides (NOx)	0	<1.00	**3.04**	**13.33**
Carbon Monoxide (CO)	31	2.00	**6.09**	**26.66**
Volatile Organic Compounds (VOC or NMNEHC excluding CH2O)	3	0.70	**2.13**	**9.33**
Formaldehyde (CH2O)	0	0.41	**1.25**	**5.46**
Particulate Matter (PM)	0		**1.13E-01**	**4.95E-01**
Sulfur Dioxide (SO2)	0		**6.65E-03**	**2.91E-02**

	% Reduction	lb/hr	Metric Tonne/yr
Carbon Dioxide (CO2)	0	**1518**	**6031**
Methane (CH4)	0	**9.07**	**36.02**

G3516B

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
CNX CAIN RIDGE 6-8-17

CATERPILLAR®

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	8	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 2 INLET (°F):	130		
AFTERCOOLER - STAGE 1 INLET (°F):	201	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	210	FUEL:	CNX CAIN RIDGE 6-8-17
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	7.0-40.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	58.9
CONTROL SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	1094
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	1200
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	90
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	1380 bhp@1400rpm
SET POINT TIMING:	28		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING	**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER (WITHOUT FAN)	(2)	bhp	1380	1380	1035	690
INLET AIR TEMPERATURE		°F	90	90	90	90
ENGINE DATA						
FUEL CONSUMPTION (LHV)	(3)	Btu/bhp-hr	7427	7427	7955	8544
FUEL CONSUMPTION (HHV)	(3)	Btu/bhp-hr	8200	8200	8782	9433
AIR FLOW (@inlet air temp, 14.7 psia) (WET)	(4)(5)	ft3/min	3225	3225	2530	1769
AIR FLOW (WET)	(4)(5)	lb/hr	13963	13963	10953	7657
FUEL FLOW (60ºF, 14.7 psia)		scfm	156	156	125	90
INLET MANIFOLD PRESSURE	(6)	in Hg(abs)	93.4	93.4	75.8	53.3
EXHAUST TEMPERATURE - ENGINE OUTLET	(7)	°F	995	995	980	989
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia) (WET)	(8)(5)	ft3/min	9151	9151	7117	5013
EXHAUST GAS MASS FLOW (WET)	(8)(5)	lb/hr	14452	14452	11346	7939
EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)	(9)(10)	g/bhp-hr	0.50	0.50	0.50	0.50
CO	(9)(10)	g/bhp-hr	2.90	2.90	3.10	3.05
THC (mol. wt. of 15.84)	(9)(10)	g/bhp-hr	4.58	4.58	4.91	4.99
NMHC (mol. wt. of 15.84)	(9)(10)	g/bhp-hr	1.60	1.60	1.71	1.74
NMNEHC (VOCs) (mol. wt. of 15.84)	(9)(10)(11)	g/bhp-hr	0.72	0.72	0.77	0.78
HCHO (Formaldehyde)	(9)(10)	g/bhp-hr	0.41	0.41	0.40	0.40
CO2	(9)(10)	g/bhp-hr	499	499	533	580
EXHAUST OXYGEN	(9)(12)	% DRY	9.1	9.1	8.8	8.4
HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(13)	Btu/min	23111	23111	21796	20489
HEAT REJ. TO ATMOSPHERE	(13)	Btu/min	6110	6110	5092	4074
HEAT REJ. TO LUBE OIL (OC)	(13)	Btu/min	4475	4475	3978	3363
HEAT REJ. TO A/C - STAGE 1 (1AC)	(13)(14)	Btu/min	11313	11313	9368	3232
HEAT REJ. TO A/C - STAGE 2 (2AC)	(13)(14)	Btu/min	5520	5520	5197	3392

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(14)(15)	Btu/min	42670
TOTAL AFTERCOOLER CIRCUIT (2AC)	(14)(15)	Btu/min	5796
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

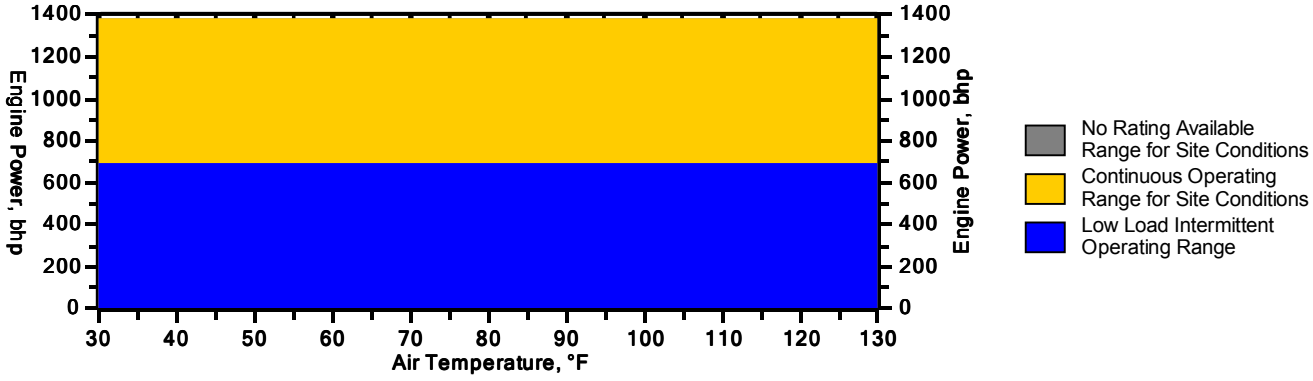
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating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

For notes information consult page three.

PREPARED BY: Chris Magee, USAC
Data generated by Gas Engine Rating Pro Version 6.04.00
Ref. Data Set EM1748-02-001, Printed 08Jun2017

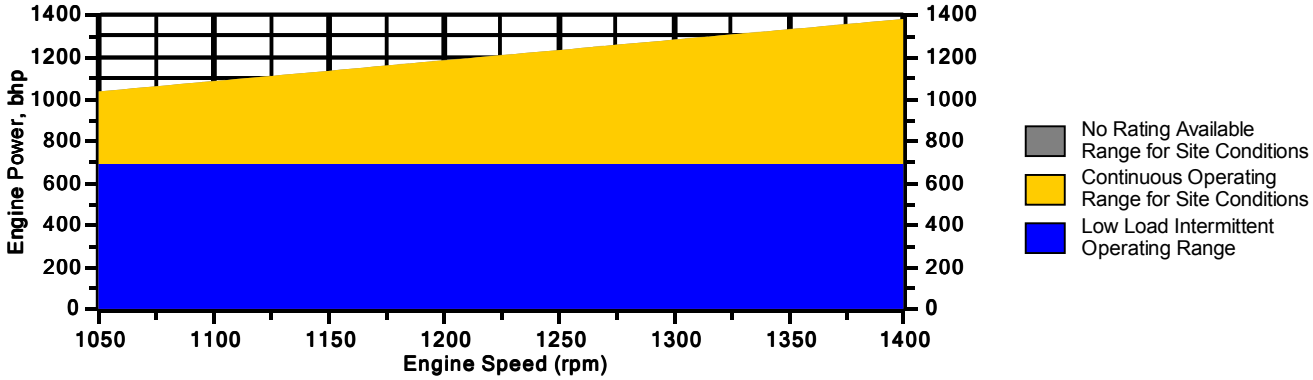
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1200 ft and 1400 rpm



