



November 2, 2015

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

**Re: Rule 13 Permit Modification Application
Bradley Compressor Station
Fanrock, West Virginia**

Dear Mr. Durham,

SLR International Corporation has prepared the attached Rule 13 Permit Modification Application on behalf of Cranberry Pipeline Corporation for the Bradley Compressor Station located in Rock View, West Virginia (plant ID No. 109-00017). The facility is currently permitted by Rule 13 Permit number R13-2127F. SLR is requesting this Modification in order to update the facility registration to more accurately reflect the site's most recent gas compositional analysis measurements.

An updated wet gas analysis was taken on March 11, 2015 from the Bradley Compressor Station. This sample and GLYCalc emission modeling indicate the need to increase the facility's potential to emit via a Rule 13 Permit Modification. The resulting emission increases are reflected in the following table for the dehydration unit still vent. These proposed limits do not trigger any additional permit requirements.

Pollutant	Currently Permitted Emission Limits (tpy)	Proposed Emission Limits (tpy)	Difference between Permitted and Proposed Limits (tpy)
VOC	32.75	73.39	40.64
Benzene	0.93	1.70	0.77
Ethylbenzene	2.42	4.44	2.02
Toluene	1.62	2.92	1.30
Xylene	3.36	5.91	2.55
n-Hexane	0.00	0.71	0
CO ₂ E	0.00	850.74	850.74

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

November 2, 2015
William F. Durham
Page 2

If any additional information is needed, please contact me by telephone at (681) 205-8949 or by e-mail at nlanham@slrconsulting.com.

Sincerely,
SLR International Corporation



Nathaniel Lanham
West Virginia Operations Manager

Cc: Mr. Randy Spencer, Cranberry Pipeline Corporation



global environmental solutions

Cranberry Pipeline Corporation

Bradley Compressor Station

Fanrock, West Virginia

Rule 13 Permit Modification Application

SLR Ref: 116.400.00127

November 2015



Bradley Compressor Station Rule 13 Permit Modification Application

Prepared for:

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, WV 25301

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.

A handwritten signature in blue ink, appearing to read "Chris Boggess", written over a horizontal line.

Chris Boggess
Associate Engineer

A handwritten signature in blue ink, appearing to read "N. Lanham", written over a horizontal line.

Nathaniel Lanham
West Virginia Operations Manager

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Notes:

ATTACHMENT M – Not applicable - No air pollution control devices used on equipment at this facility

ATTACHMENT Q – Not applicable - No information contained within this application is claimed confidential

ATTACHMENT S – Not applicable - Not a Title V Permit Revision

APPLICATION FOR PERMIT

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015



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):

Cranberry Pipeline Corporation

2. Federal Employer ID No. (**FEIN**):

042989934

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

Bradley Compressor Station

4. The applicant is the:

☐ OWNER ☐ OPERATOR ☒ BOTH

5A. Applicant's mailing address:

900 Lee Street East

Suite 1500

Charleston, WV 25301

5B. Facility's present physical address:

WV State Route 97

Fanrock, WV 24834

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: **The applicant owns the site.**

- If **NO**, you are not eligible for a permit for this source.

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

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

211111

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

109-00017

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

R13-2127F

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 <i>present location</i> of the facility from the nearest state road; – For Construction or Relocation permits , please provide directions to the <i>proposed new site location</i> from the nearest state road. Include a MAP as Attachment B . From I-64 exit 42 take SR16 south. At 3.6 miles bear right onto Lester Highway. At 3.3 miles bear right onto SR54. At 6.6 miles bear left onto SR54. At 3.9 miles turn right onto SR97. At 12 miles bear left onto SR10. At 1.1 miles turn right onto SR16. At 5.1 miles turn right onto CR12/4 (Indian Creek Rd). At 5.2 miles turn left onto CR14 (Brier Creek Rd). At 1.8 miles turn right onto local road. At 0.2 miles bear left onto local road and go 0.1 miles to compressor station on right		
12B. New site address (if applicable): N/A	12C. Nearest city or town: Fanrock	12D. County: Wyoming
12.E. UTM Northing (KM): 4,155.30	12F. UTM Easting (KM): 443.50	12G. UTM Zone: 17N
13. Briefly describe the proposed change(s) at the facility: This permit application will account for an increase in emissions associated to the dehydration unit		
14A. Provide the date of anticipated installation or change: – If this is an After-The-Fact permit application, provide the date upon which the proposed change did happen: 03/25/2015		14B. Date of anticipated Start-Up if a permit is granted:
14C. Provide a Schedule of the planned Installation of/Change to and Start-Up of each of the units proposed in this permit application as Attachment C (if more than one unit is involved).		
15. Provide maximum projected Operating Schedule of activity/activities outlined in this application: Hours Per Day 24 Days Per Week 7 Weeks Per Year 52		
16. Is demolition or physical renovation at an existing facility involved? <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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 (<i>if known</i>). 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 (<i>if known</i>). 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:

<input type="checkbox"/> Bulk Liquid Transfer Operations	<input type="checkbox"/> Haul Road Emissions	<input type="checkbox"/> Quarry
<input type="checkbox"/> Chemical Processes	<input type="checkbox"/> Hot Mix Asphalt Plant	<input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities
<input type="checkbox"/> Concrete Batch Plant	<input type="checkbox"/> Incinerator	<input checked="" type="checkbox"/> Storage Tanks
<input type="checkbox"/> Grey Iron and Steel Foundry	<input type="checkbox"/> Indirect Heat Exchanger	

☒ General Emission Unit, specify: **Natural Gas Compressor Engines, Dehydration unit**

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L**.

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

<input type="checkbox"/> Absorption Systems	<input type="checkbox"/> Baghouse	<input type="checkbox"/> Flare
<input type="checkbox"/> Adsorption Systems	<input type="checkbox"/> Condenser	<input type="checkbox"/> Mechanical Collector
<input type="checkbox"/> Afterburner	<input type="checkbox"/> Electrostatic Precipitator	<input type="checkbox"/> Wet Collecting System

☐ Other Collectors, specify

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M**.

30. Provide all **Supporting Emissions Calculations** as **Attachment N**, or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O**.
 ➤ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and **Example Legal Advertisement** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?
☐ YES ☒ NO
 ➤ If **YES**, identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's **"Precautionary Notice – Claims of Confidentiality"** guidance found in the **General Instructions** as **Attachment Q**.

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

<input checked="" type="checkbox"/> Authority of Corporation or Other Business Entity	<input type="checkbox"/> Authority of Partnership
<input type="checkbox"/> Authority of Governmental Agency	<input type="checkbox"/> 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: _____

(Please use blue ink)

35B. Printed name of signee: Randy Spencer

35C. Title:

Safety & Environmental Manager - North

35D. E-mail: randy.spencer@cabotog.com

36E. Phone: 304-347-1642

36F. FAX 304-347-1618

36A. Printed name of contact person (if different from above): Nathaniel Lanham

36B. Title: WV Operations Manager, SLR

36C. E-mail: jhanshaw@slrconsulting.com

36D. Phone: 681-205-8949

36E. FAX: 681-205-8969

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

ATTACHMENT A

BUSINESS CERTIFICATE

Rule 13 Permit Modification Application

Bradley Compressor Station
Fanrock, West Virginia

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

**WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION
CERTIFICATE**

ISSUED TO:
CRANBERRY PIPELINE CORPORATION
900 LEE ST E 1700
CHARLESTON, WV 25301-1741

BUSINESS REGISTRATION ACCOUNT NUMBER: **1006-3673**

This certificate is issued on: **06/1/2011**

*This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code*

*The person or organization identified on this certificate is registered
to conduct business in the State of West Virginia at the location above.*

This certificate is not transferrable and must be displayed at the location for which issued.

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them.
CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

ATTACHMENT B

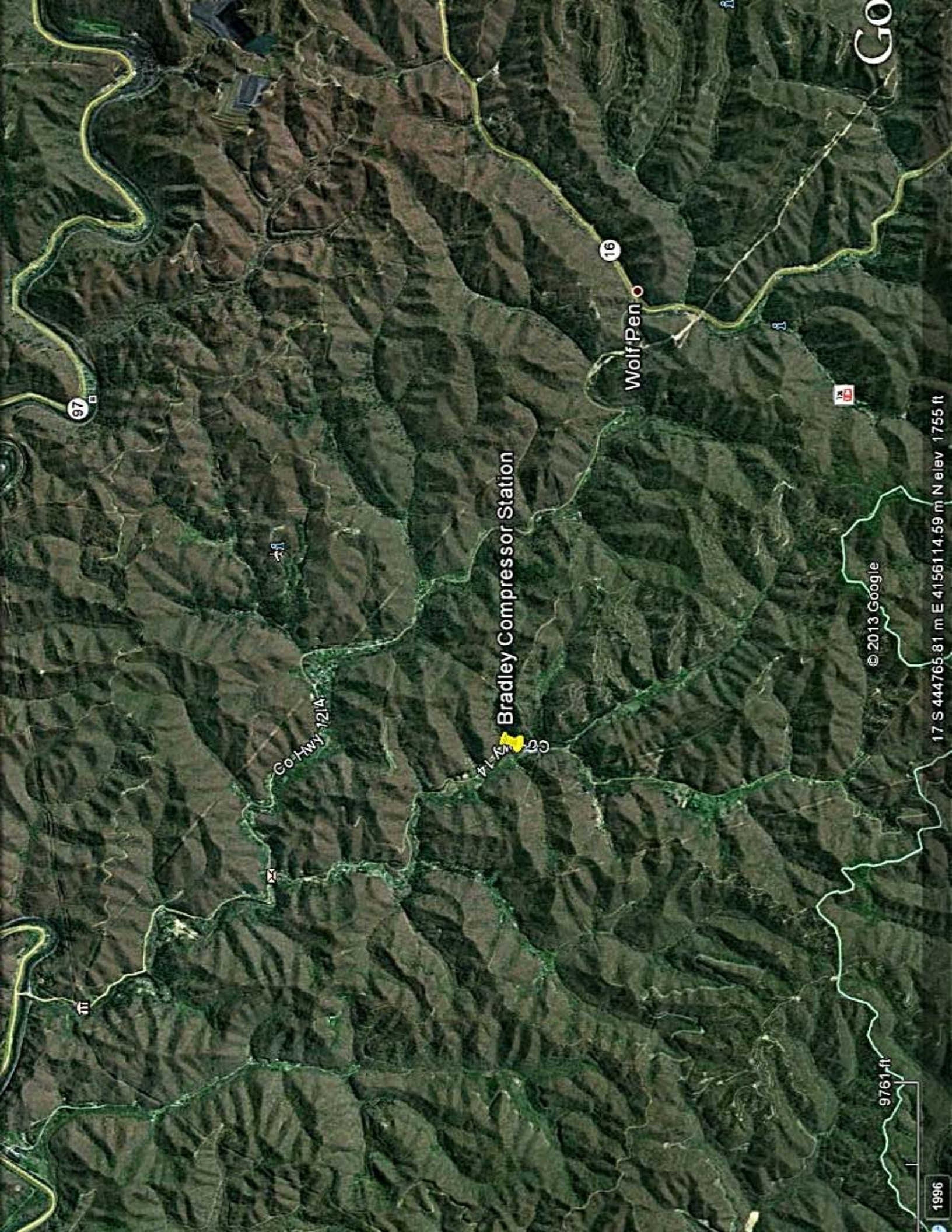
MAP

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015



Go

16

Wolf Pen o

Bradley Compressor Station

Co Hwy 121A

97

© 2013 Google

17 S 444765.81 m E 4156114.59 m N elev 1755 ft

9761 ft

1996

ATTACHMENT C

INSTALLATION AND START-UP

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

INSTALLATION AND STARTUP SCHEDULE

This is an after-the-fact permit modification brought about by recent wet gas analysis detailing a change in emissions at the facility. This after the fact modification will more accurately calculate the site's PTE based on site specific measurement and for the first time take into account the addition of tanks previously not included in the most recent permit.

ATTACHMENT D

REGULATORY DISCUSSION

Rule 13 Permit Modification Application

Bradley Compressor Station
Fanrock, West Virginia

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

REGULATORY DISCUSSION

APPLICABLE REGULATIONS

The modified equipment at this facility is subject to the following applicable rules and regulations:

Federal and State:

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

The unit is subject to the Area Source Requirements of this Subpart but complies by meeting the 1 TPY Benzene exemption for actual emissions

45 CSR 4 - No Objectionable Odors

45 CSR 11 - Standby Plans for Emergency Episodes.

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

The company has applied for a Rule 13 modification permit to incorporate an increase in emissions of regulated air pollutants associated with the dehydration unit.

Additionally, under this modification the storage vessel calculations were updated to include flashing emissions as well as tank truck loading emissions. Although, these emissions were estimated using worst case assumptions they were still found to be relatively low and do not trigger any additional requirements.

NON-APPLICABILITY DETERMINATIONS

The following requirements have been determined “not applicable” due to the following:

40 CFR 60 Subpart OOOO - Storage Vessel NSPS

The storage vessels at this facility were all installed before the NSPS applicability date of 8-23-2011. There was one exception pertaining to the TEG tank, which was installed in 2013. However, due to TEG having a low vapor pressure, the new storage vessel emissions have been determined to be an insignificant source of VOCs and therefore has a PTE < 6tpy. Therefore, the storage vessels at this site are not considered affected sources under this regulation.

40 CFR 60 Subpart K, Ka, Kb - Storage Vessel NSPS

Pipeline fluids storage tanks are exempt under 60.110b(d)(4) in accordance with the following: Vessels with a design capacity less than or equal to 1,589.874 m³ (approx

420,000 gallons) used for petroleum or condensate stored, processed, or treated prior to custody transfer.

