



March 31, 2015

BY: U.S. CERTIFIED MAIL, RETURN RECEIPT REQUESTED

7014 3490 0000 0448 3825

William F. Durham
Director, Division of Air Quality
WVDEP
601 57th Street
Charleston, WV 25304

**RE: Dominion Transmission, Inc. – Craig Compressor Station (ID# 085-00004)
45 CSR 13 New Source Review Permit and Title V Operating Permit Revision**

Dear Mr. Durham:

Enclosed are one complete original and two (2) cd copies of a 45 CSR 13 permit application to replace the existing dehydration unit, associated reboiler, and the control device at Dominion Transmission, Inc.'s Craig Compressor Station in Ritchie County, West Virginia. The enclosed application also includes the Title V Operating Permit revision forms for permit R30-08500004-2011

The public notice affidavit will be submitted to WVDEP once it is received from the newspaper.

If you require any additional information, please contact Rebekah Remick at (804) 273-3536 or via email at Rebekah.J.Remick@dom.com.

Sincerely,

A handwritten signature in blue ink that reads "Amanda B. Tornabene".

Amanda B. Tornabene
Director, Gas Environmental Services



R13 PERMIT APPLICATION

Dominion Transmission, Inc. > Craig Compressor Station

Ritchie County, West Virginia

Prepared By:

TRINITY CONSULTANTS
102 Pickering Way.
Suite 506
Exton, PA 19341
(610) 280-3902

March 2015

Project 153902.0022



Environmental solutions delivered uncommonly well

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1. INTRODUCTION

Dominion Transmission, Inc. (Dominion) is submitting this Rule 13 (R-13) modification permit application to the West Virginia Department of Environmental Protection (WVDEP) for the proposed modification of an existing natural gas compressor station located in Ritchie County, West Virginia (Craig Compressor Station).

1.1. FACILITY AND PROJECT DESCRIPTION

The Craig Compressor Station is a natural gas gathering facility covered under Standard Industrial Classification (SIC) code 4922. The facility has the potential to operate 24 hours per day, and 7 days per week. The station consists of three (3) lean burn natural gas fired compressor engines (each rated at 869 horsepower [hp]), two (2) natural gas fired emergency generators (each rated at 225 hp), one (1) triethylene glycol (TEG) dehydration unit (rated at 25 million standard cubic feet per day [MMscfd])), with an associated reboiler (rated at 1.00 million British thermal units per hour [MMBtu/hr]) and controlled by an enclosed flare, as well as six (6) miscellaneous storage tanks.

Dominion proposes to replace the existing TEG dehydration unit with an 18 MMscfd unit, complete with new reboiler (rated at 0.75 MMBtu/hr) and controlled by a thermal oxidizer (with a 95% destruction efficiency). The existing dehydrator, reboiler, and flare will be removed.

The purpose of the dehydration unit is to remove water from the natural gas stream using TEG. In the absorber tower, the TEG absorbs water from the gas stream. The water rich glycol then passes through a flash tank where the pressure of the rich TEG is dropped. During this process, natural gas entrained in the glycol stream is flashed off. The flash gas is routed to the station compressor suction. The water rich glycol is then heated in a reboiler where water and impurities are liberated from the glycol before it is recycled through the unit. The emissions from the dehydration regenerator vent are controlled by the thermal oxidizer. The dehydration unit has the potential to operate 8,760 hours per year, which is reflected in emission calculations.

A process flow diagram is included as Attachment F.

1.2. R-13 APPLICATION ORGANIZATION

This R-13 permit application is organized as follows:

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

2. SAMPLE EMISSION SOURCE CALCULATIONS

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

The proposed new emission sources at the Craig Compressor Station include the TEG dehydration unit, reboiler, and thermal oxidizer. As mentioned above, these are replacement units. The methodologies employed in calculating emissions from these sources have been summarized below.

- > **Reboiler:** Potential emissions from the proposed natural gas fired reboiler of all criteria pollutants and HAPs are calculated using U.S. EPA's AP-42 factors for natural gas combustion equipment.¹ These calculations assume a higher heating value of natural gas of 1,000 Btu/scf. Greenhouse gas emissions are calculated according to 40 CFR 98 Subpart C.²
- > **Dehydration Unit:** Potential emissions of HAPs, VOC, and methane from the dehydration unit are calculated using GRI-GLYCalc. Emissions of other criteria pollutants are calculated for natural gas combustion in the thermal oxidizer using U.S. EPA's AP-42 factors for external combustion of natural gas.¹ Greenhouse gas emissions from combustion in the thermal oxidizer are calculated according to the procedures in 40 CFR 98 Subpart C.

¹ U.S. EPA, AP 42, Fifth Edition, Volume I, Chapter 1.4, *Natural Gas Combustion*, Supplement D, July 1998.

² 40 CFR 98 Subpart C, *General Stationary Fuel combustion Sources*, Tables C-1 and C-2.

3. R13 APPLICATION FORM

The WVDEP permit application forms contained in this application include all applicable R-13 application forms including the required attachments.



WEST VIRGINIA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

**APPLICATION FOR NSR PERMIT
AND
TITLE V PERMIT REVISION
(OPTIONAL)**

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

- ☐ CONSTRUCTION ☒ MODIFICATION ☐ RELOCATION
☐ CLASS I ADMINISTRATIVE UPDATE ☐ TEMPORARY
☐ CLASS II ADMINISTRATIVE UPDATE ☐ AFTER-THE-FACT

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

- ☐ ADMINISTRATIVE AMENDMENT ☒ MINOR MODIFICATION
☐ SIGNIFICANT MODIFICATION

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant (as registered with the WV Secretary of State's Office):

Dominion Transmission, Inc.