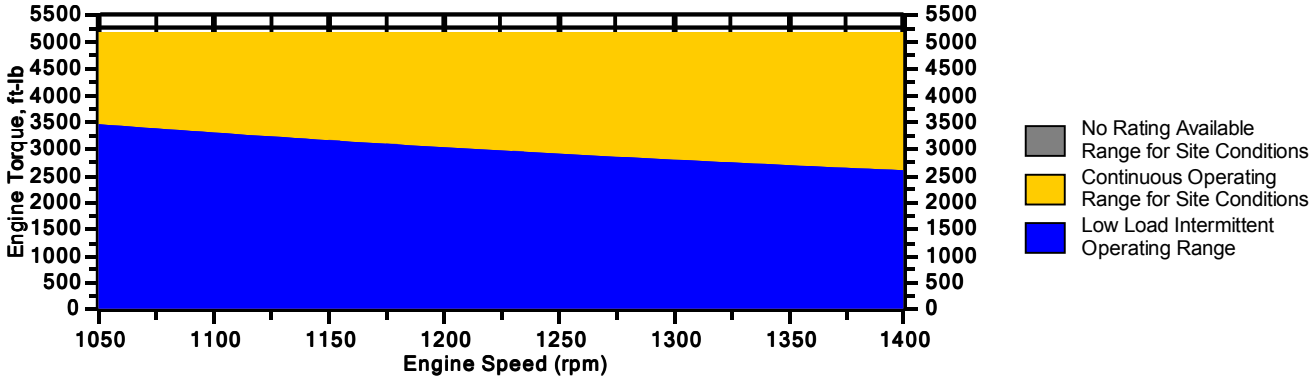
Engine Power vs. Engine Speed

Data represents speed sweep at 1200 ft and 90 ºF



Engine Torque vs. Engine Speed

Data represents speed sweep at 1200 ft and 90 ºF



Note: At site conditions of 1200 ft and 90°F inlet air temp., constant torque can be maintained down to 1050 rpm. The minimum speed for loading at these conditions is 1050 rpm.

NOTES

1. Fuel pressure range specified is to the engine fuel pressure regulator. Additional fuel train components should be considered in pressure and flow calculations.

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

3. Fuel consumption tolerance is ± 3.0% of full load data.

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

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

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

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

8. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.

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

10. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate the maximum values expected under steady state conditions. Fuel methane number cannot vary more than ± 3. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

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

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

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

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

15. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	81.9120	81.9120
Ethane	C2H6	12.1410	12.1410
Propane	C3H8	3.1640	3.1640
Isobutane	iso-C4H1O	0.4500	0.4500
Norbutane	nor-C4H1O	0.7380	0.7380
Isopentane	iso-C5H12	0.2310	0.2310
Norpentane	nor-C5H12	0.1940	0.1940
Hexane	C6H14	0.5450	0.5450
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.4480	0.4480
Carbon Dioxide	CO2	0.1770	0.1770
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup:	CNX CAIN RIDGE 6-
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	58.9
Lower Heating Value (Btu/scf):	1094
Higher Heating Value (Btu/scf):	1207
WOBBE Index (Btu/scf):	1321
THC: Free Inert Ratio:	159
Total % Inerts (% N2, CO2, He):	0.63%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.997
Stoich A/F Ratio (Vol/Vol):	11.36
Stoich A/F Ratio (Mass/Mass):	16.57
Specific Gravity (Relative to Air):	0.686
Fuel Specific Heat Ratio (K):	1.288

CONDITIONS AND DEFINITIONS

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

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

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

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

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

FUEL LIQUIDS

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

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

ATTACHMENT M

AIR POLLUTION CONTROL DEVICE

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

AIR POLLUTION CONTROL DEVICE
Vapor Combustion Control Device Sheet

Complete this vapor combustion control device sheet for each enclosed combustion device, flare, thermal oxidizer, or completion combustion device that is located at the natural gas production pad for the purpose of thermally destructing waste gas to control emissions of regulated pollutants to the atmosphere.

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.

General Information

1. Control Device ID#: F-1	2. Installation Date: 2017 ☒ New	
3. Maximum Rated Total Flow Capacity: 2,000 scfh 48,000 scfd	4. Maximum Design Heat Input: 2 MMBtu/hr	5. Design Heat Content: 1,000 BTU/scf

Control Device Information

6. Select the type of vapor combustion control device being used: ☐ Enclosed Combustion Device ☐ Elevated Flare ☒ Ground Flare ☐ Thermal Oxidizer ☐ Completion Combustion Device

7. Manufacturer: The Frederick Logan Company, Inc	8. Hours of operation per year: 8760

9. List the emission units whose emissions are controlled by this vapor combustion control device: (Emission Point ID#: 8e)

10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
RSV-2	Dehy Reboiler Still Vent and Dehy TEG Flash Separator		

If this vapor combustor controls emissions from more than six emission units, please attach additional pages.

11. Assist Type	12. Flare Height	13. Tip Diameter	14. Was the design per §60.18?
☐ Steam - ☐ Air - ☐ Pressure - ☒ Non -	20 ft	To Be Determined	☒Yes ☐No

Waste Gas Information

15. Maximum waste gas flow rate (scfm):	16. Heat value of waste gas stream (BTU/ft3)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (ft/s)
33.33	200 or greater	1450	4.52

19. Provide an attachment with the characteristics of the waste gas stream to be burned.

Pilot Information

20. Type/Grade of pilot fuel:	21. Number of pilot lights:	22. Fuel flow rate to pilot flame per pilot (scf/hr):	23. Heat input per pilot (BTU/hr):	24. Will automatic re-ignition be used?
Fuel Gas	1	5	5000	☒ Yes ☐ No

25. If automatic re-ignition will be used, describe the method: Electronic re-ignition will be installed and monitored for proof of pilot flame through flame ionization, auto relight.

26. Describe the method of controlling flame: Temperature monitoring of combustion chamber to keep between 1450F and 1600F

27. Is pilot flame equipped with a monitor to detect the presence of the flame?	28. If yes, what type?
☒ Yes ☐ No	☐ Thermocouple ☐ Infra-Red ☐ Ultra Violet ☐ Camera with monitoring control room ☒ Other, describe: Ionization rod which sends a signal to controller as long as it is in contact with the flame.

29. Pollutant(s) Controlled	30. % Capture Efficiency	31. Manufacturer's Guaranteed Control Efficiency (%)
VOC	100	98

32. Has the control device been tested by the manufacturer and certified? No

33. Describe all operating ranges and maintenance procedures required by the manufacturer to maintain warranty: Available Upon request

34. Additional Information Attached? ☒ **YES** ☐ **NO**

Please attach a copy of manufacturer's data sheet.
Please attach a copy of manufacturer's drawing.
Please attach a copy of the manufacturer's performance testing.

If any of the requested information is not available, please contact the manufacturer.

INSTRUCTIONS:
Vapor Combustion Control Device

This form assumes one vapor combustion control device emissions are being released from the emission point identification number (including the waste gas emissions and pilot emissions). If multiple vapor combustion control devices are being used at the oil and natural gas production facility, a vapor control device sheet must be completed for each device. The same form is being used for all types of vapor combustion control devices.