ATTACHMENT E

PLOT PLAN

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

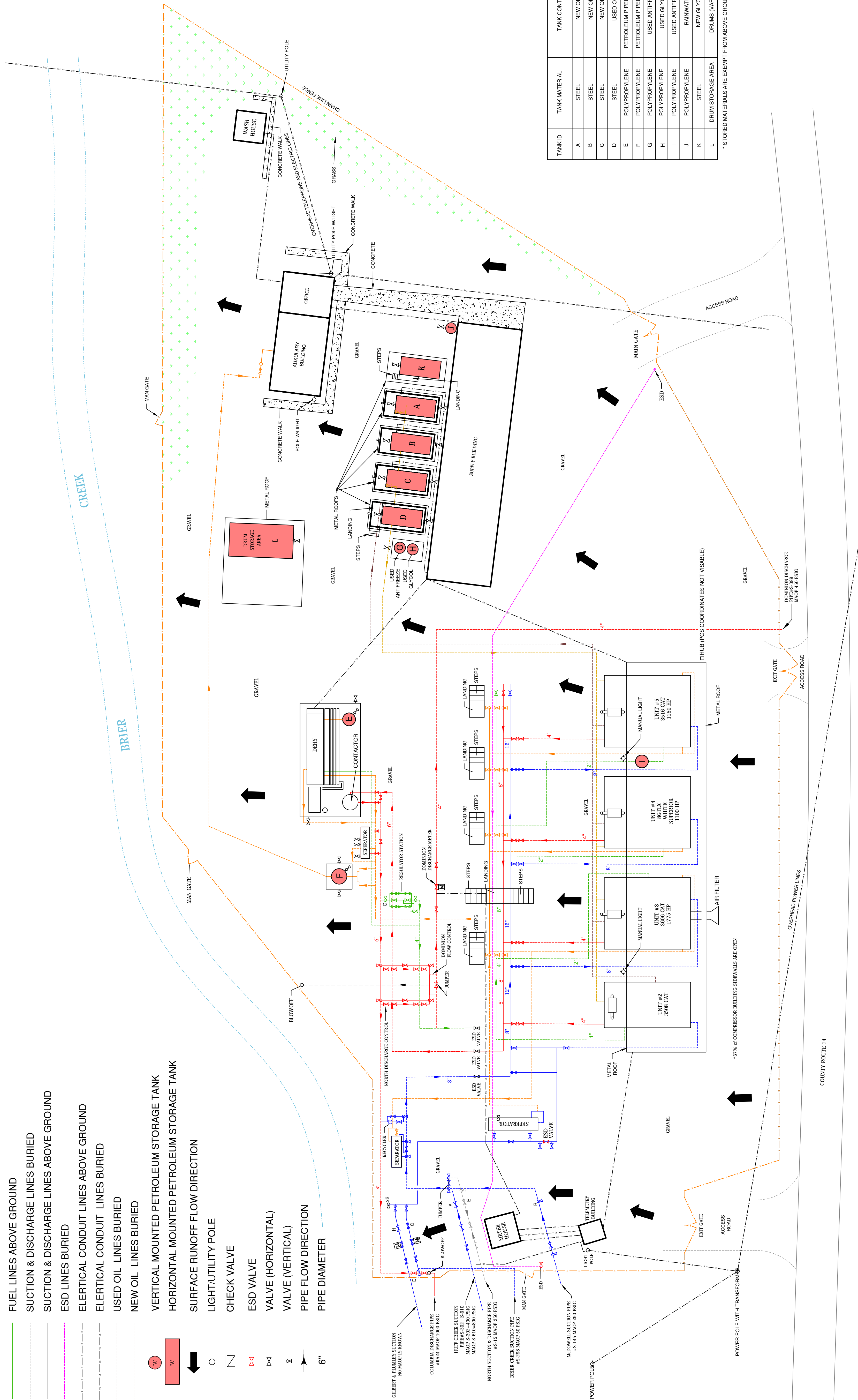
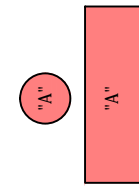
Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015



LEGEND


- LOW PRESSURE BURIED LINES
- LOW PRESSURE LINES ABOVE GROUND
- DISCHARGE BURIED LINES
- DISCHARGE LINES ABOVE GROUND
- SUCTION BURIED LINES
- SUCTION LINES ABOVE GROUND
- FUEL LINES BURIED
- FUEL LINES ABOVE GROUND
- SUCTION & DISCHARGE LINES BURIED
- SUCTION & DISCHARGE LINES ABOVE GROUND
- ESD LINES BURIED
- ELERTICAL CONDUIT LINES ABOVE GROUND
- ELERTICAL CONDUIT LINES BURIED
- USED OIL LINES BURIED
- NEW OIL LINES BURIED
- VERTICAL MOUNTED PETROLEUM STORAGE TANK
- HORIZONTAL MOUNTED PETROLEUM STORAGE TANK
- SURFACE RUNOFF FLOW DIRECTION
- LIGHT/UTILITY POLE
- CHECK VALVE
- ESD VALVE
- VALVE (HORIZONTAL)
- VALVE (VERTICAL)
- PIPE FLOW DIRECTION
- PIPE DIAMETER



TANK ID	TANK MATERIAL	TANK CONTENTS	TANK CAPACITY (GALLONS)	SECONDARY CONTAINMENT MATERIAL
A	STEEL	NEW OIL	2,000	STEEL
B	STEEL	NEW OIL	3,000	STEEL
C	STEEL	NEW OIL	3,000	STEEL
D	STEEL	USED OIL	3,000	STEEL
E	POLYPROPYLENE	PETROLEUM PIPELINE FLUIDS	500	N/A
F	POLYPROPYLENE	PETROLEUM PIPELINE FLUIDS	2,100	STEEL
G	POLYPROPYLENE	USED ANTIFREEZE*	500	STEEL
H	POLYPROPYLENE	USED GLYCOL*	500	STEEL
I	POLYPROPYLENE	USED ANTIFREEZE*	500	POLYPROPYLENE
J	POLYPROPYLENE	RAINWATER*	500	N/A
K	STEEL	NEW GLYCOL*	2,000	STEEL
L	DRUM STORAGE AREA	DRUMS (VARIOUS)	55	STEEL

* STORED MATERIALS ARE EXEMPT FROM ABOVE GROUND SPCC SECONDARY CONTAINMENT REQUIREMENTS

GPS Coordinates of Facility Site
Lat: 37° 32' 46.18" N, Long: 81° 38' 21.28" W



#8 Capitol Street, Suite 300
Charleston, West Virginia 25301
Tel: 681-205-8849 Fax: 681-205-8889

Cabot Oil & Gas Corporation

PO Box 1589
Pineville, WV 24874

Report

Bradley Compressor Station

Drawn By

Facility Plan

DWS

Date: February 28, 2014

Not To Scale

Project #: 13-0040, 0008, Task 0001

Fig. No.

2

ATTACHMENT F

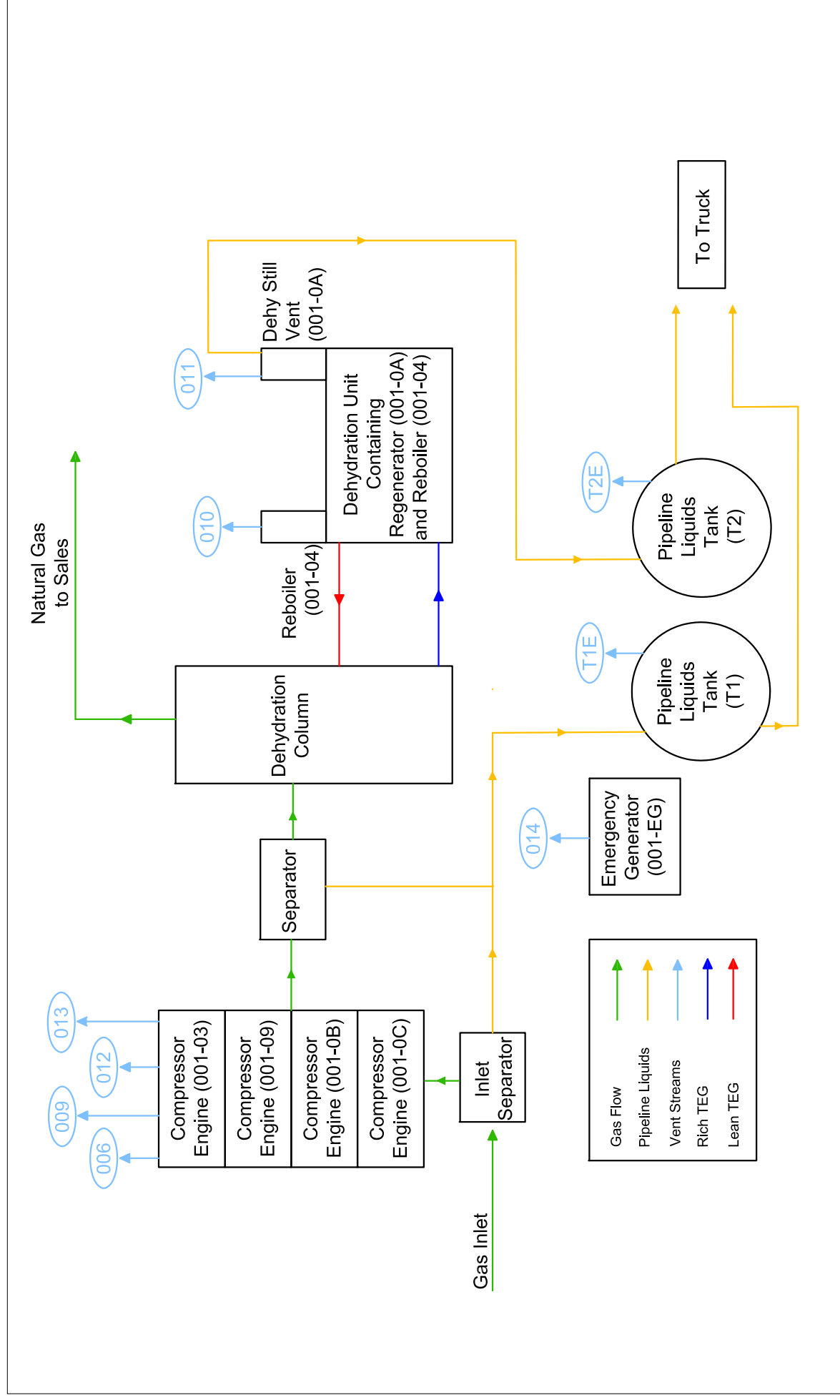
PROCESS FLOW DIAGRAM

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015



Process Flow Diagram Cranberry Pipeline Corporation Bradley Compressor Station - ID # 109-00017 Fanrock, West Virginia

ATTACHMENT G

PROCESS DESCRIPTION

Rule 13 Permit Modification Application

Bradley Compressor Station
Fanrock, West Virginia

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

PROCESS DESCRIPTION

Introduction

The facility currently operates under West Virginia New Source Review (NSR) permit number R13-2127F. On behalf of Cranberry Pipeline Corporation (Cranberry) SLR is requesting this modification in order to update the facility registration to more accurately reflect the most recent site measurements.

Recent wet gas analyses from the Bradley Compressor Station indicate that a modification is required to reflect the facility's adjusted emission levels from the dehydration unit still vent. The source's Potential to Emit (PTE) has been adjusted and new emission limits are proposed so that the facility remains within permitted throughput constraints. The proposed emission limits will not trigger new permitting program requirements (e.g. Title V Major Source).

Proposed Update

This application involves the following:

- Increase of emissions limitations set forth by the previous permit due to recent wet gas sampling and analysis
- An update of the PTE for the storage vessels T1 and T2 based on new annual throughputs
- An update of emissions from truck loading and fugitive leaks

The new emission estimates reflect the need to increase the VOC and Hazardous Air Pollutant (HAP) levels. These changes to emissions are a result of the increase to HAP and C8+ gas fractions measured within the wet gas inlet to the contactor column.

All other operating parameters on the dehydration unit were set to its maximum capacity. The lean TEG is recirculated through the unit by a electric-driven Bean pump, model M0406DI. The pump has a maximum pump rate of 5.0 GPM. The gas throughput was modeled to reflect the stations maximum flow of 30 MMscf/d. Additionally, the inlet water content was assumed to be saturated at 779 psig and 95 F. The outlet is assumed to be pipeline quality NG at 7 lb H₂O/MMscf. This equates to a TEG recirculation ratio of 3.35 gal TEG/lb H₂O removed from the wet gas so, this scenario appears to be within the units design specifications and very close to the optimum recycle ratio of 3.

Pipeline liquids and produced water is separated at the station's inlet and dehy separators as well as "compression drip" which is removed in the compression process are all by-products of the Bradley Compressor Station's process and are transferred through various operations to two different above ground storage tank (AST)

represented in the equipment table as T1 and T2. The flashing emissions from the transfer of “compression drip” in addition to tank working and breathing losses have been included within this application to better represent the storage vessel’s PTE. The emission estimates for the tank are based on direct measurement pressurized liquid testing and E&P Tanks simulation analysis taken at a representative Cranberry Pipeline’s site. The throughput was based on a maximum of 5 bbls/d.

As a result of this proposed permit revision, the tank flashing potential, loading losses and fugitive equipment leaks will be more accurately accounted for along with the new assessment of dehydration emissions based on updated gas measurement.

ATTACHMENT H

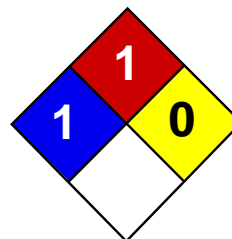
SAFETY DATA SHEETS (SDS)

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015



Health	1
Fire	1
Reactivity	0
Personal Protection	J

Material Safety Data Sheet

Triethylene glycol MSDS

Section 1: Chemical Product and Company Identification

Product Name: Triethylene glycol

Catalog Codes: SLT2644

CAS#: 112-27-6

RTECS: YE4550000

TSCA: TSCA 8(b) inventory: Triethylene glycol

CI#: Not available.

Synonym: 2,2'-[1,2-Ethanediy]bis(oxy)]bisethanol

Chemical Formula: C₆H₁₄O₄

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Triethylene glycol	112-27-6	100

Toxicological Data on Ingredients: Triethylene glycol: ORAL (LD50): Acute: 17000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of ingestion. Slightly hazardous in case of inhalation. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

Very hazardous in case of eye contact (irritant). Slightly hazardous in case of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, the nervous system. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact: No known effect on skin contact, rinse with water for a few minutes.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 371°C (699.8°F)

Flash Points: CLOSED CUP: 177°C (350.6°F). OPEN CUP: 165.5°C (329.9°F).

Flammable Limits: LOWER: 0.9% UPPER: 9.2%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Avoid contact with eyes. If ingested, seek medical advice immediately and show the container or the label.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Splash goggles. Lab coat.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Hygroscopic liquid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 150.18 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 285°C (545°F)

Melting Point: -5°C (23°F)

Critical Temperature: Not available.

Specific Gravity: 1.1274 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 5.17 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 17000 mg/kg [Rat].

Chronic Effects on Humans: The substance is toxic to kidneys, the nervous system.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion. Slightly hazardous in case of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Triethylene glycol TSCA 8(b) inventory: Triethylene glycol

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC): R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Not applicable. Lab coat. Not applicable. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:31 PM

Last Updated: 11/01/2010 12:00 PM

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Safety Data Sheet

Natural Gas Condensate, Sweet or Sour

J.P. Morgan Ventures Energy Corp.
JP Morgan Commodities Canada Corp.