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

550629203

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

Craig Compressor Station

4. The applicant is the:

☐ OWNER ☐ OPERATOR ☒ BOTH

5A. Applicant's mailing address:

445 West Main Street Clarksburg, WV 26301

5B. Facility's present physical address:

In Ritchie County, Near Smithville, WV

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: Dominion Transmission, Inc. owns 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:

486210

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

0 8 5 -0 0 0 0 4

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

R30-08500004-2011, R13-2497, R13-2503

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 Clarksburg, take Route 50 West for 41 miles to Ellensburg exit. Go left on Route 16 South for 18 miles thru Harrisville to Route 47. Turn left and go 0.2 miles across bridge then turn right on Route 16 South. Go approximately 20 feet and turn right up hill. Go 0.3 miles to station.		
12.B. New site address (if applicable):	12C. Nearest city or town: Smithville, WV	12D. County: Ritchie
12.E. UTM Northing (KM): 4324.68	12F. UTM Easting (KM): 491.49	12G. UTM Zone: 17
13. Briefly describe the proposed change(s) at the facility: Installation of replacement dehydrator, reboiler, and thermal oxidizer.		
14A. Provide the date of anticipated installation or change: 08/01/2015 – If this is an After-The-Fact permit application, provide the date upon which the proposed change did happen: / /		14B. Date of anticipated Start-Up if a permit is granted: 11/01/2015
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 checked="" type="checkbox"/> YES <input 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 type="checkbox"/> Storage Tanks
<input type="checkbox"/> Grey Iron and Steel Foundry	<input type="checkbox"/> Indirect Heat Exchanger	
<input checked="" type="checkbox"/> General Emission Unit, specify Dehydration unit		

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

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

<input type="checkbox"/> Absorption Systems	<input type="checkbox"/> Baghouse	<input checked="" 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
<input type="checkbox"/> 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 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 Brian Sheppard
(Please use blue ink)

DATE: 03-27-15
(Please use blue ink)

35B. Printed name of signee: Brian Sheppard

35C. Title: Vice President, Pipeline Operations

35D. E-mail: brian.c.sheppard@dom.com

36E. Phone: 304-627-3733

36F. FAX: 304-627-3323

36A. Printed name of contact person (if different from above): Becky Remick

36B. Title: Environmental Specialist III

36C. E-mail: Rebekah.J.Remick@dom.com

36D. Phone: 804-273-3536

36E. FAX:

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 checked="" 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 checked="" type="checkbox"/> Attachment P: Public Notice |
| <input checked="" type="checkbox"/> Attachment G: Process Description | <input type="checkbox"/> Attachment Q: Business Confidential Claims |
| <input 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 checked="" 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.

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

ATTACHMENT A

Current Business Certificate

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

ISSUED TO:
**DOMINION TRANSMISSION INC
445 W MAIN ST
CLARKSBURG, WV 26301-2843**

BUSINESS REGISTRATION ACCOUNT NUMBER: 1038-3470

This certificate is issued on: 06/8/2011

*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

Attachment B - Aerial Map - Craig Station
Dominion Transmission, Inc



ATTACHMENT C

Startup and Installation Schedule

ATTACHMENT C

Schedule of Planned Installation and Start-Up

Unit	Installation Schedule	Startup Schedule
18 MMSCFD Dehydration Unit	8/1/2015	11/1/2015
Reboiler	8/1/2015	11/1/2015
Thermal Oxidizer	8/1/2015	11/1/2015

ATTACHMENT D

Regulatory Discussion

ATTACHMENT D - REGULATORY APPLICABILITY

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

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

This review is presented to supplement and/or add clarification to the information provided in the West Virginia Department of Environmental Protection (WVDEP) Rule 13 (R-13) permit application forms. In addition to providing a summary of applicable requirements, this section of the application also provides non-applicability determinations for certain regulations, allowing the WVDEP to confirm that identified regulations are not applicable to the proposed project at the Craig Compressor Station. Note that explanations of non-applicability are limited to those regulations for which there may be some question of applicability specific to the operations at the Craig Compressor Station. Regulations that are categorically non-applicable are not discussed (e.g., NSPS Subpart J, Standards of Performance for Petroleum Refineries).

Prevention of Significant Deterioration (PSD) Source Classification

Federal construction permitting programs regulate new and modified sources of attainment pollutants under PSD and new and modified sources of non-attainment pollutants under Non-Attainment New Source Review (NNSR). The Craig Compressor Station is located in Ritchie County, West Virginia, which is designated as in attainment/unclassifiable for all pollutants. Therefore, PSD permitting is potentially applicable to the facility. PSD permitting in West Virginia is regulated under Title 45, Series 14, West Virginia Code of State Regulations (45 CSR 14).

PSD permitting applies to construction of new major stationary sources or any physical change in, or change in the method of operation of an existing major stationary source that results in a significant emissions increase. A major stationary source for PSD is defined as:

- > Any source in one of the listed source categories in the definition of “major stationary source” per 45 CSR 14-2.43 with the potential-to-emit (PTE) of 100 tons per year (tpy) or more of traditionally regulated pollutants, or
- > Any source not in one of the listed source categories with a PTE of 250 tpy or more of any traditionally regulated pollutant.

Natural gas compressor stations are not included in the listed source categories under 45 CSR 14-2.43, so the PSD major source threshold (MST) applicable to the Craig Compressor Station is 250 tpy. Because the existing facility-wide PTE for each pollutant is less than 250 tpy, the Craig Compressor Station is an existing minor source under PSD. PSD applicability is determined based on whether a physical change and/or a change in the method of operation results in an increase of potential air emissions above the MST of 250 tpy of a PSD-regulated pollutant.

This project involves replacement of the existing 25 million standard cubic feet (MMscfd) triethylene glycol (TEG) dehydrator with a smaller unit (18 MMscfd). The potential emissions of PSD pollutants for the new dehydration unit are well below the PSD permitting threshold. As such, PSD permitting is not triggered by this construction activity.

Title V Operating Permit Program

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in 45 CSR 30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single hazardous air pollutant (HAP), 25 tpy of any combination of HAPs, and 100 tpy of all other regulated pollutants.¹ The potential emissions of NO_x and VOC are above the 100 tpy threshold at this facility. Therefore, the Craig Compressor Station is a major source for Title V purposes. The Craig Compressor Station currently operates under Title V permit R30-08500004-2011, issued on December 20, 2011. Attachment S provides a request for incorporation of this project (replacement of existing dehydration unit and associated flare with new dehydration unit and associated thermal oxidizer) into the Title V permit upon completion of construction.

New Source Performance Standards

New Source Performance Standards (NSPS), located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the proposed project at the Craig Compressor Station.

NSPS Subparts D, Da, Db, and Dc - Industrial - Commercial - Institutional Steam Generating Units

These subparts apply to steam generating units of various sizes, all greater than 10 MMBtu/hr. The proposed reboiler will have a rated capacity of 0.75 MMBtu/hr and therefore the requirements of these subparts do not apply.

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

Subpart OOOO applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011. This NSPS was published in the Federal Register on August 16, 2012, with an effective date of October 15, 2012. On July 1, 2014, the EPA proposed second revisions to NSPS OOOO.

The list of potentially affected facilities includes:

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

The Craig Compressor Station is proposing to replace the dehydration unit, which is not an affected facility under this subpart. As such, Subpart OOOO is not applicable to the project.