General Information

1. Enter the control device ID#(s) that has been assigned to this control device. A unique control device identification number should identify each control device located at the affected facility.
2. Enter the date that the control device was installed at the affected facility. Include the month, day, and year. If this is a new control device that has yet to be installed, check the "NEW" box.
3. Enter the maximum rated total flow rate of the vapor combustion device. This includes the flow rate of all materials to be burned including the pilot fuel and the waste gas.
4. Enter the maximum rated design heat input capacity of the vapor combustion device in terms of million British thermal units per hour (MMBtu/hr).
5. Enter the total design heat content of the pilot in terms of million British thermal units per hour (MMBtu/hr).

Control Device Information

6. Indicate the type of vapor combustion device that applies.
7. Enter the manufacturer and model number of the control device.
8. Enter the hours of operation that the control device is planned to be used. This should be the same basis as the emissions calculations.
9. Enter the emission point identification number.
10. Enter ALL of the emission units whose emissions will be controlled and then emitted from the control device.
11. Select whether the flare is steam-assisted, air-assisted, pressure-assisted, or non-assisted.
12. Enter the height of the stack in terms of feet.
13. Enter the tip diameter (in feet) of the top of the stack where the emissions are discharged.
14. Is the applicant having the combustion device designed per §60.18? Only flares required by an NSPS standard are required to be designed and operated in accordance with §60.18.

Waste Gas Information

The waste gas is the vapor emissions that are being controlled.

15. Enter the waste gas flow rate in cubic feet per minute that is being consumed.
16. Enter the heat content of the waste gas being combusted in units of BTU per cubic feet.
17. Enter the minimum temperature of the emissions stream (°F).
18. Enter the velocity in feet per second of the gas as it discharges from the top of the stack.
19. Provide the characterization of the waste gas stream that is being controlled. This could be a certificate of analysis of the natural gas from this facility or from a similar facility. This is the basis of the emissions calculations.

Pilot Information

20. Enter the type/grade(s) of fuel that will combusted in the combustion flare's pilot (examples: natural gas pipeline quality, propane, etc.).
21. How many pilot lights does the device have?
22. What is the fuel capacity for each pilot?
23. What is the heat input for each pilot?
24. Is the system designed with automatic re-ignition?
25. Describe the re-ignition method and system.
26. Describe the method of controlling the pilot flame.
27. Is the pilot flame equipped with a monitoring device?
28. What is the monitoring device for the pilot flame?

**continued next page*

Control Information

29. Enter the types of pollutants that the control equipment controls (i.e., reduces). If numerous pollutants are controlled, indicate the different pollutants controlled in line with their respective control efficiencies.
30. What is the % capture efficiency of the collection system to the control device? In other words, what is the percentage of the waste gas stream will be controlled?
31. Enter the control efficiency of the control equipment for each pollutant being controlled. The manufacturer typically provides a manufacturer's minimum guarantee control efficiency. Provide the manufacturer's data sheet that documents the minimum guarantee.
32. Please answer if the control device had a performance test conducted by the manufacturer and if it is certified.
33. Describe the manufacturer's operating and maintenance requirements that the guaranteed control efficiency is based upon.
34. Please include any additional information associated with the control device you feel should be submitted with this application. Please attach a copy of the manufacturer's data sheet. Please include the manufacturer's performance testing.

INSTRUCTIONS:
Vapor Combustion Control Device

This form assumes one vapor combustion control device emissions are being released from the emission point identification number (including the waste gas emissions and pilot emissions). If multiple vapor combustion control devices are being used at the oil and natural gas production facility, a vapor control device sheet must be completed for each device. The same form is being used for all types of vapor combustion control devices.

General Information

1. Enter the control device ID#(s) that has been assigned to this control device. A unique control device identification number should identify each control device located at the affected facility.
2. Enter the date that the control device was installed at the affected facility. Include the month, day, and year. If this is a new control device that has yet to be installed, check the "NEW" box.
3. Enter the maximum rated total flow rate of the vapor combustion device. This includes the flow rate of all materials to be burned including the pilot fuel and the waste gas.
4. Enter the maximum rated design heat input capacity of the vapor combustion device in terms of million British thermal units per hour (MMBtu/hr).
5. Enter the total design heat content of the pilot in terms of million British thermal units per hour (MMBtu/hr).

Control Device Information

6. Indicate the type of vapor combustion device that applies.
7. Enter the manufacturer and model number of the control device.
8. Enter the hours of operation that the control device is planned to be used. This should be the same basis as the emissions calculations.
9. Enter the emission point identification number.
10. Enter ALL of the emission units whose emissions will be controlled and then emitted from the control device.
11. Select whether the flare is steam-assisted, air-assisted, pressure-assisted, or non-assisted.
12. Enter the height of the stack in terms of feet.
13. Enter the tip diameter (in feet) of the top of the stack where the emissions are discharged.
14. Is the applicant having the combustion device designed per §60.18? Only flares required by an NSPS standard are required to be designed and operated in accordance with §60.18.

Waste Gas Information

The waste gas is the vapor emissions that are being controlled.

15. Enter the waste gas flow rate in cubic feet per minute that is being consumed.
16. Enter the heat content of the waste gas being combusted in units of BTU per cubic feet.
17. Enter the minimum temperature of the emissions stream (°F).
18. Enter the velocity in feet per second of the gas as it discharges from the top of the stack.
19. Provide the characterization of the waste gas stream that is being controlled. This could be a certificate of analysis of the natural gas from this facility or from a similar facility. This is the basis of the emissions calculations.

Pilot Information

20. Enter the type/grade(s) of fuel that will combusted in the combustion flare's pilot (examples: natural gas pipeline quality, propane, etc.).
21. How many pilot lights does the device have?
22. What is the fuel capacity for each pilot?
23. What is the heat input for each pilot?
24. Is the system designed with automatic re-ignition?
25. Describe the re-ignition method and system.
26. Describe the method of controlling the pilot flame.
27. Is the pilot flame equipped with a monitoring device?
28. What is the monitoring device for the pilot flame?

**continued next page*

Control Information

29. Enter the types of pollutants that the control equipment controls (i.e., reduces). If numerous pollutants are controlled, indicate the different pollutants controlled in line with their respective control efficiencies.
30. What is the % capture efficiency of the collection system to the control device? In other words, what is the percentage of the waste gas stream will be controlled?
31. Enter the control efficiency of the control equipment for each pollutant being controlled. The manufacturer typically provides a manufacturer's minimum guarantee control efficiency. Provide the manufacturer's data sheet that documents the minimum guarantee.
32. Please answer if the control device had a performance test conducted by the manufacturer and if it is certified.
33. Describe the manufacturer's operating and maintenance requirements that the guaranteed control efficiency is based upon.
34. Please include any additional information associated with the control device you feel should be submitted with this application. Please attach a copy of the manufacturer's data sheet. Please include the manufacturer's performance testing.