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	Natural Gas Condensate, Sweet or Sour	
Synonyms	Sweet Condensate, Sour Condensate, Lease Condensate (Sweet or Sour), Field Condensate (Sweet or Sour), Casing Head Gasoline (Sweet or Sour), Natural Gas Liquids (Sweet or Sour), Gas Drips (Sweet or Sour), Natural Gas Condensate C2-C8 (Sweet or Sour)	
Chemical Family	Petroleum Hydrocarbon	
Intended Use	Feedstock	
MARPOL Annex I Category	Naphthas and Condensates	
Supplier	J.P. Morgan Ventures Energy Corp. 383 Madison Avenue, 10th Floor New York, NY 10017	JP Morgan Commodities Canada Corp. Suite 600, Vintage Towers II, 326 11 th Avenue SW Calgary, Alberta T2R 0C5
24 Hour Emergency Numbers	Chemtrec: 800-424-9300 JP Morgan Technical Information: 212-834-5788 (USA), 403-532-2000 (Canada) California Poison Control: 800-356-3219	

2. HAZARDS IDENTIFICATION

GHS Classification

H224	Flammable liquid – Category 1
H304	May be fatal if swallowed and enters airways – Category 1
H319	Eye damage/irritation – Category 2
H335	May cause respiratory irritation – Category 3
H336	Specific target organ toxicity (single exposure) – Category 3
H350	Carcinogenicity – Category 1B
H411	Hazardous to the aquatic environment, chronic toxicity – Category 2

Hazards Not Otherwise Classified

May contain or release poisonous hydrogen sulfide gas

Label Elements



Signal Words Danger

GHS Hazard Statements

H224	Extremely flammable liquid and vapor
H350	May cause cancer
H304	May be fatal if swallowed and enters airways
H319	Causes serious eye irritation
H336	May cause drowsiness or dizziness
H315	Causes skin irritation
H331	Toxic if inhaled
H411	Toxic to aquatic life with long lasting effects

GHS Precautionary Statements

P201	Obtain special instructions before use
P202	Do not handle until all safety precautions have been read and understood
P210	Keep away from heat/sparks/open flames/hot surfaces – no smoking
P233	Keep container tightly closed
P240	Ground/bond container and receiving equipment

Safety Data Sheet

Natural Gas Condensate, Sweet or Sour

J.P. Morgan Ventures Energy Corp.
JP Morgan Commodities Canada Corp.

2. HAZARDS IDENTIFICATION

P241	Use explosion-proof electrical/ventilating/lighting equipment
P242	Use only non-sparking tools
P243	Take precautionary measures against static discharge
P261	Avoid breathing dust/fume/gas/mist/vapours/spray
P264	Wash thoroughly after handling
P271	Use only outdoors or in a well-ventilated area
P273	Avoid release to the environment
P280	Wear protective gloves / protective clothing / eye protection / face protection
P361, P352, P362	IF ON SKIN OR HAIR: Remove/take off immediately all contaminated clothing. Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse.
P305,P351,P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P313	If eye irritation persists, get medical advice/attention
P301,P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P331	Do NOT induce vomiting
P304,P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P312	Call a POISON CENTER or doctor/physician if you feel unwell
P370,P378	In case of fire: Use dry chemical, carbon dioxide, or foam for extinction
P391	Collect spillage
P405	Store locked up
P403,P233, P235	Store in a well-ventilated place. Keep container tightly closed, Keep cool
P501	Dispose of contents/container to approved facility

3. COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS Registration No.	Concentration (%)
Natural Gas Condensate C2-C8	68919-39-1	100
Benzene	71-43-2	0.1 - 5
n-Butane	106-97-8	5 - 15
Cyclohexane	110-82-7	< 1 - 5
Ethyl Benzene	100-41-4	< 1 - 3
n-Heptane	142-82-5	10 - 20
n-Hexane	110-54-3	2 - 50
Hexane (all isomers)	mixture	2 - 50
Hydrogen Sulfide	7783-06-4	< 0.1 - 20
Methylcyclohexane	108-87-2	5 - 10
n-Nonane	111-84-2	5 - 15
n-Octane	111-65-9	10 - 20
n-Pentane	109-66-0	5 - 20
n-Propane	74-98-6	<1 - 8
Toluene	108-88-3	< 1 - 15
1,2,4 Trimethyl Benzene	95-63-6	< 1 - 4
Xylene, all isomers	1330-20-7	< 1 - 12

4. FIRST AID MEASURES

Inhalation (Breathing)	Move the exposed person to fresh air. If not breathing, clear airways and give artificial respiration. If breathing is difficult, humidified oxygen should be administered by qualified personnel. Seek medical attention if breathing difficulties continue.
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Safety Data Sheet

Natural Gas Condensate, Sweet or Sour

J.P. Morgan Ventures Energy Corp.
JP Morgan Commodities Canada Corp.

4. FIRST AID MEASURES

Eye Contact	Flush eyes with water for at least 15 minutes. Hold eyelids apart to ensure complete irrigation of the eye. Remove contact lenses, if worn, after initial flushing. Do not use eye ointment. Seek medical attention.
Skin Contact	Remove contaminated shoes and clothing, and flush affected areas with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, clean affected area thoroughly with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists. Launder or discard contaminated clothing.
Ingestion (Swallowing)	Aspiration hazard. Do not induce vomiting or give anything by mouth because the material can enter the lungs and cause severe lung damage. If spontaneous vomiting is about to occur, place victim's head below knees. If victim is drowsy or unconscious, place on the left side with head down. Do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention
Most Important Symptoms and Effects	Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue Delayed: Dry skin and possible irritation with repeated or prolonged exposure
Potential Acute Health Effects	Inhalation: Breathing high concentrations may be harmful. Mist or vapor can irritate the throat and lungs. Breathing this material may cause central nervous system depression with symptoms including nausea, headache, dizziness, fatigue, drowsiness or unconsciousness. This material may contain or liberate hydrogen sulfide, a poisonous gas with the smell of rotten eggs. Hydrogen sulfide and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (light sensitivity) and pulmonary edema (fluid accumulation in lungs). Severe exposures can result in nausea, vomiting, muscle weakness or convulsions, respiratory failure and death. Eye Contact: This product can cause eye irritation from short-term contact with liquid, mists or vapors. Symptoms include stinging, watering, redness and swelling. Effects may be more serious with repeated or prolonged contact. Hydrogen sulfide vapors may cause moderate to severe eye irritation and photophobia (light sensitivity). Skin Contact: This product is a skin irritant. Contact may cause redness, itching, burning and skin damage. Ingestion: Ingestion may result in nausea, vomiting, diarrhea and restlessness. Aspiration (inadvertent suction) of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema or hemorrhage and even death.
Potential Chronic Health Effects	Chronic effects of overexposure are similar to acute effects including central nervous system (CNS) effects and CNS depression. Effects may also include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting and skin dermatitis.
Notes to Physician	This material may contain or liberate hydrogen sulfide. In high doses, hydrogen sulfide may produce pulmonary edema and respiratory depression or paralysis. The first priority in treatment should be providing adequate ventilation and administering 100% oxygen. If unresponsive to supportive care, nitrites (amyl nitrite by inhalation or sodium nitrite by I.V.) may be an effective antidote, if delivered within the first few minutes of exposure. For adults, the dose is 10 ml of a 3NaNO ₂ solution (0.5 gm NaNO ₂ in 15 ml water) IV over 2 to 4 minutes. The dosage should be adjusted in children or in the

Safety Data Sheet

Natural Gas Condensate, Sweet or Sour

J.P. Morgan Ventures Energy Corp.
JP Morgan Commodities Canada Corp.

4. FIRST AID MEASURES

presence of anemia and methemoglobin levels, arterial blood gases, and electrolytes should be monitored.

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

Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis. Inhalation overexposure can produce toxic effects, monitor for respiratory distress. If cough or breathing difficulties develop, evaluate for upper respiratory tract inflammation, bronchitis and pneumonitis.

Skin contact may aggravate an existing dermatitis. High pressure injection injuries may cause necrosis of underlying tissue regardless of superficial appearance.

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

5. FIRE FIGHTING MEASURES

Flammability Classification	OSHA Classification (29 CFR 1910.1200): Flammable Liquid NFPA Class-1B Flammable Liquid NFPA Ratings: Health: 3, Flammability: 4, Reactivity: 0
Flash Point	< -46°C, < -50°F (ASTM D-56)
Flammable Limits	Lower Limit: < 1% Upper Limit: 10%
Autoignition Temperature	232°C, 450°F
Combustion Products	Highly dependent on combustion conditions. Fume, smoke, carbon monoxide, carbon dioxide, sulfur and nitrogen oxides, aldehydes and unburned hydrocarbons.
Fire and Explosion Hazards	This material is extremely flammable and can be ignited by heat, sparks, flames or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment and electronic devices such as cell phones, computers, calculators and pagers which have not been certified as intrinsically safe). Vapors are heavier than air and can accumulate in low areas. May create vapor/air explosion hazard indoors, in confined spaces, outdoors or in sewers. Vapors may travel considerable distances to a remote source of ignition where they can ignite, flash back or explode. Product can accumulate a static charge that may cause a fire or explosion. A product container, if not properly cooled, can rupture in the heat of a fire.
Extinguishing Media	Dry chemical, carbon dioxide or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may be

Safety Data Sheet

Natural Gas Condensate, Sweet or Sour

J.P. Morgan Ventures Energy Corp.
JP Morgan Commodities Canada Corp.

5. FIRE FIGHTING MEASURES

ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Use water spray to cool fire-exposed containers and to protect personnel. Isolate immediate hazard area and keep unauthorized personnel out. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water. Avoid spreading burning liquid with water used for cooling. For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by regulations, a self-contained breathing apparatus should be worn. Wear other appropriate protective equipment as conditions warrant.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Extremely Flammable. Spillage of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof electrical equipment is recommended. Product may contain or release poisonous hydrogen sulfide gas. If the presence of dangerous amounts of H₂S around the spilled product is suspected, additional or special actions may be warranted including access restrictions and the use of protective equipment. Stay upwind and away from spill/release. Isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment as conditions warrant per Exposure Controls/Personal Protection guidelines.

Environmental Precautions Stop the leak if it can be done without risk. Prevent spilled material from entering waterways, sewers, basements or confined areas. Contain release to prevent further contamination of soils, surface water or groundwater. Clean up spill as soon as possible using appropriate techniques such as applying non-combustible absorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil.

Methods for Containment and Clean Up Immediate cleanup of any spill is recommended. Build dike far ahead of spill for containment and later recovery or disposal of spilled material. Absorb spill with inert material such as sand or vermiculite and place in suitable container for disposal. If spilled on water, remove with appropriate equipment like skimmers, booms or absorbents. In case of soil contamination, remove contaminated soil for remediation or disposal in accordance with applicable regulations.

Reporting Report spills/releases as required, to appropriate local, state and federal authorities. US Coast Guard and Environmental Protection Agency regulations require immediate reporting of spills/release that could reach any waterway including intermittent dry creeks. Report spill/release to the National Response Center at (800) 424-8802. In case of accident or road spill, notify Chemtrec at (800) 424-9300.

7. HANDLING AND STORAGE

Precautions for Safe Handling Extremely flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas.

Safety Data Sheet

Natural Gas Condensate, Sweet or Sour

J.P. Morgan Ventures Energy Corp.
JP Morgan Commodities Canada Corp.

7. HANDLING AND STORAGE

Use non-sparking tools and explosion-proof equipment. Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharge. Explosion-proof electrical equipment is recommended and may be required by fire codes.

Warning! Use of this material in spaces without adequate ventilation may result in the generation of hazardous levels of combustion products and/or inadequate oxygen levels for breathing. Odor is an inadequate warning for hazardous conditions.

To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Do not use electronic devices (such as cellular phones, computers, calculators, pagers, etc.) in or around any fueling operation or storage area unless the devices are certified as intrinsically safe. Electrical equipment and fittings should comply with local fire codes.

Precautions for Safe Storage

Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area warnings: 'No Smoking or Open Flame'. Keep away from incompatible material. Outdoor or detached storage of portable containers is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

In a tank, barge or other closed container, the vapor space above materials containing hydrogen sulfide may result in concentrations of H₂S immediately dangerous to life or health. Check atmosphere for oxygen content, H₂S and flammability prior to entry.

Portable containers should never be filled while they are in or on a motor vehicle or marine craft. Static electricity may ignite vapors when filling non-grounded containers or vehicles on trailers. To avoid static buildup, do not use a nozzle lock open device. Use only approved containers. Keep containers tightly closed. Place the container on the ground before filling. Keep the nozzle in contact with the container during filling.

Empty containers retain liquid and vapor residues and can be dangerous. Do NOT pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat, flame, sparks, static electricity or other sources of ignition; they may explode and cause injury or death. Do not attempt to refill or clean containers since residue is difficult to remove. Empty drums should be completely drained, properly closed and returned to the supplier or a qualified drum reconditioner. All containers should be disposed of in an environmentally safe manner in accordance with government regulations.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component	ACGIH Exposure Limits	OSHA Exposure Limits	NIOSH Exposure Limits
Natural Gas Condensate	300 ppm TWA 500 ppm STEL (as gasoline)	300 ppm TWA 500 ppm STEL (as petroleum distillate (naphtha))	450 ppm TWA 1100 ppm IDLH (as petroleum distillate (naphtha))
Benzene	0.5 ppm TWA 2.5 ppm STEL Skin	1 ppm TWA 5 ppm STEL Skin	0.5 ppm TWA 1 ppm STEL Skin 500 ppm IDLH
n-Butane	800 ppm TWA		800 ppm TWA

Safety Data Sheet

Natural Gas Condensate, Sweet or Sour

J.P. Morgan Ventures Energy Corp.
JP Morgan Commodities Canada Corp.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component	ACGIH Exposure Limits	OSHA Exposure Limits	NIOSH Exposure Limits
Cyclohexane	100 ppm TWA	300 ppm TWA	300 ppm TWA 1300 ppm IDLH
Ethyl Benzene	100 ppm TWA 125 ppm STEL	100 ppm TWA 125 ppm STEL	100 ppm TWA 125 ppm STEL 800 ppm IDLH
n-Heptane	400 ppm TWA 500 ppm STEL	500 ppm TWA	85 ppm TWA 440 ppm Ceiling 750 ppm IDLH
n-Hexane	50 ppm TWA Skin	500 ppm TWA	50 ppm TWA 1100 ppm IDLH
Hexane (all isomers)	500 ppm TWA 1000 ppm STEL		100 ppm TWA 510 ppm IDLH Ceiling
Hydrogen Sulfide	10 ppm TWA 15 ppm STEL	20 ppm Ceiling 50 ppm Peak	10 ppm Ceiling 100 ppm IDLH
Methylcyclohexane	400 ppm TWA	500 ppm TWA	400 ppm TWA 1200 ppm IDLH
n-Nonane	200 ppm TWA		200 ppm TWA
n-Octane	300 ppm TWA	500 ppm TWA	75 ppm TWA 385 ppm Ceiling 1000 ppm IDLH
n-Pentane	600 ppm TWA	1000 ppm TWA	120 ppm TWA 610 ppm Ceiling 1500 ppm IDLH
n-Propane	2500 ppm TWA	1000 ppm TWA	1000 ppm TWA 2100 ppm IDLH
Toluene	50 ppm TWA Skin	200 ppm TWA 300 ppm Ceiling 500 ppm Peak-10 min	100 ppm TWA 150 ppm STEL 500 ppm IDLH
1,2,4 Trimethyl Benzene	25 ppm TWA	25 ppm TWA	25 ppm TWA
Xylene, all isomers	100 ppm TWA 150 ppm STEL	100 ppm TWA 150 ppm STEL	900 ppm IDLH
Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional for further information.			
ACGIH - American Conference of Government Industrial Hygienists, OSHA - Occupational Safety and Health Administration, NIOSH - National Institute for Industrial Safety and Health, TWA - Time Weighted Average (8 hour average for ACGIH and OSHA, 10 hour average for NIOSH), STEL - 15 Minute Short Term Exposure Level, Skin - indicates potential for cutaneous absorption of liquid or vapor through the eyes or mucous membranes, Ceiling - Ceiling Level, Peak - Acceptable peak over the ceiling concentration for a specified number of minutes, IDLH - Immediately Dangerous to Life and Health			

Personal Protective Equipment

General Considerations Consider the potential hazards of this material, applicable exposure limits, job activities and other substances in the work place when designing engineering controls and selecting personal protective equipment.