¹ EPA's Tailoring Rule had established a Title V major source threshold of 100,000 tpy of greenhouse gas pollutants or GHGs (on a carbon dioxide equivalent [CO₂e] basis). However, on June 23, 2014, the U.S. Supreme Court issued its decision in *Utility Air Regulatory Group v. EPA*, whereby the Court said that EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. Case No. 12-1146, decided June 23, 2014. http://www.supremecourt.gov/opinions/13pdf/12-1146_4g18.pdf.

Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than the NSPS developed for steam generating units (Subparts D, Da, Db, Dc) and natural gas processing plants (Subpart OOOO), the applicability of a particular NSPS to the proposed project at the Craig Compressor Station can be readily ascertained based on the industrial source category covered. All other NSPS are categorically not applicable to the proposed change.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

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

The following NESHAP are potentially applicable to the proposed project at the Craig Compressor Station:

- > 40 CFR Part 63 Subpart HH – Oil and Natural Gas Production Facilities
- > 40 CFR Part 63 HHH – Natural Gas Transmission and Storage Facilities
- > 40 CFR Part 63 Subpart DDDDD – Industrial, Commercial, and Institutional Boilers – Major Sources
- > 40 CFR Part 63 Subpart JJJJJ – Industrial, Commercial, and Institutional Boilers – Area Sources

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

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

This subpart applies to affected emission points that are located at facilities that are major and area sources of HAP and either process, upgrade, or store hydrocarbon liquids prior to custody transfer or that process, upgrade, or store natural gas prior to entering the natural gas transmission and storage source category. For purposes of this subpart, natural gas enters the natural gas transmission and storage source category after the natural gas processing plant, if present. As such, this subpart applies to affected units located at natural gas processing facilities and/or any production facilities upstream.

The Craig Compressor Station is an area source of HAP emissions. The station processes natural gas in its glycol dehydrator prior to the point of custody transfer to transmission pipelines and therefore, the provisions of NESHAP Subpart HH are applicable to the Craig Compressor Station. The benzene emissions from the glycol dehydrator vents are less than 0.90 megagrams per year (1 tpy), as indicated in the emission calculations in Attachment N. Dominion is claiming the exemption specified in 40 CFR 63.764(e)(1)(ii) and therefore is not subject to the control requirements for glycol dehydration unit process vents in 40 CFR 63.675. The Craig Compressor Station is only required to keep records of the actual annual average natural gas throughput (in terms of natural gas flowrate to the glycol dehydration unit per day) or actual average benzene emissions (in terms of benzene emissions per year) from the dehydrator, per 40 CFR 63.774(d)(1).

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

This standard applies to affected units at natural gas transmission and storage facilities that are major sources of HAP emissions located downstream of the point of custody transfer (after processing and/or treatment in the production sector), but upstream of the distribution sector. As previously indicated, the Craig Compressor Station is a gathering facility located upstream of the point of custody and is an area (minor) source of HAPs; therefore, the provisions of NESHAP Subpart HHH do not apply.

40 CFR 63 Subpart DDDDD - Industrial, Commercial, and Institutional Boilers (Major Source Boiler MACT)

This MACT standard applies to industrial, commercial, and institutional boilers and process heaters of various sizes and fuel types located at major sources of HAP. The Craig compressor station is an area source of HAP emissions, therefore this subpart does not apply.

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

This MACT standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types located at area sources of HAP. Gas-fired boilers are exempt from the requirements under 40 CFR 63.11195(e). Therefore, this subpart does not apply to the proposed gas-fired reboiler.

Non-Applicability of All Other NESHAP

Similar to NSPS, NESHAP are developed for particular industrial source categories. Other than the NESHAP developed for boilers and heaters (Subparts DDDDD, and JJJJJ) and natural gas sector facilities (Subpart HH, HHH), the applicability of a particular NESHAP to the proposed project at the Craig Compressor Station can be readily ascertained based on the industrial source category covered. All other NESHAP are categorically not applicable to the proposed change.

West Virginia SIP Regulations

The proposed project at the Craig Compressor Station is potentially subject to regulations contained in the West Virginia Code of State Regulations, Chapter 45 (Code of State Regulations). West Virginia regulations potentially applicable to the proposed project are discussed below.

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

45 CSR 2 applies to fuel burning units, defined as equipment burning fuel “for the primary purpose of producing heat or power by indirect heat transfer”. The reboiler at the Craig Compressor Station meets this definition and is therefore potentially subject to 45 CSR 2. Per 45 CSR 2-3, opacity of emissions from the reboiler shall not exceed 10 percent based on a six minute block average. Per 45 CSR 2-11.1, the reboiler is exempt from the PM emissions limits in sections 4, 5, 6, 8 and 9 of the rule because it has a rated heat input capacity less than 10 MMBtu/hr.

45 CSR 6: To Prevent and Control Air Pollution from Combustion of Refuse

45 CSR 10 sets forth requirements for limiting emissions from incineration which is defined as “the destruction of combustible refuse by burning in a furnace designed for that purpose. For the purposes of this rule, the destruction of any combustible liquid or gaseous material by burning in a flare or flare stack, thermal oxidizer, or thermal catalytic oxidizer stack shall be considered incineration.” The proposed thermal oxidizer meets this definition and is therefore subject to this regulation.

The thermal oxidizer will be subject to the particulate matter (PM) emission limits in 45 CSR 6-4.1. In addition, opacity from the thermal oxidizer will be limited to 20% per 45 CSR 6-4.3 except as provided in 45 CFR 6-4.4. Operating instructions will be posted as required by 45 CSR 6-4.9.

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

45 CSR 10 applies to fuel burning units, defined as equipment burning fuel “for the primary purpose of producing heat or power by indirect heat transfer”. The reboiler at the Craig Compressor Station meets this definition and is

therefore potentially subject to 45 CSR 10. However, per 45 CSR 10-10.1, the reboiler is exempt from the SO₂ emissions limits because it has a rated heat input capacity less than 10 MMBtu/hr.

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

According to 45 CSR 13, “No person shall cause, suffer, allow or permit the construction, modification, or relocation of any stationary source to be commenced without notifying the Secretary of such intent and obtaining a permit to construct, modify, or relocate the stationary source as required in this rule or any other applicable rule promulgated by the Secretary.” In compliance with this requirement, Dominion is submitting the attached permit application for the replacement of the dehydration unit at the Craig Compressor Station.

45 CSR 16: Standards of Performance for New Stationary Sources

This rule adopts the standards of performance for new stationary sources set forth in 40 CFR Part 60 by reference. Potentially applicable NSPS are discussed above.