June 14, 2017

CONE MIDSTREAM
1000 Consol Energy Drive
Canonsburg, PA 15317-6506

Attention: Mr. Andres Zapata, Process Engineer IV

Reference: 50MMSCFD Enclosed Ground Flare System Specs

Dear Mr. Zapata,

In reference to your RFQ, we are pleased to propose the following equipment for your application:

50 MMSCFD FLOW RATE DEHYDRATOR VAPOR GROUND FLARE

[Below process conditions are for each reboiler]

50 MMSCFD DEHYDRATOR OPERATING PARAMETERS

Process Fluid	Natural Gas
Process Flow	50 MMSCFD
Operating Temperature	60-110°F
Operating Pressure	850-950 PSIG
Specific Gravity	0.6
Glycol Pump:	Kimray Energy Exchange
Flash Gas Separator	40 PSIG Operating, 120°F
Electrical Service Available at Site	None

Equipment Description

ITEM	QTY	DESCRIPTION
1	**1**	**DVC-36 Skid Mounted, Valve Train Enclosed Flare complete with:**

- 36" Dia. Combustion Chamber
- 36" x 20' Tall Exhaust Stack
- (3) 24" Adjustable Flame Cell Air Inlets (one Hinged)
- (2) Dual Type K thermocouples with Thermowell
- (2) 4" Flanged Sample Ports
- Stack Lined with 4" 2300 deg. Folded Blanket Flue Liners
- Lower stack lined with 4" Castable Refractory
- (1) Sight Glass
- Stack Material –A-36
- Surface prep and paint:
  - Standard 2 coat paint
  - Color to be determined
- 4" Dehy Overhead Still Column Vapor Inlet. To be mounted on top of the Heated Enclosure. Block & Vent valves to be installed. Vent line to extend 6' above roof. (vent line to be removed for shipping)
- Install low point drains on bottom of vent line, run SS tubing with hand valve to + 1' above grade.
- Install low point drain upstream of the 3" Flame arrestor. Install SS tubing and hand valve.
- (1) 1" NPT for Flash Gas and Vessel Relief Vapors Inlet.
- (2) Lifting lug mounted on top stack section.
- Valve Train C/W: Pneumatic Shutoff Valve, Pilot Solenoid, Manual Block Valve, Strain, and Regulator.

2	**1**	**2 MMBTU/HR Burner**

- Natural Draft Gas induced Burner

3	**1**	**MR-1000 Pilot**

- Self-inspirited pilot.
- Direct Spark Ignition
- Flame Ionization Detection Rod.

4	**1**	**Burner Control Panel**

- 24 VDC Solar power Option
  - Solar Panel and mounting bracket
  - Solar Charging Module

- (2) 12 VDC deep cycle batteries
- (1) Battery enclosure
- Mounting pole

- ProFire 2100 Ignition System with Modbus Communications card.
- NEMA 4 Main Enclosure
- Assist heat burner is on when temperature drops below 1450 deg F.
- Continuous pilot operation.
- System shut down for the following events:
  - Loss of Flame
  - High Stack Temp

  - Customer contacts for the following signals
  - Fault
  - At Temp

5 1 Process Valve Train

- 4" Pneumatic Block Valve for Dehy Stream Vapors.
- 1/2" ASCO Solenoid Low draw Valve for burner gas
- 1" Pneumatic block Valve for flash Gas inlet.
- ½" ASCO Next Generation low draw solenoid valve for pilot gas
- ¼" 3-way Solenoid valve for Pneumatic valve operation.
- Manual block valve for pilot gas
- fuel gas regulator
- Instrument gas regulator for pneumatic controls
- Fuel Gas Strainer

6 2 Flame Arrestor

- 3" 150#, CS/AL construction, for Low Pressure Overhead Dehy Inlet.
- 1" NPT Threaded, CS/AL construction, for High Pressure Flash Gas Vapors.

7 3 Documentation

- Operation and Maintenance Manual

8 1 FAT – Factory Acceptance Test

- Complete test of system at Fort Worth, TX location

9 1 Heated Enclosure for Vessels and Skid mounted Valve train

- 1” thick lined insulation on roof and walls
- 6,000 BTU/HR Catco Heater
- Access door
- Louvered Vent ports

10 1 24” Dia. Knockout/Blow Pot Vessel with complete instrumentation

- ASME Pressure Vessel
- 150 PSIG @250 deg F
- 4” NPT inlet
- 4” NPT Outlet
- 1” NPT Liquid Drain
- 2” NPT Level Controller Connection
- 1” NPT Level Gauge Connections
- Kimray Gen II Level controller
- Kimray dump valve
- 1” Check valve
- 3-way pneumatic valve

Technical Summary

Process inlet stream: Based on GRI-Gly calc output (attached)

Overhead Still Inlet

Inlet Temperature:	212 °F
Inlet Pressure:	≥ 2” WC

Flash Gas Inlet

Inlet Temperature:	100 °F
Inlet Pressure:	20-50 PSIG
Combustion Chamber Temp:	1450 – 1600 deg F
Destruction Efficiency:	≥98.0%

Site Conditions:

Wind Speed	90 MPH
Seismic Zone	1
Elevation	1,000 ft.
Humidity	High

Utilities:

Gas Service Required for Burner	400 SCFH – Natural Gas Intermittent use, Only on when temp <1450 deg F
Electrical Service Required	Solar Powered 24 VDC, 5 amps
Gas Consumption at Start-up	400,000 Btu/hr
Gas Consumption under load	≤ 400 SCFH, Dependent on BTU value of waste stream

Attachment M
Air Pollution Control Device Sheet
(Oxidation Catalyst)

Control Device ID No. (C-1):

Equipment Information

1. Manufacturer: DCL America Inc. Model No. DC64AL2	2. Control Device Name: Engine Catalytic Converter Type: Oxidation Catalyst
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. See attached information for arrangement, size, flows, temperatures, catalyst type, and dimensions	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device. This device was designed to meet the 1/2/0.7 (g/hp hr) requirements for NOx, CO, VOCs respectively. See Cat Spec Sheet	
5. Provide a scale diagram of the control device showing internal construction. See Converter Drawing Attached	
6. Submit a schematic and diagram with dimensions and flow rates. Catalyst Specs attached list 9,151 acfm at exhaust temp 850F and Catalyst Dimensions of 35.875 by 14.875 by 3.50 inches.	
7. Guaranteed minimum collection efficiency for each pollutant collected: The catalyst manufacturer list 31% reduction efficiency for CO and 3% reduction efficiency for VOCs	
8. Attached efficiency curve and/or other efficiency information. NA	
9. Design inlet volume: 9151 ACFM	10. Capacity: 9151 ACFM
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. No liquid flow associated with this catalytic converter and although pressure drop may be measured periodically, the inlet and outlet temperature will be measured continuously by this unit in order to assess performance with manufacturer's operating requirements.	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment. NA	
13. Description of method of handling the collected material(s) for reuse of disposal. NA	

Gas Stream Characteristics

14. Are halogenated organics present?	☐ Yes	☒ No
Are particulates present?	☐ Yes	☒ No
Are metals present?	☐ Yes	☒ No

15. Inlet Emission stream parameters:	**Maximum**	**Typical**
Pressure (mmHg):	NA	
Heat Content (BTU/scf):	NA	
Oxygen Content (%):	8.4-9.1 %	
Moisture Content (%):	NA	
Relative Humidity (%):	NA	

16. Type of pollutant(s) controlled: ☐ SO_x ☐ Odor
☐ Particulate (type): ☒ Other CO, VOC

17. Inlet gas velocity: 41.3 ft/sec

18. Pollutant specific gravity:

19. Gas flow into the collector:
9151 ACF @ 850 °F

20. Gas stream temperature:
Inlet: 850 °F
Outlet: 900 °F

21. Gas flow rate:
Design Maximum: 9151 ACFM
Average Expected: ACFM

22. Particulate Grain Loading in grains/scf:
Inlet: NA
Outlet:

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	IN Pollutant		Emission Capture Efficiency %	OUT Pollutant		Control Efficiency %
	lb/hr	grains/acf		lb/hr	grains/acf	
A CO	8.82		100	6.08		31
B VOC	2.19		100	2.13		3
C						
D						
E						