Engineering Controls Use process enclosures, local exhaust ventilation or other engineering controls to maintain airborne levels below the recommended exposure limits. An emergency eye wash station and safety shower should be located near the work station.

Safety Data Sheet

Natural Gas Condensate, Sweet or Sour

J.P. Morgan Ventures Energy Corp.
JP Morgan Commodities Canada Corp.

Personal Protective Equipment

Personal Protective Equipment If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, personal protective equipment (PPE) is recommended. A hazard assessment of the work should be conducted by a qualified professional to determine what PPE is required.

Respiratory Protection A respiratory protection program that meets or exceeds OSHA 29 CFR 1910.134 and ANSI Z.88.2 should be followed whenever workplace conditions warrant the use of a respirator. When airborne concentrations are expected to exceed the established exposure limits given in Section 8, use a NIOSH approved air purifying respirator equipped with organic vapor cartridges/canisters. Use a full-face positive-pressure supplied air respirator in circumstances where air-purifying respirators may not provide adequate protection or where there may be the potential for airborne exposure above the exposure limits. If exposure concentration is unknown, IDLH conditions exist or there is a potential for exposure to hydrogen sulfide above exposure limits, use a NIOSH approved self contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode.

Eye Protection Eye protection that meets or exceeds ANSI Z.87.1 is recommended if there is a potential for liquid contact to the eyes. Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing or spraying of this material. A face shield may be necessary depending on conditions of use.

Skin and Body Protection Avoid skin contact. Wear long-sleeved fire-retardant garments while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing or spraying conditions exist. This may include an apron, arm covers, impervious gloves, boots and additional facial protection.

Hand Protection Avoid skin contact. Use impervious gloves (e.g., PVC, neoprene, nitrile rubber). Check with glove suppliers to confirm the breakthrough performance of gloves. PVC and neoprene may be suitable for incidental contact. Nitrile rubber should be used for longer term protection when prolonged or frequent contact may occur. Gloves should be worn on clean hands and hands should be washed after removing gloves. Also wash hands with plenty of mild soap and water before eating, drinking, smoking, using toilet facilities or leaving work.

Special Considerations Workplace monitoring plans should consider the possibility that heavy metals such as mercury may concentrate in process vessels and equipment presenting the possibility of exposure during sampling and maintenance operations. Mercury and other heavy metals may be present in trace quantities in crude oil, raw natural gas and condensates. Storage and processing of these materials can result in these metals, including elemental mercury, accumulating in enclosed vessels and piping, typically at the low point of the processing equipment. Mercury may also concentrate in sludges, sands, scales, waxes and filter media.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear to dark brown liquid	Physical Form	Liquid
Odor	Strong hydrocarbon, sulfurous odor possible	Odor Threshold	Not established
pH	Neutral	Vapor Pressure	5 - 15 psi (Reid)
Vapor Density	>1 (air = 1)	Boiling Point/Range	-20-1000°F/-17-538°C

Safety Data Sheet

Natural Gas Condensate, Sweet or Sour

J.P. Morgan Ventures Energy Corp.
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9. PHYSICAL AND CHEMICAL PROPERTIES

Percent Volatile	>50%	Partition Coefficient	Not established
Specific Gravity	0.6 - 0.8 @ 60°F	Density	6.3 lb/gal @ 60°F
Molecular Weight	Not determined	Evaporation Rate	Not established
Flash Point	<100°F/<38°C	Test Method	ASTM D-56
Explosive Limits	< 1% LEL, 10% UEL	Autoignition Temperature	450°F/232°C
Solubility in Water	Slightly soluble in water		

10. STABILITY AND REACTIVITY

Stability	Stable under normal anticipated storage and handling temperatures and pressures. Extremely flammable liquid and vapor. Vapor can cause flash fire.
Conditions to Avoid	Avoid high temperatures and all possible sources of ignition. Prevent vapor accumulation.
Incompatibility (Materials to Avoid)	Avoid contact with strong oxidizing agents such as strong acids, alkalies, chlorine and other halogens, dichromates or permanganates, which can cause fire or explosion.
Hazardous Decomposition Products	Hazardous decomposition products are not expected to form during normal storage. The use of hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of combustion products (e.g., oxides of carbon, sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels.
Hazardous Polymerization	Not known to occur

11. TOXICOLOGICAL INFORMATION

Overview	<p>This product is a clear to dark brown liquid with a strong hydrocarbon odor. It may also have a sulfurous or rotten egg odor. Hydrogen sulfide, an extremely flammable and very toxic gas is expected to be present. This product is a volatile and extremely flammable liquid that may cause flash fires. Keep away from heat, sparks and flames and other sources of ignition. This product contains benzene, which may cause cancer or be toxic to blood forming organs. It contains material that has caused cancer based on animal data. Never siphon this product by mouth. If swallowed, this product may be aspirated into the lungs and cause lung damage or death.</p>
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This material may contain benzene and ethyl benzene at concentrations above 0.1%. Benzene is considered to be a known human carcinogen by OSHA, IARC and NTP. IARC has ethyl benzene, gasoline and gasoline engine exhaust as possibly carcinogenic to humans (Group 2B) based on laboratory animal studies.

Toxicological Information of the Material.

Acute Toxicity	<p>Dermal: Low Toxicity: LD50 > 2000 mg/kg (rabbit) Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking that can lead to dermatitis.</p> <p>Inhalation: Hydrogen Sulfide is Extremely Toxic: LC100 = 600 ppm(v), 30 min (man)</p>
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Safety Data Sheet

Natural Gas Condensate, Sweet or Sour

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11. TOXICOLOGICAL INFORMATION

Product expected to have low degree of toxicity by inhalation: LC 50 > 5.2 mg/l (vapor)

Effect of overexposure may include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of central nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued inhalation may result in unconsciousness and/or death.

Ingestion: Product expected to have low degree of toxicity by ingestion: Oral LD50 > 5 g/kg (rat), > 10 g/kg (mice)

Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

**Eye Damage /
Irritation
Sensitization**

Causes serious eye irritation.

Skin: Not expected to be a skin sensitizer

Respiratory: Not expected to be a respiratory sensitizer

**Specific Target
Organ Toxicity**

Single Exposure: High concentrations may cause irritation of the skin, eyes, digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of central nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued inhalation may result in unconsciousness and/or death.

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

**Conditions
Aggravated by
Overexposure**

Disorders of the organs or organ systems that may be aggravated by significant exposure to this material or its components include the skin, respiratory system, liver, kidneys, CNS, cardiovascular system and blood-forming system.

Carcinogenicity

May cause cancer based on component information.

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

Unleaded gasoline has been identified as a possible carcinogen by the International Agency for Research on Cancer.

**Germ Cell
Mutagenicity**

Inadequate information available, not expected to be mutagenic.

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11. TOXICOLOGICAL INFORMATION

Reproductive and Developmental Toxicity	Not expected to cause reproductive or developmental toxicity. No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to high vapor concentrations of unleaded gasoline and petroleum naphthas via inhalation. A two generation reproductive toxicity study of vapor recovery gasoline did not adversely affect reproductive function or offspring survival and development.
Additional Information	Hydrogen Sulfide (H₂S). This material may contain or liberate H ₂ S, a poisonous gas with the smell of rotten eggs. Odor is not a reliable indicator of exposure because olfactory fatigue causes the smell to disappear. H ₂ S has a broad range of effects depending on the airborne concentration and length of exposure: 10 ppm: eye and respiratory tract irritation 100 ppm: coughing, headache, dizziness, nausea, eye irritation, loss of sense of smell in minutes 200 ppm: potential for pulmonary edema after 20 minutes 500 ppm: loss of consciousness after short exposures, potential for respiratory arrest 1000 ppm: Immediate loss of consciousness may lead rapidly to death, prompt cardiopulmonary resuscitation may be required.

Toxicological Information of Components

Benzene 71-43-2

Acute Data:

Dermal LD50 > 9400 mg/kg (Rabbit), (Guinea Pig)

LC50 = 9980 ppm (Mouse); 10000 ppm/7hr (Rat)

Oral LD50 = 4700 mg/kg (Mouse); 930 mg/kg (Rat); 5700 mg/kg (Mammal)

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

Target Organs: Prolonged or repeated exposures to benzene vapors has been linked to bone marrow toxicity which can result in blood disorders such as leukopenia, thrombocytopenia, and aplastic anemia. All of these diseases can be fatal.

Developmental: Exposure to benzene during pregnancy demonstrated limited evidence of developmental toxicity in laboratory animals. The effects seen include decreased body weight and increased skeletal variations in rodents. Alterations in hematopoiesis have been observed in the fetuses and offspring of pregnant mice.

Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells, and DNA damage in mammalian cells in vitro

Cyclohexane 110-82-7

Acute Toxicity:

Dermal LD50 => 2 g/kg (Rabbit)

LC50 > 4,044 ppm (4-hr, Rat)

Oral LD50 > 2 g/kg (Rat)

Target Organs: Cyclohexane can cause eye, skin and mucous membrane irritation, CNS depressant and narcosis at elevated concentrations. In experimental animals exposed to lethal concentrations by inhalation or oral route, generalized vascular damage and degenerative changes in the heart, lungs, liver, kidneys and brain were identified.

Developmental: Cyclohexane has been the focus of substantial testing in laboratory animals. Cyclohexane was not found to be genotoxic in several tests including unscheduled DNA synthesis, bacterial and mammalian cell mutation assays, and in vivo chromosomal aberration. An increase in chromosomal aberrations in bone marrow cells of rats exposed to cyclohexane was reported in the 1980's. However, a careful reevaluation of slides from this study by the laboratory which conducted the study indicates these findings were in error, and that no significant chromosomal effects were

Safety Data Sheet

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11. TOXICOLOGICAL INFORMATION

observed in animals exposed to cyclohexane. Findings indicate long-term exposure to cyclohexane does not promote dermal tumorigenesis.

Ethyl Benzene 100-41-4

Acute Toxicity:

Dermal LD50 = 17800 mg/kg (Rabbit)

LC50 = 4000 ppm/4 hr; 13367 ppm (Rat)

Oral LD50 = 3500 mg/kg (Rat)

Carcinogenicity: Rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study demonstrated limited evidence of kidney, liver, and lung cancer. Ethyl benzene has been listed as a possible human carcinogen by IARC. Ethyl benzene has not been listed as a carcinogen by NTP or OSHA.

Target Organs: In rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study there was mild damage to the kidney (tubular hyperplasia), liver (eosinophilic foci, hypertrophy, necrosis), thyroid (hyperplasia) and pituitary (hyperplasia).

n-Hexane 110-54-3

Acute Toxicity:

Dermal LD50 = >2,000 mg/kg (Rabbit)

LC50 > 3,367 ppm (4 hr, Rat)

Oral LD50 > 5,000 mg/kg (Rat)

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

Hydrogen Sulfide 7783-06-4

Acute Toxicity:

Dermal - No data

LCLo = 600 ppm, 30 min (Human)

Hydrogen sulfide concentrations will vary significantly depending on the source and sulfur content of the product. Sweet natural gas condensate (<0.5% sulfur) may contain toxicologically significant levels of hydrogen sulfide in the vapor spaces of bulk storage tanks and transport compartments. Concentrations of H₂S as low as 10 ppm over an 8 hour workshift may cause eye or throat irritation. Prolonged breathing of 50-100 ppm H₂S vapors can produce significant eye and respiratory irritation. Sour condensates commonly contain extremely high concentrations of H₂S (500-70,000 ppm) in the vapor spaces of bulk storage vessels. Exposure to 250-600 ppm for 15-30 minutes can produce headache, dizziness, nervousness, staggering gait, nausea and pulmonary edema or bronchial pneumonia. Concentrations >1,000 ppm will cause immediate unconsciousness and death through respiratory paralysis. Rats and mice exposed to 80 ppm H₂S, 6 hrs/day, 5 days/week for 10 weeks, did not produce any toxicity except for irritation of nasal passages. H₂S did not affect reproduction and development (birth defects or neurotoxicity) in rats exposed to concentrations of 75-80 ppm or 150 ppm H₂S, respectively. Over the years a number of acute cases of H₂S poisonings have been reported. Complete and rapid recovery is the general rule. However, if the exposure was sufficiently intense and sustained causing cerebral hypoxia (lack of oxygen to the brain), neurologic effects such as amnesia, intention tremors or brain damage are possible.

Toluene 108-88-3

Acute Toxicity:

Dermal LD50 = 14 g/kg (Rabbit)

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11. TOXICOLOGICAL INFORMATION

LC50 = 8,000 ppm (4-hr, Rat)

Oral LD50 = 2.5 - 7.9 g/kg (Rat)

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

Developmental: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. The effects seen include decreased fetal body weight and increased skeletal variations in both inhalation and oral studies.