45 CSR 21: To Prevent and Control Air Pollution from the Emission of Volatile Organic Compounds

45 CSR 21 is intended to require reasonably available control technology for VOC sources in Putnam, Kanawha, Cabell, Wayne, and Wood Counties. As such, these requirements do not apply to VOC sources in Ritchie County.

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

West Virginia regulates the emissions of toxic air pollutant emissions through 45 CSR 27. A facility that discharges, or may discharge, a toxic pollutant into the open atmosphere in quantities greater than those delineated in Table A of this rule is required to employ Best Available Technology (BAT) on all chemical processing equipment emitting the pollutant. The TEG dehydrator meets the definition of chemical processing equipment and is potentially subject to this regulation for benzene emissions. The potential to emit threshold quantity listed for benzene is 1,000 pounds per year. Emissions of benzene from the TEG dehydrator are less than 1,000 pounds per year. As such, this regulation does not apply to the project at the Craig Compressor Station.

45 CSR 34: Emission Standards for Hazardous Air Pollutants

This rule adopts the National Emissions Standards for Hazardous Air Pollutants (NESHAPs by reference. Potentially applicable NESHAP are discussed above.

ATTACHMENT E

Plot Plan



NOTE: THE NUMBER OF DRUMS, TYPES OF DRUMS, AND POSITION ON SITE CAN VARY DURING THE COURSE OF THE YEAR DEPENDENT ON OPERATIONAL NEEDS.

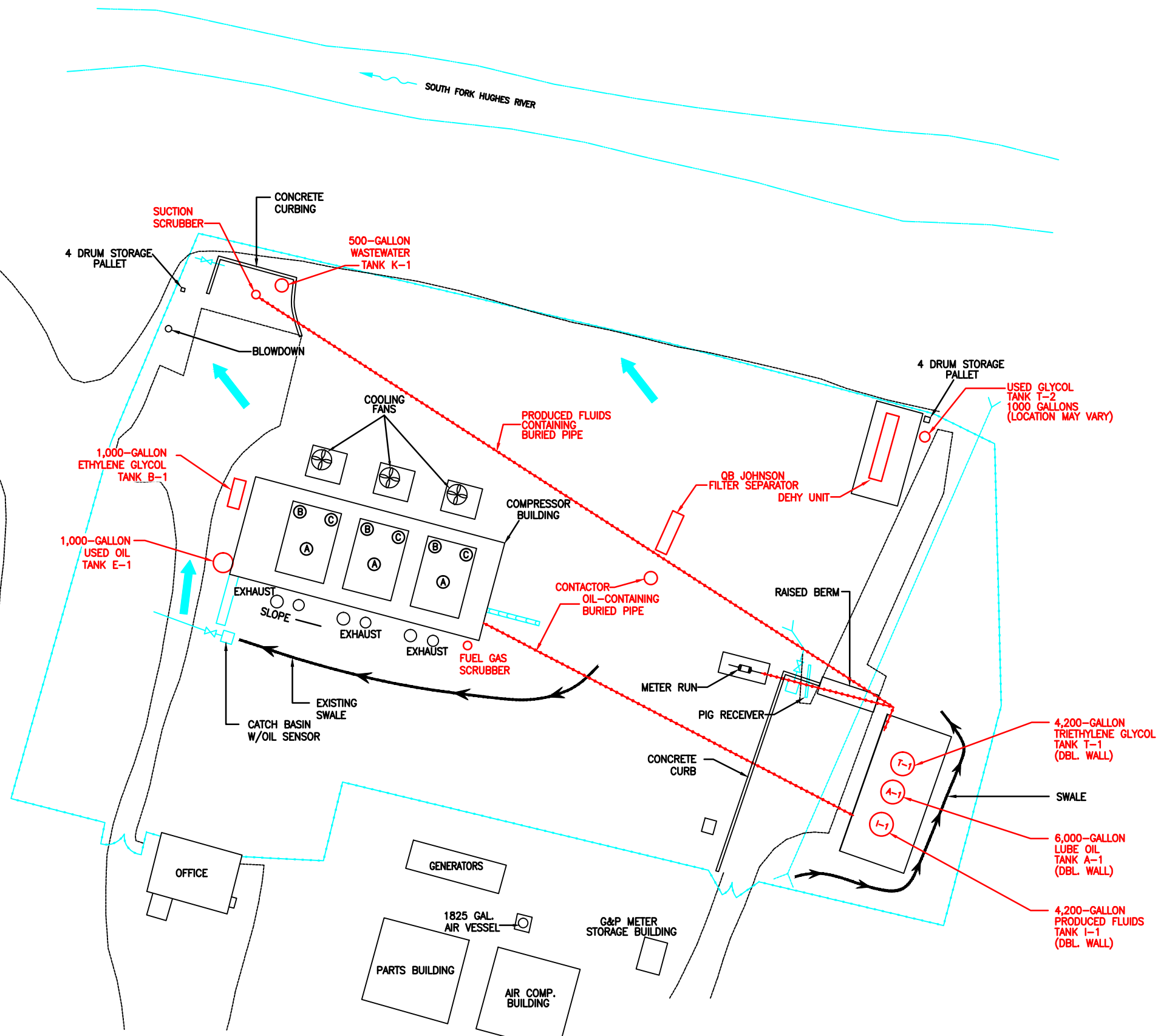
OIL CONTAINING MECHANICAL EQUIPMENT		
QUANTITY	MATERIAL	LOCATION
(3) 90-GALLON EA.	LUBE OIL SYSTEM	800 HP AJAX COMP. ENGINES (A) COMPRESSOR BUILDING
(3) 109-GALLON EA.	PRODUCED FLUIDS	UNIT 18" DISCHARGE SCRUBBERS (B)
(3) 176-GALLON EA.	PRODUCED FLUIDS	UNIT 24" SUCTION SCRUBBERS (C)
57-GALLON EA.	PRODUCED FLUIDS	FUEL GAS SCRUBBER
555-GALLON EA.	PRODUCED FLUIDS	SUCTION SCRUBBER
231-GALLON EA.	PRODUCED FLUIDS	QB JOHNSON FILTER SEPARATOR
(2) 50-GALLON EA.	USED OIL	DRUM VACUUM UNITS IN COMPRESSOR BUILDING

NOTE:
OIL VOLUMES FOR DOT REGULATED PIPELINE EQUIPMENT ARE LISTED IN THE PLAN.