24. Dimensions of stack: Height Diameter

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector. NA

Particulate Distribution

26. Complete the table:	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	Weight % for Size Range	Weight % for Size Range
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification): NA

28. Describe the collection material disposal system: NA

29. Have you included ***Other Collectores Control Device*** in the Emissions Points Data Summary Sheet? Yes

30. **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: The inlet and outlet catalyst temperatures will be measured to assure proper operation in accordance with manufacturer's specifications	RECORDKEEPING: All maintenance records will be maintained and made available upon request.
REPORTING: Any malfunctions of control equipment that cause an emission exceedance will be reported to the Director of the WV DAQ. Additionally, the stack testing compliance demonstration results will be reported in accordance with 40CFR60, subpart JJJJ	TESTING: The engine will be tested to verify compliance with NSPS JJJJ emission limitations for NOx, CO, and VOCs. This shall consist of an initial test as well as ongoing periodic testing.

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

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant. 31% reduction efficiency for CO, 3% reduction efficiency for VOCs

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant. Same as #31

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

NA

DCL America Inc.
12620 FM 1960 W, Ste A4 Box # 560, Houston, TX 77065
Tel.: 877-897-9759 Fax: 281-605-5858 E-mail: info@dclamerica.com

To	Chris Magee	**Phone**	
	USA Compression	**Fax**	
Date	June 2016	**Email**	cmagee@usacompression.com

RE: EMISSIONS GUARANTEE

Chris,

We hereby guarantee that our QUICK-LID™ Model DC64AL2-16 Hospital+ Grade Catalytic Silencer described below:

Catalyst model	DC64AL2
Catalyst coating	Oxidation (A coating)
Outside Diameter of catalyst substrate	24.23"
No. Of Catalyst Layers	2
No. of catalyst substrates	2
Cell Density	300 cpsi
Approx. Attenuation	40-52 dBA

and sized for the following engine:

Engine model	CAT G3516B
Power	1380 hp @ 1400 rpm
Fuel	Pipeline Quality Natural Gas
Exhaust Temperature	850 F

will perform as follows:

Emissions	**After Catalyst (% destruction)**
Carbon Monoxide (CO)	31%
VOC (NMNEHC)	3%

for a period of 1 year (after invoice date) or 8000 hours, whichever comes first, subject to all terms and conditions contained in the attached warranty document being respected and met.

Best regards,
DCL America

Sam Kirk
Regional Account Manager

ATTACHMENT N

SUPPORTING EMISSIONS CALCULATIONS

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

Table 1. Annual Potential To Emit (PTE)
CONE Midstream Devco III LP
Cain Run Station

Proposed Rule 13 Modifications

Source	PM	PM10	PM2.5	SO2	NOx	CO	VOC	CO2e
Dehy Reboiler Burner (tons/yr)	0.02	0.02	0.02	0.00	0.32	0.27	0.02	384.38
Dehydration/Ground Flare (ton/yr)	--	--	--	0.04	0.60	2.72	6.01	1023.96
Compressor Engine (tons/yr)	0.49	0.49	0.49	0.03	13.33	26.65	9.33	6950.63
Compressor Blowdowns (tons/yr)	--	--	--	--	--	--	1.40	157.75
Total Point Source Emissions (ton/yr)	0.52	0.52	0.52	0.07	14.24	29.64	16.75	8516.72
(lb/hr)	0.12	0.12	0.12	0.02	3.25	6.77	3.83	1944.46

Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs
Dehy Reboiler Burner (tons/yr)	0.00	0.00	--	--	0.01	0.00	0.01
Dehydration/Ground Flare (ton/yr)	0.16	0.65	0.01	0.74	0.16	--	1.71
Compressor Engine (tons/yr)	0.02	0.02	0.00	0.01	0.06	5.46	6.51
Total Point Source Emissions (ton/yr)	0.18	0.67	0.01	0.75	0.22	5.46	8.23
(lb/hr)	0.04	0.15	0.00	0.17	0.05	1.25	1.88

Current Rule 13 Permit Allowables

Source	PM	PM10	PM2.5	SO2	NOx	CO	VOC*	CO2e
Slop/Brine Tank (tons/yr)	--	--	--	--	--	--	0.00	-
Dehy Reboiler Burner (tons/yr)	0.01	0.01	0.01	0.00	0.16	0.14	0.01	192.19
Dehydration/Ground Flare (ton/yr)	--	--	--	0.04	0.60	2.72	1.23	1023.96
MicroTurbine (ton/yr)	--	--	--	--	0.08	0.24	0.03	222.07
Compressor Engine (tons/yr)	0.45	0.45	0.45	0.03	13.33	26.65	9.33	6947.29
Compressor Blowdowns (tons/yr)	--	--	--	--	--	--	1.19	158.42
Pigging Vent Emissions (tons/yr)	--	--	--	--	--	--	0.80	106.24
Total Point Source Emissions (ton/yr)	0.46	0.46	0.46	0.06	14.17	29.75	12.59	8650.17
(lb/hr)	0.10	0.10	0.10	0.01	3.23	6.79	2.87	1974.92

*VOC does not include formaldehyde

Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs
Dehy Reboiler Burner (tons/yr)	0.00	0.00	--	--	0.00	0.00	0.00
Dehydration/Ground Flare (ton/yr)	0.02	0.06	0.02	0.06	0.02	--	0.18
Compressor Engine (tons/yr)	0.02	0.02	0.00	0.01	0.05	5.20	6.14
Total Point Source Emissions (ton/yr)	0.04	0.08	0.02	0.07	0.07	5.20	6.32
(lb/hr)	0.01	0.02	0.01	0.02	0.02	1.19	1.44

Proposed Rule 13 Permit Allowables

Source	PM	PM10	PM2.5	SO2	NOx	CO	VOC*	CO2e
Slop/Brine Tank (tons/yr)	--	--	--	--	--	--	0.00	-
Dehy Reboiler Burner (tons/yr)	0.02	0.02	0.02	0.00	0.32	0.27	0.02	384.38
Dehydration/Ground Flare (ton/yr)	--	--	--	0.04	0.60	2.72	6.01	1023.96
MicroTurbine (ton/yr)	--	--	--	--	0.08	0.24	0.03	222.07
Compressor Engine (tons/yr)	0.49	0.49	0.49	0.03	13.33	26.65	9.33	6950.63
Compressor Blowdowns (tons/yr)	--	--	--	--	--	--	1.40	157.75
Pigging Vent Emissions (tons/yr)	--	--	--	--	--	--	0.80	106.24
Total Point Source Emissions (ton/yr)	0.52	0.52	0.52	0.07	14.33	29.87	17.58	8845.03
(lb/hr)	0.12	0.12	0.12	0.02	3.27	6.82	4.01	2019.41