1,2,4 Trimethyl Benzene 95-63-6

Acute Toxicity:

Dermal LD50 = No data available

LC50 = 18 gm/m³/4hr (Rat)

Oral LD50 = 3-6 g/kg (Rat)

Xylenes 1330-20-7

Acute Toxicity:

Dermal LD50 >3.16 ml/kg (Rabbit)

LC50 = 5000 ppm/4 hr. (Rat)

Oral LD50 = 4300 mg/kg (Rat)

Target Organs: A six week inhalation study with xylene produced hearing loss in rats.

Developmental: Both mixed xylenes and the individual isomers produced limited evidence of developmental toxicity in laboratory animals. Inhalation and oral administration of xylene resulted in decreased fetal weight, increased incidences of delayed ossification, skeletal variations and resorptions.

12. ECOLOGICAL INFORMATION

Toxicity

This material is expected to be toxic to aquatic organisms with the potential to cause long term adverse effects in the aquatic environment. Acute aquatic toxicity studies on samples of gasoline and naphtha streams show acute toxicity values greater than 1 mg/l and mostly in the range of 1 to 100 mg/l. These tests were carried out on water accommodated fractions in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition.

Classification H411, Chronic Category 2

96 hours LC50: 8.3 mg/l (Cyprinodon variegatus)

96 hours LC50: 1.8 mg/l (Mysidopsis bahia)

48 hours LC50: 3.0 mg/l (Daphnia magna)

96 hours LC50: 2.7 mg/l (Oncorhynchus mykiss)

Coating action of oil can kill birds, plankton, aquatic life, algae and fish.

Persistence and Degradability

This material is not readily biodegradable. Most of the nonvolatile constituents are inherently biodegradable. Some of the highest molecular weight components are persistent in water. The individual hydrocarbon components of this material are differentially soluble in water with aromatic hydrocarbons tending to be more water soluble than aliphatic hydrocarbons. If spilled, the lighter components will generally

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12. ECOLOGICAL INFORMATION

evaporate but depending on local environmental conditions (temperature, wind, soil type, mixing or wave action in water, etc), photo-oxidation and biodegradation, the remainder may become dispersed in the water column or absorbed to soil or sediment. Because of their differential solubility, the occurrence of hydrocarbons in groundwater will be at different proportions than the parent material. Under anaerobic conditions, such as in anoxic sediments, rates of biodegradation are negligible.

Persistence per IOPC Fund Definition

Non-Persistent

Bioaccumulative Potential

Contains components with the potential to bioaccumulate. The octanol water coefficient values measured for the hydrocarbon components of this material range from 3 to greater than 6, and therefore would be considered as having the potential to bioaccumulate.

Mobility

Air: Contains volatile components. Lighter components will volatilize in the air. In air, the volatile hydrocarbons undergo photodegradation by reaction with hydroxyl radicals with half lives varying from 0.5 days for n-dodecane to 6.5 days for benzene.

Water: Spreads on a film on the surface of water. Significant proportion of spill will remain after one day. Lower molecular weight aromatic hydrocarbons and some polar compounds have low but significant water solubility. Some higher molecular weight compounds are removed by emulsification and these also slowly biodegrade while others adsorb to sediment and sink. Heavier fractions agglomerate to form tars, some of which sink.

Soil: Some constituents may be mobile and contaminate groundwater.

Other Adverse Effects

Films form on water and may affect oxygen transfer and damage organisms.

13. DISPOSAL CONSIDERATIONS

Recover or recycle if possible. It is the responsibility of the generator to determine the toxicity and physical properties of the material generated so as to properly classify the waste and ensure disposal methods comply with applicable regulations.

This material, if discarded as produced, is not a RCRA "listed" hazardous waste. However, it should be fully characterized for ignitability (D001), reactivity (D003) and benzene (D018) prior to disposal (40 CFR 261). Use which results in chemical or physical change or contamination may subject it to regulation as a hazardous waste. Along with properly characterizing all waste materials, consult state and local regulations regarding the proper disposal of this material.

Do not dispose of tank water bottoms by draining onto the ground. This will result in soil and groundwater contamination. Waste arising from spillage or tank cleaning should be disposed of in accordance with applicable regulations.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a qualified drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

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JP Morgan Commodities Canada Corp.

14. TRANSPORTATION INFORMATION

United States Department of Transportation (US DOT)	Shipping Description: Petroleum Distillates, n.o.s., 3, UN1268, I or II Shipping Name: Petroleum Distillates, n.o.s (contains natural gas condensate) Hazard Class and Division: 3 ID Number: UN1268 Packing Group: I or II Label: Flammable Liquid Placard: Flammable Reportable Quantity: None established for this material Emergency Response Guide: 128
Transportation of Dangerous Goods (TDG) Canada	
International Maritime Dangerous Goods Code (IMDG)	Shipping Description: Petroleum Distillates, n.o.s., 3, UN1268, I or II Shipping Name: Petroleum Distillates, n.o.s (contains natural gas condensate) Hazard Class and Division: 3 UN Number: 1268 Label: Flammable Liquid EMS Guide: F-E, S-E Not a DOT Marine Pollutant per 49 CFR 71.8
European Agreements Concerning the International Carriage by Rail (RID) and by Road (ADR)	Shipping Name: Petroleum Distillates, n.o.s (contains natural gas condensate) Hazard Class: 3 Packing Group: I or II Label: Flammable Liquid Danger Number: 33 UN Number: 1268
International Civil Aviation Organization / International Air Transport Association (ICAO/IATA)	Shipping Name: Petroleum Distillates, n.o.s (contains natural gas condensate) or Natural Gasoline UN/ID Number: UN1268 Hazard Class/Division: 3 Packing Group: I or II Labels: Flammable Emergency Response Guide: 3H

15. REGULATORY INFORMATION

United States Federal Regulatory Information

EPA TSCA Inventory	This product and/or its components are listed on the Toxic Substances Control Act (TSCA) Inventory
EPA SARA 302/304 Emergency Planning and Notification	This material contains the following chemicals subject to reporting under the Superfund Amendments and Reauthorization Act of 1986 (SARA): Material contains hydrogen sulfide, considered an extremely hazardous substance. TPQ– 500 lb, EPCRA RQ – 100 lb
EPA SARA 311/312 (Title III Hazard Categories)	Acute Health: Yes Chronic Health: Yes Fire Hazard: Yes Pressure Hazard: No Reactive Hazard: No

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15. REGULATORY INFORMATION

EPA SARA Toxic Chemical Notification and Release Reporting (40 CFR 372) and CERCLA Reportable Quantities (40 CFR 302.4)	Component	CAS Number	Concentration	RQ
	Benzene	71-43-2	< 5 %	10 lb
	Cyclohexane	110-82-7	< 5 %	1000 lb
	Ethyl Benzene	100-41-4	< 3 %	1000 lb
	n-Hexane	110-54-3	< 50 %	5000 lb
	Toluene	108-88-3	< 15 %	1000 lb
	1,2,4 Trimethyl Benzene	95-63-6	< 4 %	not listed
	Xylene, all isomers	1330-20-7	< 12 %	100 lb

CERCLA Section 101(14) excludes crude oil and crude oil fractions, including hazardous constituents of petroleum, from the definition of hazardous substances. The petroleum exclusion applies to this product.

EPA CWA and OPA This product is classified as an oil under Section 311 of the Clean Water Act (CWA) and Oil Pollution Act of 1990 (OPA), subject to spill reporting requirements.

Canadian Regulatory Information

DSL/NDSL Inventory This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the Regulations..

Workplace Hazardous Materials Information System (WHMIS) Hazard Class
B2 - Flammable Liquid
D1A – Material Causing Immediate and Serious Toxic Effects - Very Toxic Material
D2A: Material Causing Other Toxic Effects Very Toxic
D2B - Material Causing Other Toxic Effects - Toxic Material

European Union Regulatory Information

Labeling Product is dangerous as defined by the European Union Dangerous Substances / Preparations Directives
Contains: Low Boiling Point Naphtha

Symbol
F+ Extremely Flammable
T Toxic
N Dangerous for the Environment

Risk Phrases
R12-45-38-65-67-51/53
Extremely flammable. May cause cancer. Irritating to skin. Harmful: may cause lung damage if swallowed. Vapors may cause drowsiness and dizziness. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases
S16-53-45-2-23-24-29-43-62
Keep away from sources of ignition – No smoking. Avoid exposure – obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Keep out of reach of children. Do not breathe vapor. Avoid contact with skin. Do not empty into drains. In case of fire use foam/dry powder/CO₂. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

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15. REGULATORY INFORMATION

California Proposition 65

This product may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects, or other reproductive harm and which may be subject to the warning requirements of California Proposition 65. Chemicals known to the State of California to cause cancer, birth defects or other reproductive harm are created by the combustion of this product.

Carcinogens: Benzene, Ethyl Benzene

Developmental Toxicity: Benzene, Toluene

Male Reproductive Toxicity: Benzene

Carcinogen Identification by International Agency for Research on Cancer

Group 1	Carcinogenic to Humans	Benzene
Group 2A	Probably Carcinogenic to Humans	
Group 2B	Possibly Carcinogenic to Humans	Ethyl Benzene, Gasoline, Gasoline Engine Exhaust
Group 3	Not Classifiable	Toluene, Xylenes

16. OTHER INFORMATION

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ATTACHMENT I

EMISSION UNITS TABLE

Rule 13 Permit Modification Application

Bradley Compressor Station
Fanrock, West Virginia

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

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
001-03*	006	Caterpillar – G3508TA	2007	515 hp	Exist	None
001-09*	009	White Superior – 8GT825	1995	1,100 hp	Exist	None
001-0B*	012	Caterpillar – G3516LE	1997	1.150 hp	Exist	None
001-0C*	013	Caterpillar – G3606TA	2004	1,775 hp	Exist	None
001-0A	011	Petrofab – Dehydration Still Vent	1995	30 MMscf/day	Modification	None
001-04*	010	Dehydration Reboiler	2013	2,000 ft3/hr	Exist	None
Tank 10	010	Flash Tank (100 Gallon)	2013	100 gal	Exist	Emissions recycled to reboiler fuel line
001-EG*	014	Generac Emergency Generator	2013	28 hp	Exist	None
T1	T1E	Pipeline Liquids	Pre-2006	500 gal	Modification	None
T2	T2E	Pipeline Liquids	Pre-2006	2,100 gal	Modification	None
Fugitives	Fugitives	Fugitive Emissions	2015	Fugitives	New	None

¹ For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S,... or other appropriate designation.

² For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.

³ New, modification, removal

⁴ For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

ATTACHMENT J

EMISSION POINTS DATA SUMMARY SHEET

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

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 ³)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
011	Vertical Stack	001-0A	Petrofab TEG Dehydration Still Vent	NA	NA	NA	NA	VOC Benzene Ethylbenzene Toluene Xylene n-Hexane	11.912 0.387 1.013 0.668 1.350 0.162	52.175 1.697 4.436 2.924 5.912 0.708	11.912 0.387 1.013 0.668 1.350 0.162	52.175 1.697 4.436 2.924 5.912 0.708	Gas/ Vapor	EE	Can Supply Upon Request
T1E	Vented	T1	Pipeline Liquids Tank	NA	NA	NA	NA	VOC	0.07	0.32	0.07	0.32	Gas/ Vapor	EE	Can Supply Upon Request
T2E	Vented	T2	Pipeline Liquids Tank	NA	NA	NA	NA	VOC	0.07	0.32	0.07	0.32	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, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. **DO NOT LIST** H₂, H₂O, N₂, O₂, 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/m³) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO₂, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. <i>(Must match Emission Units Table)</i>	Inner Diameter (ft.)	Exit Gas		Emission Point Elevation (ft)		UTM Coordinates (km)		
		Temp. (°F)	Volumetric Flow ¹ (acfm) <i>at operating conditions</i>	Velocity (fps)	Ground Level <i>(Height above mean sea level)</i>	Stack Height ² <i>(Release height of emissions above ground level)</i>	Northing	Easting
011	0.25	212	26.16	87.64	1,360 ft	20 ft	4,155.30	443.50

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

ATTACHMENT K

FUGITIVE EMISSIONS DATA SHEET

Rule 13 Permit Modification Application

Bradley Compressor Station
Fanrock, West Virginia

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

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

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

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

FUGITIVE EMISSIONS SUMMARY		All Regulated Pollutants - Chemical Name/CAS ¹	Maximum Potential Uncontrolled Emissions ²		Maximum Potential Controlled Emissions ³		Est. Method Used ⁴
			lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads			-	-	-	-	EE
Unpaved Haul Roads			-	-	-	-	EE
Storage Pile Emissions			-	-	-	-	EE
Loading/Unloading Operations		VOC	0.064	0.210	0.064	0.210	EE
Wastewater Treatment Evaporation & Operations			-	-	-	-	EE
Equipment Leaks		VOC CO _{2e}	0.803 18.68	3.520 81.80	0.803 18.68	3.520 81.80	EE
General Clean-up VOC Emissions			-	-	-	-	EE
Other			-	-	-	-	EE

¹ List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂O, N₂, O₂, and Noble Gases.

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

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

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

ATTACHMENT L

EMISSION UNIT DATA SHEET

Rule 13 Permit Modification Application

Bradley Compressor Station
Fanrock, West Virginia

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET

General Glycol Dehydration Unit Data		Manufacturer and Model		Petrofab	
		Max Dry Gas Flow Rate (mmscf/day)		30 MMscf/day	
		Design Heat Input (mmBtu/hr)		2.04 mmBtu/hr	
		Design Type (DEG or TEG)		TEG	
		Source Status ²		MS	
		Date Installed/Modified/Removed ³		1995	
		Regenerator Still Vent APCD ⁴		NA	
		Fuel HV (Btu/scf)		1,020 Btu/scf	
		H ₂ S Content (gr/100 scf)		0.25	
		Operation (hrs/yr)		8,760	
Source ID # ¹	Vent	Reference ⁵	Potential Emissions ⁶	lbs/hr	tons/yr
Reboiler	Reboiler Vent	AP	NO _x	0.200	0.876
		AP	CO	0.168	0.736
		AP	VOC	0.011	0.048
		AP	SO ₂	0.001	0.005
		AP	PM ₁₀	0.015	0.067
		AP	PM _{2.5}	0.015	0.067
Dehy	Glycol Regenerator Still Vent	GRI-GLYCalc TM	VOC	11.912	52.175
		GRI-GLYCalc TM	Benzene	0.387	1.697
		GRI-GLYCalc TM	Ethylbenzene	1.013	4.436
		GRI-GLYCalc TM	Toluene	0.668	2.924
		GRI-GLYCalc TM	Xylenes	1.350	5.912
		GRI-GLYCalc TM	n-Hexane	0.162	0.708

1. Enter the appropriate Source Identification 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 Unit Data Sheet* shall be completed for each, using Source Identification #s RBV-2 and RSV-2, RBV-3 and RSV-3, etc.