LEGEND:

- ABOVEGROUND OIL CONTAINING PIPE
- UNDERGROUND OIL CONTAINING PIPE
- FLOW DIRECTION

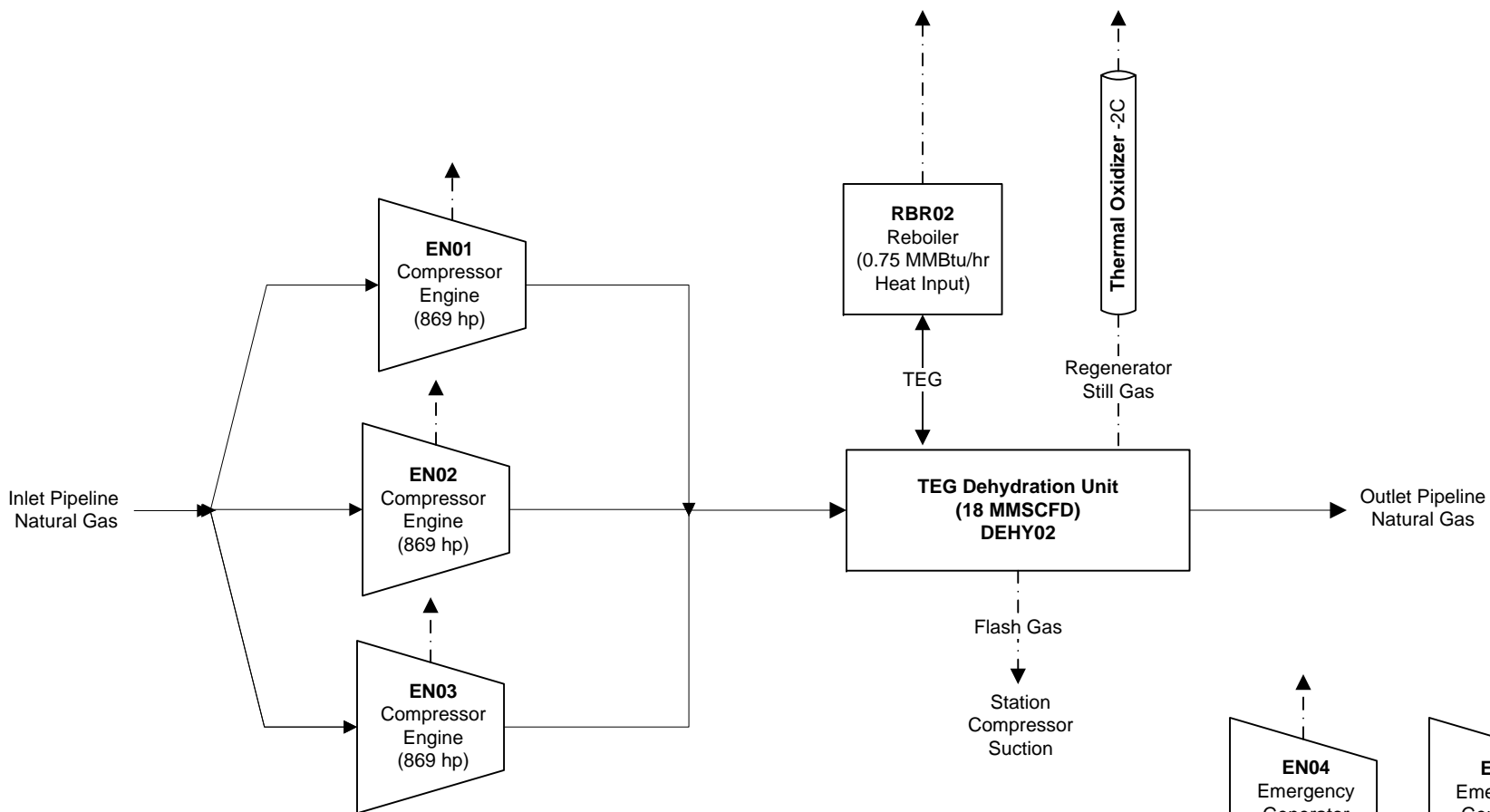
REFERENCE: MSES CONSULTANTS INC. DWG. NO. 00-102-1.



SYM.	DATE	BY	REVISION DESCRIPTION	PRJ/TSK	APP.	SCALE	1"=40'	DATE	Dominion Transmission, Inc.			
5	02/26/14	TBB	PER TIM JACKSON MARKUPS			DRAWN	DJF		445 West Main St. Clarksburg, West Virginia 26301 / Phone: (304) 623-8000			
4	03/04/13	TBB	PER TIM JACKSON MARKUPS			CHECKED			TITLE: CRAIG COMPRESSOR STATION			
3	02/05/13	TBB	REVISED USING MSES VENDOR DWG# 11-557-1						RITCHIE COUNTY, WEST VIRGINIA			
2	3/30/12	DRC	PER TIM JACKSON MARKUPS						ENVIRONMENTAL EMERGENCY SITE PLAN			
1	3/15/10	JDB	PER RUSS EVANS MARKUPS						DIR:	GROUP	DWG. NO.	REV.
									FILE:	PRJ/TSK:	PD	X9773
												5

ATTACHMENT F

Detailed Process Flow Diagram



- | | | | | | |
|---|---|---|---|---|--|
| TK04
Vertical Antifreeze Tank
(1000 gallons) | TK10
TEG Tank
(4200 gallons) | TK11
Vertical Drip Gas Tank
(4200 gallons) | TK12
Vertical Engine Oil Tank
(6000 gallons) | TK13
Vertical Used Oil Tank
(1000 gallons) | TK14
Vertical Wastewater Tank
(500 gallons) |
|---|---|---|---|---|--|

Flow Legend

- ▶ Gas/Water/Condensate Flow
- - - - -▶ Stack Emissions

Dominion Transmission, Inc.

Process Flow Diagram
Craig Compressor Station

Trinity
Consultants

March 2015
153902.0022

ATTACHMENT G

Process Description

ATTACHMENT G - PROCESS DESCRIPTION

Natural gas enters the station via a pipeline system and is compressed using the three (3) natural gas-fired compressor engines (identified as EN01 – EN03 and rated at 869 hp each). The compressed natural gas stream is then processed through the triethylene glycol (TEG) dehydration unit (with associated reboiler), identified as DEHY02. The dehydration unit will introduce TEG to the gas stream in a contact tower to absorb water vapor from the gas to a level not exceeding 7 pounds per million standard cubic feet (lb/MMscf). The TEG is then sent to the natural gas-fired reboiler, rated at 0.75 MMBtu/hr heat input (RBR02). The water is evaporated from the TEG in the reboiler and discharged, and the glycol is then sent back to the contact tower for reuse. The dehydration unit is equipped with a thermal oxidizer (2C) which will control emissions from the dehydration still vent, and the emissions from the flash tank will be routed to the station compressor suction. The natural gas stream from the contact tower flows into the pipeline to be transported further along the pipeline system. The station is also equipped with six (6) storage tanks and two (2) emergency backup generators, rated at 225 hp each.