*VOC does not include formaldehyde

Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs
Dehy Reboiler Burner (tons/yr)	0.00	0.00	--	--	0.01	0.00	0.01
Dehydration/Ground Flare (ton/yr)	0.16	0.65	0.01	0.74	0.16	--	1.71
Compressor Engine (tons/yr)	0.02	0.02	0.00	0.01	0.06	5.46	6.51
Total Point Source Emissions (ton/yr)	0.18	0.67	0.01	0.75	0.22	5.46	8.23
(lb/hr)	0.04	0.15	0.00	0.17	0.05	1.25	1.88

Proposed Difference of Emissions

Source	PM	PM10	PM2.5	SO2	NOx	CO	VOC	CO2e
Total Point Source Emissions (ton/yr)	0.06	0.06	0.06	0.00	0.16	0.13	5.00	194.86
(lb/hr)	0.01	0.01	0.01	0.00	0.04	0.03	1.14	44.49

Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs
Total Point Source Emissions (ton/yr)	0.14	0.59	-0.01	0.68	0.15	0.27	1.90
(lb/hr)	0.03	0.13	0.00	0.15	0.03	0.06	0.43

Table 2 Reboiler Burner (RBV-2) Rates and Emissions
CONE Midstream Devco III LP
Cain Run Station

Pollutant	Emission Factor			Emissions (lbs/hr)	Emissions (tons/yr)
Criteria Pollutants					
PM/PM10/PM2.5	7.6	lb/MMcf	(1)	0.006	0.024
SO_2	0.6	lb/MMcf	(1)	0.000	0.002
NOx	100	lb/MMcf	(2)	0.07	0.32
CO	84	lb/MMcf	(2)	0.06	0.27
VOC	5.5	lb/MMcf	(1)	0.004	0.018
Hazardous Air Pollutants					
Arsenic	2.0E-04	lb/MMcf	(3)	1.47E-7	6.44E-7
Benzene	2.1E-03	lb/MMcf	(4)	1.54E-6	6.76E-6
Beryllium	1.2E-05	lb/MMcf	(3)	8.82E-9	3.86E-8
Cadmium	1.1E-03	lb/MMcf	(3)	8.09E-7	3.54E-6
Chromium	1.4E-03	lb/MMcf	(3)	1.03E-6	4.51E-6
Cobalt	8.4E-05	lb/MMcf	(3)	6.18E-8	2.71E-7
Dichlorobenzene	1.2E-03	lb/MMcf	(4)	8.82E-7	3.86E-6
Formaldehyde	7.5E-02	lb/MMcf	(4)	5.51E-5	2.42E-4
Hexane	1.8E+00	lb/MMcf	(4)	1.32E-3	5.80E-3
Lead	5.0E-04	lb/MMcf	(3)	3.68E-7	1.61E-6
Manganese	3.8E-04	lb/MMcf	(3)	2.79E-7	1.22E-6
Mercury	2.6E-04	lb/MMcf	(3)	1.91E-7	8.37E-7
Naphthalene	6.1E-04	lb/MMcf	(4)	4.49E-7	1.96E-6
Nickel	2.1E-03	lb/MMcf	(3)	1.54E-6	6.76E-6
PAH/POM	1.3E-03	lb/MMcf	(4)	9.47E-7	4.15E-6
Selenium	2.4E-05	lb/MMcf	(3)	1.76E-8	7.73E-8
Toluene	3.4E-03	lb/MMcf	(4)	2.50E-6	1.10E-5
Total HAP	**1.9E+00**	**lb/MMCF**		1.39E-3	6.09E-3
Greenhouse Gas Emissions					
CO_2	116.89	lb/MMBtu	(5)	8.77E+1	3.84E+2
CH_4	2.2E-03	lb/MMBtu	(5)	1.65E-3	7.24E-3
N_2O	0.0	lb/MMBtu	(5)	1.65E-4	7.24E-4
CO_2e[(b)]	-	-		87.7574	384.3775

Calculations:

(a) Annual emissions (tons/yr) = [Annual Usage (MMBtu/yr or MMCF/yr)]x [Number of Identical Heaters] x [Emission Factor (lb/MMBtu or lb/MMCF)] / [2,000 lb/ton]

Number of Line Heaters=	1	
Fuel Use (MMBtu/hr) =	0.75	
Hours of Operation (hr/yr)=	8760	
PTE Fuel Use (MMcf/yr) =	6.4	(7)

(b) CO_2 equivalent = [(CO_2 emissions)*(GWP_{CO2})]+[(CH_4 emissions)*(GWP_{CH4})]+[(N_2O emissions)*(GWP_{N2O})]
Global Warming Potential (GWP)

CO_2	1	(6)
CH_4	25	(6)
N_2O	298	(6)

Notes:

(1) AP-42, Chapter 1.4, Table 1.4-2. Emission Factors For Criteria Pollutants and Greenhouse Gases From Natural Gas Combustion, July 1998.
(2) AP-42, Chapter 1.4, Table 1.4-1. Emission Factors For Nitrogen Oxides (Nox) and Carbon Monoxide(CO) From Natural Gas Combustion, July 1998.
(3) AP-42, Chapter 1.4, Table 1.4-4. Emission Factors For Metals From Natural Gas Combustion, July 1998.
(4) AP-42, Chapter 1.4, Table 1.4-3. Emission Factors for Speciated Organic Compounds from Natural Gas Combustion, July 1998.
(5) Emission factors are from 40 CFR 98, Subpart C, Table C-1 and C-2.
(6) Global Warming Potentials obtained from 40 CFR 98, Subpart A, Table A-1
(7) MMBtu to MMcf conversion factor is 1020. AP-42, Chapter 1.4

Table 3 TEG Dehydration Unit with Ground Flare Control System
CONE Midstream Devco III LP
Cain Run Station

Stream	Uncontrolled Emission Rates			Controlled Rates	
Components	lb/hr	lb/d	tpy	lb/hr	tpy
Methane	23.167	556.010	101.472	0.46	2.03
Ethane	18.461	443.073	80.861	0.37	1.62
Propane	10.344	248.253	45.306	0.21	0.91
n-Hexane	1.851	44.426	8.108	0.04	0.16
Benzene	1.800	43.191	7.882	0.04	0.16
Toluene	7.380	177.124	32.325	0.15	0.65
Ethylbenzene	0.128	3.068	0.560	0.00	0.01
Xylene	8.407	201.759	36.821	0.17	0.74
VOC	68.646	1647.496	300.668	1.37	6.01
Total HAPs	19.567	469.613	85.704	0.39	1.71

Emission estimates were calculated using GLYCalc software.