2. Enter the Source Status using the following codes:

NS Construction of New Source	ES Existing Source
MS Modification of Existing Source	RS Removal of Source

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

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

NA	None	CD	Condenser
FL	Flare	CC	Condenser/Combustion Combination
TO	Thermal Oxidizer		

5. Enter the Potential Emissions Data Reference designation using the following codes:

MD	Manufacturer's Data	AP	AP-42
GR	GRI-GLYCalc TM	OT	Other _____ (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-GLYCalcTM (Radian International LLC & Gas Research Institute). Attach all referenced Potential Emissions Data (or calculations) and the GRI-GLYCalc *Aggregate Calculations Report* to this *Glycol Dehydration Unit Data Sheet(s)*. This PTE data shall be incorporated in the *Emissions Summary Sheet*.

Include a copy of the GRI-GLYCalcTM analysis. This includes a printout of the aggregate calculations report, which shall include emissions reports, equipment reports, and stream reports.

***An explanation of input parameters and examples, when using GRI-GLYCalcTM is available on our website.**

West Virginia Department of Environmental Protection

Division of Air Quality

40 CFR Part 63; Subpart HH & HHH Registration Form

DIVISION OF AIR QUALITY : (304) 926-0475

WEB PAGE: <http://www.wvdep.org>

Complete this form for any oil and natural gas production or natural gas transmission and storage facility that uses an affected unit under HH/HHH, whether subject or not.

Section A: Facility Description			
Affected facility actual annual average natural gas throughput (scf/day): 7.5 MMscf/day			
Affected facility actual annual average hydrocarbon liquid throughput: (bbl/day): None			
The affected facility processes, upgrades, or stores hydrocarbon liquids prior to custody transfer.		Yes	X No
The affected facility processes, upgrades, or stores natural gas prior to the point at which natural gas (NG) enters the NG transmission and storage source category or is delivered to the end user.		X Yes	No
The affected facility is: <input type="checkbox"/> prior to a NG processing plant <input type="checkbox"/> a NG processing plant <input checked="" type="checkbox"/> prior to the point of custody transfer and there is no NG processing plant			
The affected facility transports or stores natural gas prior to entering the pipeline to a local distribution company or to a final end user (if there is no local distribution company).		Yes	X No
The affected facility exclusively processes, stores, or transfers black oil.		Yes	X No
Initial producing gas-to-oil ratio (GOR): _____ scf/bbl API gravity: _____ degrees			
Section B: Dehydration Unit (if applicable) ¹			
Description: Petrofab TEG Dehydration Unit			
Date of Installation: 1995	Annual Operating Hours: 8,760	Burner rating (MMbtu/hr): 2.04	
Exhaust Stack Height (ft): 20	Stack Diameter (ft): 0.67	Stack Temp. (°F): 350	
		Reboiler	
Glycol Type: <input checked="" type="checkbox"/> TEG <input type="checkbox"/> EG <input type="checkbox"/> Other:			
Glycol Pump Type: <input checked="" type="checkbox"/> Electric <input type="checkbox"/> Gas If gas, what is the volume ratio?			
Condenser installed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Exit Temp. ____ Condenser Pressure ____			
Incinerator/flare installed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Destruction Eff.			
Other controls installed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Describe:			
Wet Gas ² : Gas Temp.: 95.18°F Gas Pressure 778.77 PSIG			
(Upstream of Contact Tower) Saturated Gas? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, water content ____ lb/MMSCF			
Dry Gas: Gas Flowrate (MMSCFD) Actual 7.5 Design 30			
(Downstream of Contact Tower) Water Content 7.0 lb/MMSCF			
Lean Glycol: Circulation rate (gpm) Actual ³ 3.0 Maximum ⁴ 5			
(1) Pump make/model: FMC MO406 glycol pump			
Glycol Flash Tank (if applicable): Temp.: 60 °F Pressure 70 psig Vented? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>			
If no, describe vapor control: Vapor directed to reboiler fuel line.			
Stripping Gas (if applicable): Source of gas: NA Rate ____ scfm			

Please attach the following required dehydration unit information:

1. System map indicating the chain of custody information. See Page 43 of this document for an example of a gas flow schematic. It is not intended that the applicant provide this level of detail for all sources. The level of detail that is necessary is to establish where the custody transfer points are located. This can be accomplished by submitting a process flow diagram indicating custody transfer points and the natural gas flow. However, the DAQ reserves the right to request more detailed information in order to make the necessary decisions.
2. Extended gas analysis from the Wet Gas Stream including mole percents of C₁-C₈, benzene, ethylbenzene, toluene, xylene and n-Hexane, using Gas Processors Association (GPA) 2286 (or similar). A sample should be taken from the inlet gas line, downstream from any inlet separator, and using a manifold to remove entrained liquids from the sample and a probe to collect the sample from the center of the gas line. GPA standard 2166 reference method or a modified version of EPA Method TO-14, (or similar) should be used.
3. GRI-GLYCalc Ver. 3.0 aggregate report based on maximum Lean Glycol circulation rate and maximum throughput.
4. Detailed calculations of gas or hydrocarbon flow rate.

Section C: Facility NESHAPS Subpart HH/HHH status

Affected facility status: (choose only one)	<input type="checkbox"/>	Subject to Subpart HH	
	<input type="checkbox"/>	Subject to Subpart HHH	
	<input checked="" type="checkbox"/>	Not Subject	<input checked="" type="checkbox"/> < 10/25 TPY
	because:	<input type="checkbox"/> Affected facility exclusively handles black oil	
		<input type="checkbox"/> The facility wide actual annual average NG throughput is < 650 thousand scf/day and facility wide actual annual average hydrocarbon liquid is < 250 bpd	
		<input type="checkbox"/> No affected source is present	

STORAGE TANK DATA SHEET

Source ID # ¹	Status ²	Content ³	Volume ⁴	Dia ⁵	Throughput ⁶	Orientation ⁷	Liquid Height ⁸
T1	Exist	TEG/PPL	500	5	76,650	Vert	3.5
T2	Exist	TEG/PPL	2100	8	76,650	Vert	3.5

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the compressor station. Tanks should be designated T01, T02, T03, etc.
2. Enter storage tank Status using the following:

EXIST Existing Equipment
 REM Equipment Removed

NEW Installation of New Equipment
3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, etc.
4. Enter storage tank volume in gallons.
5. Enter storage tank diameter in feet.
6. Enter storage tank throughput in gallons per year.
7. Enter storage tank orientation using the following:

VERT Vertical Tank

HORZ Horizontal Tank
8. Enter storage tank average liquid height in feet.

ATTACHMENT M

NOT APPLICABLE (SEE NOTE)

Note: No air pollution control devices used on equipment at this facility.

Rule 13 Permit Modification Application

Bradley Compressor Station
Fanrock, West Virginia

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

ATTACHMENT N

SUPPORTING EMISSIONS CALCULATIONS

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

Table 1. Annual Potential To Emit (PTE)
Cranberry Pipeline Corporation - Bradley Station

Proposed Criteria PTE

Source	PM	PM10	PM2.5	SO2	NOx	CO ²	VOC ¹	CO2e
Storage Tanks (ton/yr)	--	--	--	--	--	--	0.639	-
Dehy (ton/yr)	-	-	-	-	-	-	52.175	785.300
Truck Loading (ton/yr)	-	-	-	-	-	-	0.210	-
Piping Fugitives (ton/yr)	-	-	-	-	-	-	2.815	65.438
Total Emissions (ton/yr)	0.00	0.00	0.00	0.00	0.00	0.00	55.84	850.74
Total Emissions (lb/hr)	0.00	0.00	0.00	0.00	0.00	0.00	12.75	194.23

Proposed HAP PTE

Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs Listed
Storage Tanks (ton/yr)	-	-	-	-	-	-	0.000
Dehy (ton/yr)	1.697	2.924	4.436	5.912	0.708	-	15.678
Total Emissions (ton/yr)	1.697	2.924	4.436	5.912	0.708	0.000	15.678
Total Emissions (lb/hr)	0.387	0.668	1.013	1.350	0.162	0.000	3.579

Previous Emission Summary R13-2127F

Source	VOCs	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs Listed
Storage Tanks (ton/yr)	-	-	-	-	-	-	-	-
Dehy (ton/yr)	15.200	0.930	1.620	2.420	3.360	-	-	8.330
Truck Loading (ton/yr)	-	-	-	-	-	-	-	-
Piping Fugitives (ton/yr)	-	-	-	-	-	-	-	-
Total Emissions (ton/yr)	15.200	0.930	1.620	2.420	3.360	0.000	0.000	8.330
Total Emissions (lb/hr)	3.470	0.212	0.370	0.553	0.767	0.000	0.000	1.902

Proposed Difference in Emissions

Source	VOCs	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs Listed
Facility Emissions (ton/yr)	40.638	0.767	1.304	2.016	2.552	0.708	0.000	7.348

Table 2. Tank Emissions
Cranberry Pipeline Corporation - Bradley Station

Emission Unit	Tank Contents	Control Devices	Tank Throughput (bbls/day)	Flashing/Working/Breathing Em. Factor (lbs/bbl)	VOC Emissions (lbs/day)	VOC Emissions (lb/hr)	VOC Emissions (tons/yr)
T1	PPL/Waste	None	5	0.350	1.75	0.07	0.32
T2	PPL/Waste	None	5	0.350	1.75	0.07	0.32

Note: This tank is filled by the liquids captured from the dehy and compressor suction pots.

Calculations:

Notes:

(1) Flashing/Working/Breathing losses calculated from pressurized liquid sample taken by FESCO and modeled using E+P Tanks 2.0
The sample was taken from the Putnam B6 site on 4-25-13 and is assumed to be representative worst case with respect to Hamon

**Table 9. TEG Dehydration Unit (001-0A)
Cranberry Pipeline Corporation - Bradley Station**

Stream	Uncontrolled Emission Rates		
Components	lb/hr	lb/d	tpy
Methane	7.172	172.121	31.412
Ethane	0.936	22.460	4.099
Propane	0.293	7.041	1.285
n-Hexane	0.135	3.233	0.590
Benzene	0.323	7.748	1.414
Toluene	0.556	13.353	2.437
Ethylbenzene	0.844	20.258	3.697
Xylene	1.125	26.997	4.927
VOC	9.927	238.241	43.479
Total HAPs	2.983	71.584	13.064
CO2e	179.292	4303.014	785.300

Uncontrolled Emission Rates (20% Buffer)		
Accounts for gas variability in the future		
	lb/hr	tpy
	8.606	37.694
	1.123	4.919
	0.352	1.542
	0.162	0.708
	0.387	1.697
	0.668	2.924
	1.013	4.436
	1.350	5.912
	11.912	52.175
	3.579	15.678

Emission estimates were calculated using GRI-GlyCalc Software. The aggregate emissions report is provided within supporting attachments.

Specs 30 MMscf/d
 5.0 gpm TEG max pump rate
 Column Pressure 778.77 psig
 Column Temperature 95.18 F
 Wet gas water content - Saturated
 Dry gas water content - 7 lb H2O/ MMscf
 Flash Tank Temperature 60 F
 Flash Tank Pressure 70 psig

**Table 11. Fugitive Leak Emissions
Cranberry Pipeline Corporation - Bradley Station**

Pollutant	Emission Factor	PTE ^(a) Gas Service (tons/yr)
Valves	9.9E-03 lb/hr/source (1)	21.72
Low Bleed Pneumatic Valves	9.9E-03 lb/hr/source (1)	4.34
Flanges	8.6E-04 lb/hr/source (1)	4.52
Connector	4.4E-04 lb/hr/source (1)	2.32
Other Points in Gas Service	1.9E-02 lb/hr/source (1)	37.46
Total Gas Released	- -	70.36
Total VOC Released (gas service)	(b)	2.81
Calculations:	CO2e	65.44

(a) Annual emissions (tons/yr) = [Emission Factor (lb/hr/source)] x [Number of Sources] x [Hours of Operation per Year] x [0.0005 tons/ lb]

(b) Gas sample from Bradley gas analysis as worst case at 4 wt % VOC

(b) OEPA guideline used for wt % VOC at 18.52%

Number of Components in Gas Service

Valves=	500	(2)
Low Bleed Pneumatic Valves=	100	(2)
Connectors=	1,200	(2)
Other Points in Gas Service =	200	(2)

Maximum Hour of Operation = 8,760

(1) Emission factors from 1995 EPA Protocol for Equipment Leak Emission Estimates, Table 2-4 Oil and Gas Production

(2) *Default Average Component Counts for Major Onshore Natural Gas Production Equipment* from 40 CFR 98, Subpart W, Table W-1B

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

**Table 10. Truck Loading (TL) VOC Emissions
Cranberry Pipeline Corporation - Bradley Station**

Contents	Volume Transferred ³	Loading Loss ^(a) (lb VOC/1000gal)	PTE VOC Emissions (lb/hr)	PTE VOC Emissions (ton/yr) ^(b)
Pipeline Liquids	153,300 gal/yr	3.659	0.064	0.210
Total			0.064	0.210

Calculations:

(a) Loading Loss (lbs/1000 gal) = $12.46 \times [\text{Saturation Factor}] \times [\text{True Vapor Pressure of Liquid Loaded (psia)}] \times [\text{Molecular Weight of Vapors (lbs/lbmole)}] / [\text{Temperature of Bulk Liquid Loaded (°R)}]$

(b) Annual Emissions(tons/yr) = $[\text{Loading Loss (lb VOC/ 1000 gal)}] \times [\text{Volume Transferred(gal/yr)}] / 1000 / 2000$

<u>Pipeline liquids</u>	
Saturation factor	0.60 Note ⁽¹⁾
Pvap (psia)	7.70 Note ⁽²⁾
Molecular Weight Vap (lb/lbmol)	33.37 Note ⁽²⁾
Bulk Liquid Temperature (F)	65.00 Note ⁽²⁾

Notes:

- (1) AP-42 Section 5.2
- (2) Putnam B6 Compressor Station Pressurized Separator Sampling and Emission Estimation Report, August 2013
- (3) Annual rates based on maximum throughput of 5 bbls/d

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Bradley Compressor Station Wet Gas Sample 3-11-2015
 File Name: N:\West Virginia\Cabot\Projects\2015\Air Permits\Bradley
 Station\Glycalc\Bradley Glycalc_PTE_0815.ddf
 Date: September 21, 2015

DESCRIPTION:

 Description: Potential To Emit

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

 Temperature: 95.18 deg. F
 Pressure: 778.77 psig
 Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.1102
Nitrogen	1.0789
Methane	96.1398
Ethane	2.0143
Propane	0.2532
Isobutane	0.0380
n-Butane	0.0640
Isopentane	0.0208
n-Pentane	0.0104
Cyclopentane	0.0010
n-Hexane	0.0140
Cyclohexane	0.0044
Other Hexanes	0.0265
Heptanes	0.0287
Methylcyclohexane	0.0125
2,2,4-Trimethylpentane	0.0010
Benzene	0.0010
Toluene	0.0010
Ethylbenzene	0.0010
Xylenes	0.0010
C8+ Heavies	0.0321

DRY GAS:

 Flow Rate: 30.0 MMSCF/day
 Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

 Glycol Type: TEG
 Water Content: 1.5 wt% H2O
 Flow Rate: 5.0 gpm

PUMP:

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

Flash Control: Vented to atmosphere
Temperature: 60.0 deg. F
Pressure: 70.0 psig

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Bradley Compressor Station Wet Gas Sample 3-11-2015
 File Name: N:\West Virginia\Cabot\Projects\2015\Air Permits\Bradley
 Station\Glycalc\Bradley Glycalc_PTE_0815.ddf
 Date: September 21, 2015

DESCRIPTION:

Description: Potential To Emit

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.8199	19.677	3.5910
Ethane	0.3436	8.246	1.5048
Propane	0.1782	4.276	0.7804
Isobutane	0.0610	1.464	0.2672
n-Butane	0.1471	3.531	0.6445
Isopentane	0.0638	1.532	0.2795
n-Pentane	0.0433	1.039	0.1896
Cyclopentane	0.0189	0.454	0.0829
n-Hexane	0.1265	3.037	0.5542
Cyclohexane	0.1788	4.292	0.7833
Other Hexanes	0.1774	4.257	0.7769
Heptanes	0.5877	14.106	2.5743
Methylcyclohexane	0.6684	16.042	2.9276
2,2,4-Trimethylpentane	0.0097	0.233	0.0425
Benzene	0.3224	7.737	1.4120
Toluene	0.5559	13.342	2.4350
Ethylbenzene	0.8436	20.248	3.6952
Xylenes	1.1245	26.988	4.9253
C8+ Heavies	4.5493	109.182	19.9257
Total Emissions	10.8201	259.682	47.3920
Total Hydrocarbon Emissions	10.8201	259.682	47.3920
Total VOC Emissions	9.6567	231.760	42.2961
Total HAP Emissions	2.9827	71.585	13.0642
Total BTEX Emissions	2.8465	68.315	12.4675

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	6.3518	152.443	27.8209
Ethane	0.5924	14.217	2.5946
Propane	0.1152	2.765	0.5046
Isobutane	0.0218	0.522	0.0953
n-Butane	0.0368	0.883	0.1611
Isopentane	0.0122	0.294	0.0536
n-Pentane	0.0061	0.147	0.0269
Cyclopentane	0.0007	0.017	0.0031
n-Hexane	0.0082	0.196	0.0358

Cyclohexane	0.0029	0.070	0.0127
Other Hexanes	0.0163	0.391	0.0714
Heptanes	0.0153	0.366	0.0668
Methylcyclohexane	0.0073	0.174	0.0318
2,2,4-Trimethylpentane	0.0006	0.014	0.0025
Benzene	0.0005	0.012	0.0021
Toluene	0.0004	0.011	0.0019
Ethylbenzene	0.0003	0.008	0.0014
Xylenes	0.0003	0.007	0.0012
C8+ Heavies	0.0252	0.605	0.1104

Total Emissions	7.2142	173.140	31.5981
Total Hydrocarbon Emissions	7.2142	173.140	31.5981
Total VOC Emissions	0.2700	6.480	1.1827
Total HAP Emissions	0.0103	0.247	0.0450
Total BTEX Emissions	0.0015	0.037	0.0067

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr

Methane	7.1717	172.120	31.4119
Ethane	0.9359	22.462	4.0994
Propane	0.2934	7.041	1.2850
Isobutane	0.0828	1.987	0.3625
n-Butane	0.1839	4.414	0.8056
Isopentane	0.0760	1.825	0.3331
n-Pentane	0.0494	1.186	0.2165
Cyclopentane	0.0196	0.471	0.0860
n-Hexane	0.1347	3.233	0.5900
Cyclohexane	0.1817	4.362	0.7960
Other Hexanes	0.1937	4.648	0.8483
Heptanes	0.6030	14.472	2.6411
Methylcyclohexane	0.6757	16.216	2.9594
2,2,4-Trimethylpentane	0.0103	0.247	0.0450
Benzene	0.3229	7.749	1.4141
Toluene	0.5564	13.353	2.4369
Ethylbenzene	0.8440	20.255	3.6966
Xylenes	1.1248	26.994	4.9265
C8+ Heavies	4.5745	109.787	20.0361

Total Emissions	18.0343	432.822	78.9901
Total Hydrocarbon Emissions	18.0343	432.822	78.9901
Total VOC Emissions	9.9267	238.240	43.4788
Total HAP Emissions	2.9930	71.831	13.1092
Total BTEX Emissions	2.8480	68.351	12.4741

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction

Methane	31.4119	31.4119	0.00
Ethane	4.0994	4.0994	0.00
Propane	1.2850	1.2850	0.00
Isobutane	0.3625	0.3625	0.00
n-Butane	0.8056	0.8056	0.00

Isopentane	0.3331	0.3331	0.00
n-Pentane	0.2165	0.2165	0.00
Cyclopentane	0.0860	0.0860	0.00
n-Hexane	0.5900	0.5900	0.00
Cyclohexane	0.7960	0.7960	0.00
Other Hexanes	0.8483	0.8483	0.00
Heptanes	2.6411	2.6411	0.00
Methylcyclohexane	2.9594	2.9594	0.00
2,2,4-Trimethylpentane	0.0450	0.0450	0.00
Benzene	1.4141	1.4141	0.00
Toluene	2.4369	2.4369	0.00
Ethylbenzene	3.6966	3.6966	0.00
Xylenes	4.9265	4.9265	0.00
C8+ Heavies	20.0361	20.0361	0.00
<hr/>			
Total Emissions	78.9901	78.9901	0.00
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Total Hydrocarbon Emissions	78.9901	78.9901	0.00
Total VOC Emissions	43.4788	43.4788	0.00
Total HAP Emissions	13.1092	13.1092	0.00
Total BTEX Emissions	12.4741	12.4741	0.00

EQUIPMENT REPORTS:

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:	3.58 lbs. H2O/MMSCF
Temperature:	95.2 deg. F
Pressure:	778.8 psig
Dry Gas Flow Rate:	30.0000 MMSCF/day
Glycol Losses with Dry Gas:	0.2120 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	60.75 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	4.20 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.89%	94.11%
Carbon Dioxide	99.80%	0.20%
Nitrogen	99.98%	0.02%
Methane	99.99%	0.01%
Ethane	99.95%	0.05%
Propane	99.92%	0.08%
Isobutane	99.89%	0.11%
n-Butane	99.85%	0.15%
Isopentane	99.85%	0.15%
n-Pentane	99.80%	0.20%
Cyclopentane	99.15%	0.85%
n-Hexane	99.66%	0.34%
Cyclohexane	98.51%	1.49%

Other Hexanes	99.74%	0.26%
Heptanes	99.36%	0.64%
Methylcyclohexane	98.33%	1.67%
2,2,4-Trimethylpentane	99.73%	0.27%
Benzene	87.47%	12.53%
Toluene	81.70%	18.30%
Ethylbenzene	75.91%	24.09%
Xylenes	67.89%	32.11%
C8+ Heavies	97.46%	2.54%

FLASH TANK

Flash Control: Vented to atmosphere
Flash Temperature: 60.0 deg. F
Flash Pressure: 70.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	100.00%	0.00%
Carbon Dioxide	72.85%	27.15%
Nitrogen	10.93%	89.07%
Methane	11.43%	88.57%
Ethane	36.71%	63.29%
Propane	60.73%	39.27%
Isobutane	73.71%	26.29%
n-Butane	80.00%	20.00%
Isopentane	84.00%	16.00%
n-Pentane	87.64%	12.36%
Cyclopentane	96.45%	3.55%
n-Hexane	93.95%	6.05%
Cyclohexane	98.45%	1.55%
Other Hexanes	91.67%	8.33%
Heptanes	97.48%	2.52%
Methylcyclohexane	98.97%	1.03%
2,2,4-Trimethylpentane	94.58%	5.42%
Benzene	99.86%	0.14%
Toluene	99.93%	0.07%
Ethylbenzene	99.97%	0.03%
Xylenes	99.98%	0.02%
C8+ Heavies	99.52%	0.48%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	37.10%	62.90%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%

Isopentane	0.60%	99.40%
n-Pentane	0.57%	99.43%
Cyclopentane	0.52%	99.48%
n-Hexane	0.53%	99.47%
Cyclohexane	3.25%	96.75%
Other Hexanes	1.09%	98.91%
Heptanes	0.51%	99.49%
Methylcyclohexane	4.04%	95.96%
2,2,4-Trimethylpentane	1.59%	98.41%
Benzene	5.01%	94.99%
Toluene	7.91%	92.09%
Ethylbenzene	10.41%	89.59%
Xylenes	12.92%	87.08%
C8+ Heavies	12.08%	87.92%

STREAM REPORTS:

WET GAS STREAM

Temperature: 95.18 deg. F
Pressure: 793.47 psia
Flow Rate: 1.25e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.28e-001	7.60e+001
Carbon Dioxide	1.10e-001	1.60e+002
Nitrogen	1.08e+000	9.97e+002
Methane	9.62e+001	5.09e+004
Ethane	2.01e+000	2.00e+003
Propane	2.53e-001	3.68e+002
Isobutane	3.80e-002	7.29e+001
n-Butane	6.40e-002	1.23e+002
Isopentane	2.08e-002	4.95e+001
n-Pentane	1.04e-002	2.48e+001
Cyclopentane	1.00e-003	2.31e+000
n-Hexane	1.40e-002	3.98e+001
Cyclohexane	4.40e-003	1.22e+001
Other Hexanes	2.65e-002	7.54e+001
Heptanes	2.87e-002	9.49e+001
Methylcyclohexane	1.25e-002	4.05e+001
2,2,4-Trimethylpentane	1.00e-003	3.77e+000
Benzene	1.00e-003	2.58e+000
Toluene	1.00e-003	3.04e+000
Ethylbenzene	1.00e-003	3.50e+000
Xylenes	1.00e-003	3.50e+000
C8+ Heavies	3.21e-002	1.80e+002
Total Components	100.00	5.52e+004

DRY GAS STREAM

Temperature: 95.18 deg. F
Pressure: 793.47 psia

Flow Rate: 1.25e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.55e-003	4.48e+000
Carbon Dioxide	1.10e-001	1.60e+002
Nitrogen	1.08e+000	9.97e+002
Methane	9.63e+001	5.09e+004
Ethane	2.02e+000	2.00e+003
Propane	2.53e-001	3.68e+002
Isobutane	3.80e-002	7.28e+001
n-Butane	6.40e-002	1.23e+002
Isopentane	2.08e-002	4.94e+001
n-Pentane	1.04e-002	2.47e+001
Cyclopentane	9.93e-004	2.29e+000
n-Hexane	1.40e-002	3.97e+001
Cyclohexane	4.34e-003	1.20e+001
Other Hexanes	2.65e-002	7.52e+001
Heptanes	2.86e-002	9.43e+001
Methylcyclohexane	1.23e-002	3.98e+001
2,2,4-Trimethylpentane	9.99e-004	3.76e+000
Benzene	8.76e-004	2.25e+000
Toluene	8.18e-004	2.48e+000
Ethylbenzene	7.60e-004	2.66e+000
Xylenes	6.80e-004	2.38e+000
C8+ Heavies	3.13e-002	1.76e+002
Total Components	100.00	5.51e+004

LEAN GLYCOL STREAM

Temperature: 95.18 deg. F
Flow Rate: 5.00e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	2.77e+003
Water	1.50e+000	4.22e+001
Carbon Dioxide	1.13e-012	3.19e-011
Nitrogen	5.42e-013	1.53e-011
Methane	8.56e-018	2.41e-016
Ethane	1.57e-008	4.42e-007
Propane	4.24e-010	1.19e-008
Isobutane	8.82e-011	2.48e-009
n-Butane	1.62e-010	4.56e-009
Isopentane	1.36e-005	3.82e-004
n-Pentane	8.83e-006	2.48e-004
Cyclopentane	3.51e-006	9.86e-005
n-Hexane	2.41e-005	6.77e-004
Cyclohexane	2.13e-004	6.01e-003
Other Hexanes	6.95e-005	1.96e-003
Heptanes	1.08e-004	3.03e-003
Methylcyclohexane	1.00e-003	2.82e-002
2,2,4-Trimethylpentane	5.56e-006	1.56e-004
Benzene	6.04e-004	1.70e-002
Toluene	1.70e-003	4.77e-002
Ethylbenzene	3.48e-003	9.80e-002
Xylenes	5.93e-003	1.67e-001

C8+ Heavies	2.22e-002	6.25e-001

Total Components	100.00	2.81e+003

RICH GLYCOL STREAM

Temperature: 95.18 deg. F
 Pressure: 793.47 psia
 Flow Rate: 5.18e+000 gpm
 NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)

TEG	9.54e+001	2.77e+003
Water	3.92e+000	1.14e+002
Carbon Dioxide	1.10e-002	3.19e-001
Nitrogen	5.26e-003	1.53e-001
Methane	2.47e-001	7.17e+000
Ethane	3.22e-002	9.36e-001
Propane	1.01e-002	2.93e-001
Isobutane	2.85e-003	8.28e-002
n-Butane	6.33e-003	1.84e-001
Isopentane	2.63e-003	7.64e-002
n-Pentane	1.71e-003	4.97e-002
Cyclopentane	6.79e-004	1.97e-002
n-Hexane	4.66e-003	1.35e-001
Cyclohexane	6.46e-003	1.88e-001
Other Hexanes	6.74e-003	1.96e-001
Heptanes	2.09e-002	6.06e-001
Methylcyclohexane	2.42e-002	7.04e-001
2,2,4-Trimethylpentane	3.59e-004	1.04e-002
Benzene	1.17e-002	3.40e-001
Toluene	2.08e-002	6.04e-001
Ethylbenzene	3.24e-002	9.42e-001
Xylenes	4.45e-002	1.29e+000
C8+ Heavies	1.79e-001	5.20e+000