A process flow diagram is included as Attachment F.

ATTACHMENT I

Emission Units Table

Attachment I

Emission Units Table

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

Emission Unit ID ¹	Emission Point ID ²	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type ³ and Date of Change	Control Device ⁴
DEHY02	DEHY02	Dehydration Unit (Regenerator Still)	2015	18 MMSCFD	New	2C
RBR02	RBR02	Reboiler (associated with Dehydration Unit)	2015	0.75 MMBtu/hr	New	None
2C	2C	Thermal Oxidizer	2015	95% Destruction Efficiency	New	None
DEHY01	DEHY01	Dehydration Unit (Regenerator Still)	1984	25 MMSCFD	Removal	1C
RBR01	RBR01	Reboiler (associated with Dehydration Unit)	1984	1 MMBtu/hr	Removal	None
1C	1C	Thermal Oxidizer	1984	95% Destruction Efficiency	Removal	None

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

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

³ New, modification, removal

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

ATTACHMENT J

Emission Points Data Summary Sheet

Attachment J

EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ⁴)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
DEHY02	Upward Vertical Stack	DEHY02	Dehydration Unit (Emissions only)	2C	Thermal Oxidizer	NA	NA	VOC Total HAP CO ₂ e	174 48 3,433	761 211 15,038	6.83 2.27 116	30 9.95 508	Gas/Vapor	O ^A O ^A O ^{A,B}	
RBR02	Upward Vertical Stack	RBR02	Reboiler	NA	NA	NA	NA	NO _x CO PM/PM10/PM2.5 SO ₂ VOC Total HAP CO ₂ e	0.11 0.09 0.008 0.0007 0.006 0.002 129	0.48 0.41 0.04 0.003 0.03 0.009 556	0.11 0.09 0.008 0.0007 0.006 0.002 129	0.48 0.41 0.04 0.003 0.03 0.009 556	Gas/Vapor	O ^C O ^C O ^C O ^C O ^C O ^C O ^D	
2C	Upward Vertical Stack	2C	Thermal Oxidizer	NA	NA	NA	NA	NO _x CO PM/PM10/PM2.5 SO ₂ CO ₂ e	N/A N/A	N/A	0.33 0.27 0.02 0.002 381	1.42 1.2 0.11 0.009 1,667	Gas/Vapor	O ^C O ^C O ^C O ^C O ^D	

A- GRI-GLYCalc

B- 40 CFR 98, Subpart A, global warming potentials.

C- AP Section 1.4 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4 July 1998.

D- 40 CFR 98, Subpart C for natural gas fired combustion,

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

[illegible]¹ Give at operating conditions. Include inerts.

² Release height of emissions above ground level.

ATTACHMENT K

Fugitive Emissions Data Summary Sheet

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

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

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

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? <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 type="checkbox"/> Yes <input checked="" 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 type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input 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	NA	--	--	--	--	--
Unpaved Haul Roads	NA	--	--	--	--	--
Storage Pile Emissions	NA	---	---	---	---	---
Loading/Unloading Operations	NA	---	---	---	---	---
Wastewater Treatment Evaporation & Operations	NA	---	---	---	---	---
Equipment Leaks	NA	---	---	---	---	---
General Clean-up VOC Emissions	NA	---	---	---	---	---
Other	NA	---	---	---	---	---

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

NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET

General Glycol Dehydration Unit Data		Manufacturer and Model		Inegral	
		Max Dry Gas Flow Rate (mmscf/day)		18 MMscf/day	
		Design Heat Input (mmBtu/hr)		0.75 MMBtu/hr	
		Design Type (DEG or TEG)		TEG	
		Source Status ²		NS	
		Date Installed/Modified/Removed ³		November 2015	
		Regenerator Still Vent APCD ⁴		TO	
		Fuel HV (Btu/scf)		1,000	
		H ₂ S Content (gr/100 scf)		0 ppm	
		Operation (hrs/yr)		8,760	
Source ID # ¹	Vent	Reference ⁵	Potential Emissions ⁶	lbs/hr	tons/yr
RBR02	Reboiler Vent	AP	NO _x	0.11	0.48
		AP	CO	0.09	0.41
		AP	VOC	0.006	0.03
		AP	SO ₂	0.0006	0.003
		AP	PM ₁₀	0.008	0.04
DEHY02	Glycol Regenerator Still Vent	GR	VOC	6.8	30
		GR	Benzene	0.05	0.2
		GR	Ethylbenzene	0.04	0.2
		GR	Toluene	0.3	1.1
		GR	Xylenes	1.8	7.8
		GR	n-Hexane	0.05	0.2

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™

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-GLYCalc™ (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-GLYCalc™ 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-GLYCalc™ is available on our website.**