Specs:
50 MMscf/d dehy
15 gpm TEG max pump rate (Dual Kimray 45020PV)
Column Pressure 950 psig
Column Temperature 110 F
Wet gas water content - Saturated
Dry gas water content - 7 lb H20/ MMscf
Flash Tank Temperature 149 F
Flash Tank Pressure 60 psia

Table 4 Ground Flare Emissions
CONE Midstream Devco III LP
Cain Run Station

Pollutant	Emission Factor (lb/MMBtu)	Volume (scf/hr)	Gas Heat Value (Btu/scf)	(MMBtu/ 1000000Btu)	Emissions (lbs/hr)	Emissions (ton/yr)
CO	0.31	2,000	1,000	(1/1,000,000)	0.62	2.72
NOx	0.068	2,000	1,000	(1/1,000,000)	0.14	0.60
VOC[a]	0.14	2,000	1,000	(1/1,000,000)	0.28	6.01
CO2e	116.89	2,000	1,000	(1/1,000,000)	233.78	1023.96

[a] - Measured as methane equivalent, assumed worst case

Example Formula:

$$emissions\left(\frac{ton}{yr}\right) = emission\,factor\left(\frac{lb}{MMBtu}\right) \times Volume\left(\frac{scf}{hr}\right) \times gas\,heat\,value\left(\frac{Btu}{scf}\right) \times \frac{MMBtu}{1{,}000{,}000\,Btu} \times \frac{8760\,hrs}{1\,yr} \times \frac{1\,ton}{2{,}000\,lbs}$$

Emission Factor = AP-42 Tables 13.5-1 and 2 emission factor for specific pollutant
Volume = 2000 scf/hr set to equate to 2 MMBtu/hr Ground Flare rating
Hours of operation calculated at 8760
Gas Heat Value = 1,000 Btu/scf
VOC emissions used are assumed to be worst case at 2% uncontrolled from the dehydration unit

Pollutant	Volume (scf/hr)	grain H2S/ 100 scf	Mol Fraction	Mol weight (g/mol)	(lb-mol /scf)	Emissions (lbs/hr)	Emissions (ton/yr)
SO2	2,000	15.26	0.0002423	64.00	1/379.4	0.0818	0.0358

Example Formula:

$$emissions\left(\frac{ton}{yr}\right) = Volume\left(\frac{scf}{hr}\right) \times mol\,fraction\left(\frac{H2S}{100\,scf} \times 0.00001588\right) \times molecular\,weight \times \frac{lb\text{-}mol}{scf} \times \frac{876\,hrs}{1\,yr} \times \frac{1\,ton}{2{,}000\,lbs}$$

$$\frac{1\,grain\,H2S}{100\,scf} = 15.26\,ppm\,of\,H2S$$

H2S conversion taken from supporting Sulfur Measurement Handbook
grain H2S/100 scf = 15.26
Volume = 8333 scf/hr
Hours of operation calculated at 8760
1 lb mol = 379.4 cubic feet

For Pilot Light

Pollutant	Emission Factor (lb/MMBtu)	Volume (scf/hr)	Gas Heat Value (Btu/scf)	(MMBtu/ 1000000Btu)	Emissions (lbs/hr)	Emissions (ton/yr)
CO	0.31	5	1,197	(1/1,000,000)	0.0019	0.0081
NOx	0.068	5	1,197	(1/1,000,000)	0.0004	0.0018
VOC[a]	0.14	5	1,197	(1/1,000,000)	0.0008	0.0037

[a] - Measured as methane equivalent, assumed worst case

Example Formula:

$$emissions\left(\frac{ton}{yr}\right) = emission\,factor\left(\frac{lb}{MMBtu}\right) \times Volume\left(\frac{scf}{hr}\right) \times gas\,heat\,value\left(\frac{Btu}{scf}\right) \times \frac{MMBtu}{1{,}000{,}000\,Btu} \times \frac{8760\,hrs}{1\,yr} \times \frac{1\,ton}{2{,}000\,lbs}$$

Emission Factor = AP-42 Tables 13.5-1 and 2 emission factor for specific pollutant
Gas Heat Value = 1197 Btu/scf average of two sales gas samples taken 6-10-16

Pollutant	Volume (scf/hr)	grain H2S/ 100 scf	Mol Fraction	Mol weight (g/mol)	(lb-mol /scf)	Emissions (lbs/hr)	Emissions (ton/yr)
SO2	5.00	15.26	0.0002423	64.00	1/379.4	0.0002	0.0009

Example Formula:

$$emissions\left(\frac{ton}{yr}\right) = Volume\left(\frac{scf}{hr}\right) \times mol\,fraction\left(\frac{H2S}{100\,scf} \times 0.00001588\right) \times molecular\,weight \times \frac{lb\text{-}mol}{scf} \times \frac{8760\,hrs}{1\,yr} \times \frac{1\,ton}{2{,}000\,lbs}$$

$$\frac{1\,grain\,H2S}{100\,scf} = 15.26\,ppm\,of\,H2S$$

H2S conversion taken from supporting Sulfur Measurement Handbook
grain H2S/100 scf = 15.26

1 lb mol = 379.4 cubic feet

Ground Flare and Pilot Combined		
Pollutant	lb/hr	ton/yr
CO	**0.622**	**2.724**
Nox	**0.136**	**0.597**
VOC	**1.373**	**6.014**
SO2	**0.082**	**0.037**

Table 5 Compressor Engine Emissions (CE-1)
Caterpillar G3516TALE; 4SLB
CONE Midstream Devco III LP
Cain Run Station

Pollutant	Emission Factor			PTE (lb/hr)		PTE (tons/yr)	
Criteria Pollutants							
PM/PM10/PM2.5**	9.98E-03	lb/MMBtu	(1)	0.11	(a)	0.49	(c)
SO_2	5.88E-04	lb/MMBtu	(1)	0.01	(a)	0.03	(c)
NOx	1.00E+00	g/hp-hr	(2)	3.04	(b)	13.33	(d)
CO	2.00E+00	g/hp-hr	(2)	6.08	(b)	26.65	(d)
VOC*	7.00E-01	g/hp-hr	(2)	2.13	(b)	9.33	(d)
*VOCs does not include Formaldehyde.							
Hazardous Air Pollutants							
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	(1)	0.000	(a)	0.002	(c)
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	(1)	0.000	(a)	0.002	(c)
1,3-Butadiene	2.67E-04	lb/MMBtu	(1)	0.003	(a)	0.013	(c)
1,3-Dichloropropene	2.64E-05	lb/MMBtu	(1)	0.000	(a)	0.001	(c)
2-Methylnapthalene	3.32E-05	lb/MMBtu	(1)	0.000	(a)	0.002	(c)
2,2,4-Trimethylpentane	2.50E-05	lb/MMBtu	(1)	0.000	(a)	0.001	(c)
Acetaldehyde	8.36E-03	lb/MMBtu	(1)	0.095	(a)	0.414	(c)
Acrolein	5.14E-03	lb/MMBtu	(1)	0.058	(a)	0.255	(c)
Benzene	4.40E-04	lb/MMBtu	(1)	0.005	(a)	0.022	(c)
Biphenyl	2.12E-03	lb/MMBtu	(1)	0.024	(a)	0.105	(c)
Carbon Tetrachloride	3.67E-05	lb/MMBtu	(1)	0.000	(a)	0.002	(c)
Chlorobenzene	3.04E-05	lb/MMBtu	(1)	0.000	(a)	0.002	(c)
Chloroform	2.85E-05	lb/MMBtu	(1)	0.000	(a)	0.001	(c)
Ethylbenzene	3.97E-05	lb/MMBtu	(1)	0.000	(a)	0.002	(c)
Ethylene Dibromide	4.43E-05	lb/MMBtu	(1)	0.001	(a)	0.002	(c)
Formaldehyde	4.10E-01	g/hp-hr	(2)	1.247	(b)	5.463	(d)
Methanol	2.50E-03	lb/MMBtu	(1)	0.028	(a)	0.124	(c)
Methylene Chloride	2.00E-05	lb/MMBtu	(1)	0.000	(a)	0.001	(c)
n-Hexane	1.11E-03	lb/MMBtu	(1)	0.013	(a)	0.055	(c)
Naphthalene	7.44E-05	lb/MMBtu	(1)	0.001	(a)	0.004	(c)
PAH (POM)	2.69E-05	lb/MMBtu	(1)	0.000	(a)	0.001	(c)
Phenol	1.04E-05	lb/MMBtu	(1)	0.000	(a)	0.001	(c)
Styrene	2.36E-05	lb/MMBtu	(1)	0.000	(a)	0.001	(c)
Toluene	4.08E-04	lb/MMBtu	(1)	0.005	(a)	0.020	(c)
Vinyl Chloride	1.49E-05	lb/MMBtu	(1)	0.000	(a)	0.001	(c)
Xylenes	1.84E-04	lb/MMBtu	(1)	0.002	(a)	0.009	(c)
Total HAP				**1.485**		**6.506**	
Greenhouse Gas Emissions							
CO_2	4.99E+02	g/hp-hr	(2)	1518.12	(b)	6044.88	(d)
CH_4	2.98E+00	g/hp-hr	(2)	9.07	(b)	36.10	(d)
N_2O	2.2E-04	lb/MMBtu	(3)	0.00	(a)	0.01	(c)
CO_2e[(e)]	-	-		1745.52		6950.63	