Total Components	100.00	2.90e+003

FLASH TANK OFF GAS STREAM

Temperature: 60.00 deg. F
 Pressure: 84.70 psia
 Flow Rate: 1.62e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)

Water	2.58e-002	1.99e-003
Carbon Dioxide	4.60e-001	8.66e-002
Nitrogen	1.14e+000	1.36e-001
Methane	9.27e+001	6.35e+000
Ethane	4.61e+000	5.92e-001
Propane	6.12e-001	1.15e-001
Isobutane	8.76e-002	2.18e-002
n-Butane	1.48e-001	3.68e-002
Isopentane	3.97e-002	1.22e-002
n-Pentane	1.99e-002	6.14e-003
Cyclopentane	2.34e-003	7.00e-004

n-Hexane	2.22e-002	8.18e-003
Cyclohexane	8.08e-003	2.90e-003
Other Hexanes	4.43e-002	1.63e-002
Heptanes	3.56e-002	1.53e-002
Methylcyclohexane	1.73e-002	7.26e-003
2,2,4-Trimethylpentane	1.16e-003	5.65e-004
Benzene	1.44e-003	4.82e-004
Toluene	1.12e-003	4.41e-004
Ethylbenzene	7.14e-004	3.24e-004
Xylenes	6.07e-004	2.75e-004
C8+ Heavies	3.46e-002	2.52e-002

Total Components	100.00	7.44e+000

FLASH TANK GLYCOL STREAM

Temperature: 60.00 deg. F
Flow Rate: 5.16e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)

TEG	9.57e+001	2.77e+003
Water	3.93e+000	1.14e+002
Carbon Dioxide	8.02e-003	2.32e-001
Nitrogen	5.76e-004	1.67e-002
Methane	2.83e-002	8.20e-001
Ethane	1.19e-002	3.44e-001
Propane	6.15e-003	1.78e-001
Isobutane	2.11e-003	6.10e-002
n-Butane	5.08e-003	1.47e-001
Isopentane	2.22e-003	6.42e-002
n-Pentane	1.50e-003	4.35e-002
Cyclopentane	6.57e-004	1.90e-002
n-Hexane	4.39e-003	1.27e-001
Cyclohexane	6.38e-003	1.85e-001
Other Hexanes	6.19e-003	1.79e-001
Heptanes	2.04e-002	5.91e-001
Methylcyclohexane	2.40e-002	6.97e-001
2,2,4-Trimethylpentane	3.41e-004	9.86e-003
Benzene	1.17e-002	3.39e-001
Toluene	2.08e-002	6.04e-001
Ethylbenzene	3.25e-002	9.42e-001
Xylenes	4.46e-002	1.29e+000
C8+ Heavies	1.79e-001	5.17e+000

Total Components	100.00	2.90e+003

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.57e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)

Water	9.63e+001	7.16e+001
Carbon Dioxide	1.28e-001	2.32e-001
Nitrogen	1.44e-002	1.67e-002

Methane	1.24e+000	8.20e-001
Ethane	2.77e-001	3.44e-001
Propane	9.79e-002	1.78e-001
Isobutane	2.54e-002	6.10e-002
n-Butane	6.14e-002	1.47e-001
Isopentane	2.14e-002	6.38e-002
n-Pentane	1.45e-002	4.33e-002
Cyclopentane	6.54e-003	1.89e-002
n-Hexane	3.56e-002	1.27e-001
Cyclohexane	5.15e-002	1.79e-001
Other Hexanes	4.99e-002	1.77e-001
Heptanes	1.42e-001	5.88e-001
Methylcyclohexane	1.65e-001	6.68e-001
2,2,4-Trimethylpentane	2.06e-003	9.71e-003
Benzene	1.00e-001	3.22e-001
Toluene	1.46e-001	5.56e-001
Ethylbenzene	1.93e-001	8.44e-001
Xylenes	2.57e-001	1.12e+000
C8+ Heavies	6.47e-001	4.55e+000
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Total Components	100.00	8.26e+001

Final Report

- Certificate of Analysis -

Company Name: SLR-CABOT

Report Date: 3/25/2015

Report Number: 30099-0

Chain of Custody #: 119563

Lab Analyst: WG

Project Comments: NG EXTENDED

Lab ID: 15032310

Date Sampled: 3/11/2015 12:02:00PM

Sample Type: Natural Gas

Date Received: 3/19/2015

Your Sample ID: BRADLEY

Analysis Date: 03/23/15

Method	Analyte	Result	Units	MDL/PQL
Collection	Sampler	RSJ	-	
	Sample PSI	750	-	
GPA 2145	Temperature (heating value)	60.0	°F	
	Temperature (density)	60.0	°F	
	Atmospheric Pressure	14.696	PSIA	
per GPA 2172	Molar Mass	16.7460	-	
	Relative Density	0.5792	-	
	Compressibility Factor	0.9979	-	
per GPA 2172	Btu/Gal	59945.0	BTU/Gal	
	Btu/Ideal CF	1027.3	BTU/Ideal CF	
	Btu/Real CF	1029.4	BTU/Real CF	
GPA 2286	Helium	0.0414	Mole %	0.001
	Hydrogen	0.1108	Mole %	0.001
	Nitrogen	1.0789	Mole %	0.001
	Oxygen	<0.0010	Mole %	0.001
	Methane	96.1398	Mole %	0.001
	Carbon Dioxide	0.1102	Mole %	0.001
	Ethane	2.0143	Mole %	0.001
	Propane	0.2532	Mole %	0.001
	I-Butane	0.0380	Mole %	0.001
	N-Butane	0.0640	Mole %	0.001
	I-Pentane	0.0208	Mole %	0.001
	N-Pentane	0.0104	Mole %	0.001
	Hexanes Plus	0.1182	Mole %	0.001

Lab ID: 15032310

Date Sampled: 3/11/2015 12:02:00PM

Sample Type: Natural Gas

Date Received: 3/19/2015

Your Sample ID: BRADLEY

Analysis Date: 03/23/15

Method	Analyte	Result	Units	MDL/PQL
GPA 2286	Carbon Monoxide	<0.0010	Mole %	0.001
	2,2-Dimethylbutane	0.0034	Mole %	0.001
	2,3-Dimethylbutane	<0.0010	Mole %	0.001
	2-Methylpentane	0.0095	Mole %	0.001
	3-Methylpentane	0.0080	Mole %	0.001
	N-Hexane	0.0140	Mole %	0.001
	2,2-Dimethylpentane	<0.0010	Mole %	0.001
	Methylcyclopentane	0.0056	Mole %	0.001
	Benzene	<0.0010	Mole %	0.001
	3-dimethylpentane	<0.0010	Mole %	0.001
	Cyclohexane	0.0044	Mole %	0.001
	2-Methylhexane/2,3-Dimethylpentane	0.0097	Mole %	0.001
	3-Methylhexane	0.0073	Mole %	0.001
	3-Dimethylcyclopentane	<0.0010	Mole %	0.001
	3-Ethylpentane	<0.0010	Mole %	0.001
	2,2,4-Trimethylpentane	<0.0010	Mole %	0.001
	N-Heptane	0.0117	Mole %	0.001
	Methylcyclohexane	0.0125	Mole %	0.001
	2,5-Dimethylhexane	0.0030	Mole %	0.001
	1,t-2,c-4-trimethylcyclopentane	<0.0010	Mole %	0.001
	2,2,3-Trimethylpentane	<0.0010	Mole %	.001
	Toluene	<0.0010	Mole %	0.001
	2-Methylheptane	<0.0010	Mole %	0.001
	4-Methylheptane	0.0060	Mole %	0.001
	3-Methylheptane	0.0044	Mole %	0.001
	2,2,5-trimethylhexane	0.0028	Mole %	0.001
	N-Octane	0.0080	Mole %	0.001
	2,2,4,4-tetramethylpentane	<0.0010	Mole %	0.001
	2,2,4-trimethylhexane	<0.0010	Mole %	0.001
	isopropylcyclopentane	<0.0010	Mole %	0.001
	2,2-dimethylheptane	<0.0010	Mole %	0.001

Lab ID: 15032310

Date Sampled: 3/11/2015 12:02:00PM

Sample Type: Natural Gas

Date Received: 3/19/2015

Your Sample ID: BRADLEY

Analysis Date: 03/23/15

Method	Analyte	Result	Units	MDL/PQL
GPA 2286	2,4-dimethylheptane	<0.0010	Mole %	0.001
	2,2,3-trimethylhexane	<0.0010	Mole %	0.001
	Ethylbenzene	<0.0010	Mole %	0.001
	2,2,3,3-tetramethylpentane	<0.0010	Mole %	0.001
	1,t-2,t-4-trimethylcyclohexane	<0.0010	Mole %	0.001
	M/P Xylene	<0.0010	Mole %	0.001
	2-Methyloctane	0.0026	Mole %	0.001
	O-Xylene	<0.0010	Mole %	0.001
	3-Methyloctane	0.0019	Mole %	0.001
	1,1,2-trimethylcyclohexane	<0.0010	Mole %	0.001
	isobutylcyclopentane	<0.0010	Mole %	0.001
	N-Nonane	0.0034	Mole %	0.001
	1,c-2,t-3,trimethylcyclohexane	<0.0010	Mole %	0.001
	Isopropylbenzene	<0.0010	Mole %	0.001
	2,2-dimethyloctane	<0.0010	Mole %	0.001
	isopropylcyclohexane	<0.0010	Mole %	0.001
	Cyclooctane	<0.0010	Mole %	0.001
	n-butylcyclopentane	<0.0010	Mole %	0.001
	propylcyclohexane	<0.0010	Mole %	0.001
	N-Propylbenzene	<0.0010	Mole %	0.001
	m-ethyltoluene	<0.0010	Mole %	0.001
	p-ethyltoluene	<0.0010	Mole %	0.001
	1,3,5-Trimethylbenzene	<0.0010	Mole %	0.001
	2-methylnonane	<0.0010	Mole %	0.001
	3-ethyloctane	<0.0010	Mole %	0.001
	3-methylnonane	<0.0010	Mole %	0.001
	t-butylbenzene	<0.0010	Mole %	0.001
	n-decane	<0.0010	Mole %	0.001
	i-butylbenzene	<0.0010	Mole %	0.001
	sec-butylbenzene	<0.0010	Mole %	0.001
	T-Butylcyclohexane	<0.0010	Mole %	0.001

Lab ID: 15032310

Date Sampled: 3/11/2015 12:02:00PM

Sample Type: Natural Gas

Date Received: 3/19/2015

Your Sample ID: BRADLEY

Analysis Date: 03/23/15

Method	Analyte	Result	Units	MDL/PQL
GPA 2286	n-Butylcyclohexane	<0.0010	Mole %	0.001
	n-Butylbenzene	<0.0010	Mole %	0.001
	n-undecane	<0.0010	Mole %	0.001

Joe Arnold

Laboratory QA/QC Manager

Results relate only to items tested. Samples tested as received. This report may not be reproduced except in full with the approval of R. L. Laughlin.

ATTACHMENT O

**MONITORING/RECORDKEEPING/REPORTING/
TESTING PLANS**

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

MONITORING, RECORD KEEPING, REPORTING, TESTING PLANS

Monitoring

The company will at a minimum monitor hours of operation, site production throughputs, as well as planned and unplanned maintenance of permitted equipment comprising the facility.

Recordkeeping

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

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

The company will report any control equipment malfunctions, emission limit or opacity deviations.

Testing

Company will at a minimum perform one (1) stack test for the Caterpillar G3606TA every 5 years to prove compliance with actual emission levels used in this facility's potential-to-emit.

ATTACHMENT P

PUBLIC NOTICE

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

AIR QUALITY PERMIT NOTICE

Notice of Application

Notice is given that Cranberry Pipeline Corporation has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Modification Permit for Bradley Compressor Station located near Fanrock, in Wyoming County, West Virginia. From Pineville, travel 5.1 miles south on US Route 16 and turn right onto CR12/4 (Indian Creek Rd). At 5.2 miles turn left onto CR14 (Brier Creek Rd). At 1.8 miles turn right onto local road. At 0.2 miles bear left onto local road and go 0.1 miles to compressor station on right. The latitude and longitude coordinates are: 37.5429 and -81.6396.

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

Pollutant	(tons/yr)
VOCs	40.638
Benzene	0.767
Toluene	1.304
Ethylbenzene	2.016
Xylene	2.552
n-Hexane	0.708
CO₂ Equivalent	850.74

Modification of operation will take place upon issuance of permit. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.

Dated this the 2nd day of November, 2015.

By: Cranberry Pipeline Corporation
 Randy Spencer
 Safety and Environmental Manager
 900 Lee Street East, Suite 1500
 Charleston, WV 25301

ATTACHMENT Q

NOT APPLICABLE (SEE NOTE)

Note: No information contained within this application is claimed confidential.

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

ATTACHMENT R

AUTHORITY FORMS

Rule 13 Permit Modification Application

Bradley Compressor Station
Fanrock, West Virginia

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

Attachment R
AUTHORITY OF CORPORATION
OR OTHER BUSINESS ENTITY (DOMESTIC OR FOREIGN)

TO: The West Virginia Department of Environmental Protection,
Division of Air Quality

DATE: July 19, 2010, 2010

ATTN.: Director

Corporation's / other business entity's Federal Employer I.D. Number 042989934

The undersigned hereby files with the West Virginia Department of Environmental Protection, Division of Air Quality, a permit application and hereby certifies that the said name is a trade name which is used in the conduct of an incorporated business or other business entity.

Further, the corporation or the business entity certifies as follows:

(1) RANDY SPENCER (is/are) the authorized representative(s) and in that capacity may represent the interest of the corporation or the business entity and may obligate and legally bind the corporation or the business entity.

(2) The corporation or the business entity is authorized to do business in the State of West Virginia.

(3) If the corporation or the business entity changes its authorized representative(s), the corporation or the business entity shall notify the Director of the West Virginia Department of Environmental Protection, Division of Air Quality, immediately upon such change.



Dan O. Dinges - President, Chief Executive Officer
President or Other Authorized Officer

(Vice President, Secretary, Treasurer or other official in charge of a principal business function of the corporation or the business entity)

(If not the President, then the corporation or the business entity must submit certified minutes or bylaws stating legal authority of other authorized officer to bind the corporation or the business entity).

Secretary

CABOT OIL & GAS CORPORATION
CRANBERRY PIPELINE CORPORATION

Name of Corporation or business entity

ATTACHMENT S

NOT APPLICABLE (SEE NOTE)

Note: Not a Title V Permit Revision.

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015

ATTACHMENT T

PERMIT MODIFICATION APPLICATION FEE

Rule 13 Permit Modification Application

**Bradley Compressor Station
Fanrock, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia

November 2015