West Virginia Department of Environmental Protection

DIVISION OF AIR QUALITY : (304) 926-0475

Division of Air Quality

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

40 CFR Part 63; Subpart HH & HHH Registration Form

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): 18 MMscf/day			
Affected facility actual annual average hydrocarbon liquid throughput: (bbl/day): N/A			
The affected facility processes, upgrades, or stores hydrocarbon liquids prior to custody transfer.			Yes 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.			Yes No
The affected facility is: <input type="checkbox"/> prior to a NG processing plant <input type="checkbox"/> a NG processing plant <input 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 No
The affected facility exclusively processes, stores, or transfers black oil.			Yes No
Initial producing gas-to-oil ratio (GOR): _____ scf/bbl API gravity: _____ degrees			
Section B: Dehydration Unit (if applicable) ¹			
Description: Inegral 18 MMscf/day Dehydration Unit			
Date of Installation: 2015	Annual Operating Hours: 8,760	Burner rating (MMBtu/hr): 0.75 MMBtu/hr	
Exhaust Stack Height (ft): 40	Stack Diameter (ft): 1.9	Stack Temp. (°F): 1,637	
Glycol Type: <input checked="" type="checkbox"/> TEG <input type="checkbox"/> EG <input type="checkbox"/> Other:			
Glycol Pump Type: <input type="checkbox"/> Electric <input checked="" type="checkbox"/> Gas If gas, what is the volume ratio? <u>0.080</u> ACFM/gpm			
Condenser installed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Exit Temp. _____ °F Condenser Pressure _____ psig			
Incinerator/flare installed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Destruction Eff. <u>95</u> %			
Other controls installed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Describe:			
Wet Gas ² : Gas Temp.: <u>120</u> °F Gas Pressure <u>390</u> 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 _____ Design <u>18 MMscf/day</u> (Downstream of Contact Tower) Water Content <u>7</u> lb/MMSCF			
Lean Glycol: Circulation rate (gpm) Actual ³ _____ Maximum ⁴ <u>3.0 gal/lb H2O</u> Pump make/model: Kimray 20020SC			
Glycol Flash Tank (if applicable): Temp.: <u>150</u> °F Pressure <u>60</u> psig Vented? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If no, describe vapor control:			
Stripping Gas (if applicable): Source of gas: Dry Gas Rate <u>39.984</u> 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 checked="" type="checkbox"/>	Subject to Subpart HH – Benzene Exemption Claimed
	<input type="checkbox"/>	Subject to Subpart HHH
	<input type="checkbox"/>	Not Subject
	because:	<div><input type="checkbox"/> < 10/25 TPY</div> <div><input type="checkbox"/> Affected facility exclusively handles black oil</div> <div><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</div> <div><input type="checkbox"/> No affected source is present</div>

ATTACHMENT M

Air Pollution Control Device Sheet

AIR POLLUTION CONTROL DEVICE

Vapor Combustion Control Device Sheet

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

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.

General Information

1. Control Device ID#: 2C	2. Installation Date: 2015 <input checked="" type="checkbox"/> New	
3. Maximum Rated Total Flow Capacity: 174,960 scf/d	4. Maximum Design Heat Input: 3.19 MMBtu/hr	5. Design Heat Content: 409 Btu/scf

Control Device Information

6. Select the type of vapor combustion control device being used: <input type="checkbox"/> Enclosed Combustion Device <input type="checkbox"/> Elevated Flare <input type="checkbox"/> Ground Flare <input checked="" type="checkbox"/> Thermal Oxidizer <input type="checkbox"/> Completion Combustion Device	
7. Manufacturer: Questor Technologies Inc. Model No.: Q100	8. Hours of operation per year: 8,760
9. List the emission units whose emissions are controlled by this vapor combustion control device: Emission Units: DEHY02	

10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
DEHY02	Dehydration Unit Still		

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

11. Assist Type	12. Flare Height	13. Tip Diameter	14. Was the design per §60.18?
<input type="checkbox"/> Steam - <input type="checkbox"/> Air - <input type="checkbox"/> Pressure - <input checked="" type="checkbox"/> Non -	40 ft	23 in	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Waste Gas Information

15. Maximum waste gas flow rate (scfm):	16. Heat value of waste gas stream (BTU/ft3)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (ft/s)
121.5 scfm	409 Btu/ft3	1,637 °F	47 ft/s

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

Pilot Information				
20. Type/Grade of pilot fuel:	21. Number of pilot lights:	22. Fuel flow rate to pilot flame per pilot (scf/hr):	23. Heat input per pilot (BTU/hr):	24. Will automatic re-ignition be used?
Pipeline quality Natural Gas	1	~1,250 scf/hr	60,000 Btu/hr	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
25. If automatic re-ignition will be used, describe the method: N/A				
26. Describe the method of controlling flame: There are 3 flame cells to stop the main flame front and two (2) 2" flame arrestors on the piping from the drip pot to the burner assembly.				
27. Is pilot flame equipped with a monitor to detect the presence of the flame? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		28. If yes, what type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infra-Red <input type="checkbox"/> Ultra Violet <input type="checkbox"/> Camera with monitoring control room <input type="checkbox"/> Other, describe:		

29. Pollutant(s) Controlled	30. % Capture Efficiency	31. Manufacturer's Guaranteed Control Efficiency (%)
HC	100	>95
VOC	100	>95
HAP	100	>95
32. Has the control device been tested by the manufacturer and certified? Pending Testing		
33. Describe all operating ranges and maintenance procedures required by the manufacturer to maintain warranty: See Attached		
34. Additional Information Attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Please attach a copy of manufacturer's data sheet. Please attach a copy of manufacturer's drawing. Please attach a copy of the manufacturer's performance testing.		

Table M-1
Section 60.18 Demonstration

Craig	
Type	Unassisted
Throat Diameter (inches)	22.8

GLYCalc		7290	scf/h
	INPUT	Compound Net	Mixture Net
	mole	Heating Value	Heating Value
Compound	percent	(Btu/scf)	(Btu/scf)
water	55.400	0	0.0
carbon dioxide	0.116	0	0.0
nitrogen	0.955	0	0.0
methane	30.200	913	275.7
ethane	5.360	1641	88.0
propane	2.370	2385	56.5
Isobutane	0.341	3105	10.6
n-butane	0.741	3113	23.1
Isopentane	0.231	3716	8.6
n-pentane	0.215	3709	8.0
cyclopentane	0.001	3516	0.0
n-hexane	0.063	4412	2.8
cyclohexane	0.053	4185	2.2
other hexanes	0.081	4870	3.9
heptane	0.175	4925	8.6
benzene	0.061	3601	2.2
toluene	0.295	4284	12.6
ethylbenzene	0.043	4977	2.2
xylene	1.760	4980	87.6
octane (C8+)	1.450	5804	84.2
hydrogen sulfide	0.000	596	0.0
TOTALS:	100		676.8

Assist gas requirements for nonassisted flare per 40 CFR 60.18(c)(3):