** includes condensible PM

Calculations:

Hourly Emissions - If emission factor note 1 is used, use calculation (a). If emission factor note 2 is used, use calculation (b).

(a) Hourly Emissions (lb/hr) = Emission factor (lb/MMBtu) * (1MMBtu/1000000 Btu) * Engine Power Output (hp) * BSFC (Btu/hp-hr)

(b) Hourly Emissions (lb/hr) = Emission factor (g/hp-hr) * Engine Power Output (hp) * (lb/453.6g)

Annual Emissions - If emission factor note 1 is used, use calculation (c). If emission factor note 2 is used, use calculation (d).

(c) Annual emissions (tons/yr) = Emission factor (lb/MMBtu) * (1MMBtu/1000000Btu) * Engine Power Output (hp) * BSFC (Btu/hp-hr) * Annual Hours of operation (hr/yr) * (1ton/2000lbs)

(d) Annual emissions (tons/yr) = Emission factor (g/hp-hr) * Engine Power Output (hp) * Annual Hours of operation (hr/yr) * (1ton/2000lbs) * (lb/453.6g)

MAXIMUM HOURLY EMISSION INPUTS

Engine Power Output (kW) =	1029	
Engine Power Output (hp) =	1,380	
Number of Engines =	1	
BSFC (BTU/HP-hr) =	8,200	(4)
Heat Content Natural Gas(Btu/scf) =	1,205.0	(5)
Fuel Throughput (ft3/hr) =	9,390.9	(6)
PTE Hours of Operation =	8,760	

(e) CO_2 equivalent = $[(CO_2 \text{ emissions})*(GWP_{CO2})]+[(CH_4 \text{ emissions})*(GWP_{CH4})]+[(N_2O \text{ emissions})*(GWP_{N2O})]$

Global Warming Potential (GWP)

CO_2	1	(7)
CH_4	25	(7)
N_2O	298	(7)

Notes:

(1) AP-42, Chapter 3.2, Table 3.2-2. Natural Gas-fired Reciprocating Engines (7/00). *Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines.*

(2) Emission factors supplied from manufacturer's specification sheet

(3) Emission factors supplied from 40 CFR 98, Subpart C, Table C-1 and C-2.

(4) Fuel consumption from manufacturer's specification sheet.

(5) Value obtained from AP-42, Chapter 3.2, Table 3.2-1, footnote b

(6) Fuel throughput = BSFC (BTU/HP-hr) x Power (HP) / Heat Content (BTU/scf)

(7) Global Warming Potentials obtained from 40 CFR 98, Subpart A, Table A-1

Table 6 Compressor Blowdown Venting Emissions
Caterpillar G3516TALE; 4SLB
CONE Midstream Devco III LP
Cain Run Station

Pollutant	Volume (scf/event)	Moles	Molecular Weight of Gas	lbs VOC/event	Events per Year	Emissions (lbs/hr)	Emissions (ton/yr)
VOC[a]	6,163	16.01	19.90	47	60	46.53	1.40
CO2e						36.30	157.75

Measured VOC content of GPU Gas from Oxford 11-K GPU outlet gas.

ATTACHMENT O

MONITORING/RECORDKEEPING/REPORTING/ TESTING PLANS

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

MONITORING, RECORD KEEPING, REPORTING, TESTING PLANS

Monitoring

Since the compressor at this station will commence construction after September 18, 2015, the fugitive components will become subject to the equipment leak standards of §60.5397a. As a result, the source will be required to develop and implement a fugitive monitoring plan and conduct quarterly OGI surveys. The initial survey will be required within 60 days of startup or by June 3, 2017, whichever is later in accordance with §60.5397a(f)(2). However, on April 18, 2017 the USEPA Administrator, E. Scott Pruitt, issued a letter of reconsideration based on comments received from industry groups on August 2, 2016. This letter authorizes a 90 day stay of the compliance date for fugitive emissions monitoring requirements.

In addition to that mentioned above, CONE will at a minimum monitor hours of operation, site production throughputs, malfunctions of equipment, as well as planned and unplanned maintenance of permitted equipment comprising the facility.

Recordkeeping

CONE will retain records of the following for five (5) years, two (2) years on site, certified by a company official at such time that the DAQ may request said records

Records of maintenance conducted on the engine shall be kept in accordance with §60.4243(b)(2)(ii)).

The reciprocating compressor itself will also be subject to the rod packing standards of §60.5385a that require them to be replaced/rebuilt every 26,000 hrs or 3 years. Records shall be maintained based on months or hours of operations since initial startup and each subsequent rebuild or replacement of the compressor's rod packing.

In addition to those mentioned above, the company will keep records of the items monitored, such as station throughput, hours of operation, planned maintenance activities, unplanned maintenance activities, and complaints regarding the facility.

Reporting

CONE, at a minimum, will submit results of initial performance test and subsequent performance testing to the EPA Regional Office within sixty (60) days of completion of such tests. In addition, the company will report any control equipment malfunctions or emission limit deviations.

Testing

CONE will demonstrate initial compliance by conducting a performance test as specified in §60.4244 showing the emission limitations in Table 1 to Subpart JJJJ of Part 60 are

being met. Subsequent performance testing shall be conducted every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance.

ATTACHMENT P

PUBLIC NOTICE

45CSR13 Permit Modification Application

Cain Run Station
New Milton, West Virginia

CONE Midstream Devco III LP
1000 Consol Energy Drive
Canonsburg, PA 15317

July 2017

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that CONE Midstream Devco III LP has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Rule 13 Permit Modification, for a natural gas compressor and dehydration station located off S. Fork of Hughes River, near New Milton, in Doddridge County, West Virginia. The latitude and longitude coordinates are 39.17070 and -80.76350.

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

Pollutant	Tons/yr
$PM/PM_{10}/PM_{2.5}$	0.06
NO_X	0.16
CO	0.13
VOCs	5.00
Benzene	0.14
Toluene	0.59
Xylenes	0.68
n-Hexane	0.15
Formaldehyde	0.27
Total HAPs	1.90

Startup of operation is planned to begin in the 4th quarter of 2017. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the XX day of June, 2017.

By: CONE Midstream Devco III LP
Joseph Fink
Chief Operating Officer
1000 Consol Energy Drive
Canonsburg, PA 15317