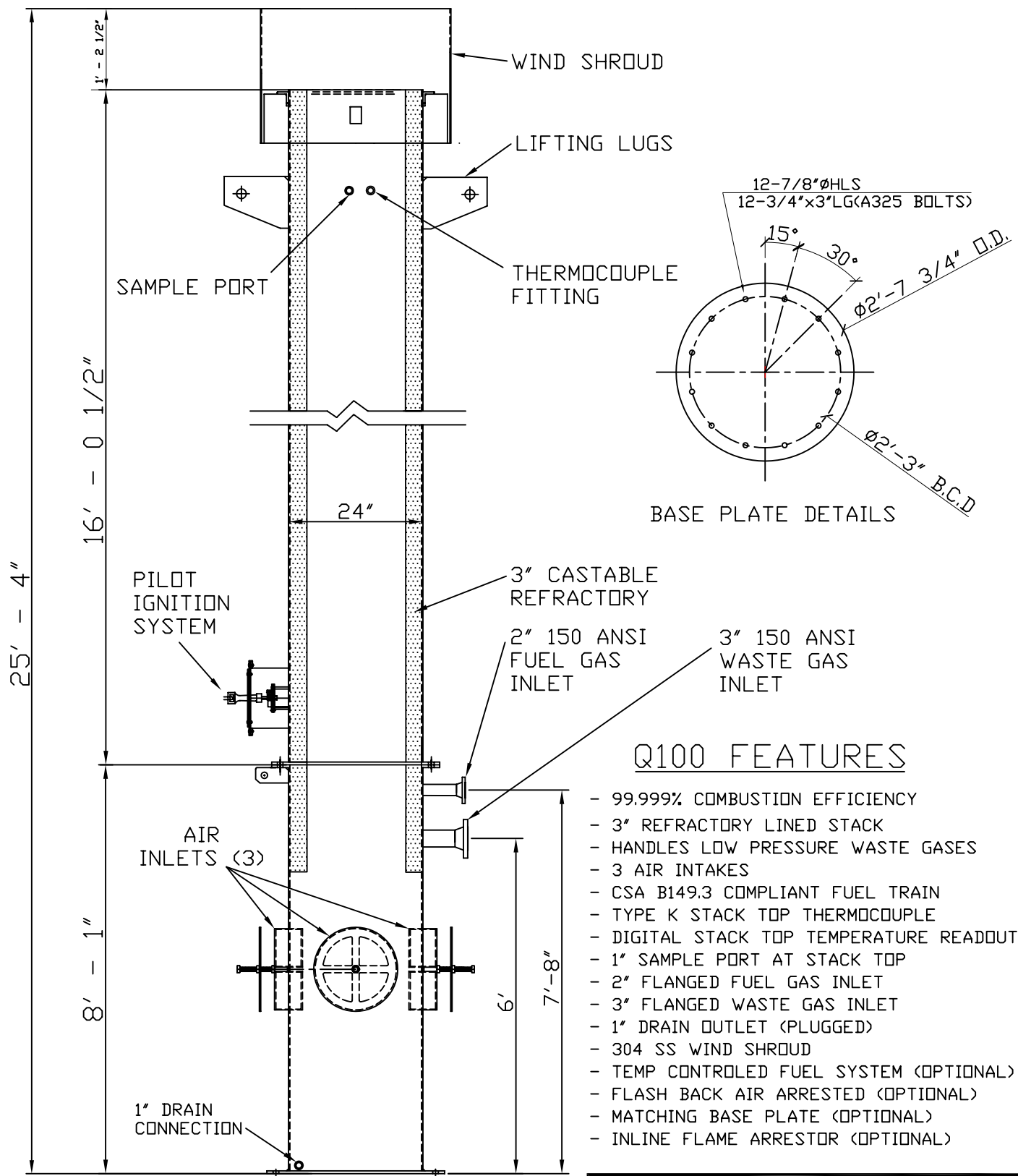
Minimum allowable net heating value	200	Btu/scf
Additional assist gas required	0.0	scfh
Assist (fuel) gas supplied	0	scfh
Composite net heating value	678.36	Btu/scf

Maximum allowable flare exit velocity (V_{max}) for nonassisted flare per 40 CFR 60.18(f)(5):

Lower (Net) Heating Value	Btu/scf	MJ/scm
(1000 Btu/scf = 37.3 MJ/scm)	677	25.2
$V_{max} = 10 \sqrt{[LHV+28.2]/31.7}$ for V_{max} in m/sec and LHV in MJ/scm	m/sec	ft/sec
(1 m = 3.28 ft)	50.7	166.3
V_{max} limit based on 40 CFR 60.18(b)(4)(iii)	50.7	166.3

Actual flare exit velocity:

Total volumetric flow (vent gas + assist gas in scfh/3600 sec/hr) =	2.03	scf/sec
Total volumetric flow at 180F & atmospheric pressure =	2.62	cf/sec
Flare exit cross-sectional area based on throat diameter =	2.84	ft ²
Velocity = volumetric flow / cross-sectional area =	0.9	ft/sec



Q100 FEATURES

- 99.999% COMBUSTION EFFICIENCY
- 3" REFRACTORY LINED STACK
- HANDLES LOW PRESSURE WASTE GASES
- 3 AIR INTAKES
- CSA B149.3 COMPLIANT FUEL TRAIN
- TYPE K STACK TOP THERMOCOUPLE
- DIGITAL STACK TOP TEMPERATURE READOUT
- 1" SAMPLE PORT AT STACK TOP
- 2" FLANGED FUEL GAS INLET
- 3" FLANGED WASTE GAS INLET
- 1" DRAIN OUTLET (PLUGGED)
- 304 SS WIND SHROUD
- TEMP CONTROLLED FUEL SYSTEM (OPTIONAL)
- FLASH BACK AIR ARRESTED (OPTIONAL)
- MATCHING BASE PLATE (OPTIONAL)
- INLINE FLAME ARRESTOR (OPTIONAL)

ELEVATION

NOT TO SCALE

APPROXIMATE WEIGHT = 6,000 LBS



QUESTOR TECHNOLOGY INC.

510, 100 - 4th Ave. SW
CALGARY, ALBERTA, T2P 3K7
PHONE (403) 571-1530 FAX (403) 571-1539

Q100 TYPICAL DETAILS

Q100

DWN. BY: J.VESSO

DATE: 03/01/2005

www.questortech.com

APP. BY: D.MOTYKA

DATE: 03/01/2005

DWG.# BID

REV.#: 0



QUESTOR Q100 INCINERATOR

TECHNICAL SPECIFICATIONS

Design Basis

Maximum throughput:	100,000 scf/d of methane equivalent gas
Fuel requirement:	(varies depending upon waste gas composition)
Design operating temperature:	600 to 1200 °C

Questor Q100 Incinerator Detail

Total height:	25 ½ feet (7.7 meters)
Total weight:	6,000 lbs (2,120 kg)
Foot print:	2 feet – 7 ¾ inch Dia (0.86 m Dia)
Number of sections:	3 – Stack and air induction
Stack material:	A36 - Refractory lined
Stack OD:	24.0 inches (61 cm)
Stack Refractory I.D.:	17.5 inches (44.5 cm)
Stack length:	16.0 feet (4.9 m)
Stack wall thickness:	0.25 inches (6.35 mm)
Air induction material:	A36
Air induction OD:	24 inches (61 cm)
Air induction length:	8 feet – 5 inches (2.5 m)
Air induction wall thickness:	0.500 inches (12.7 mm)
Wind shroud:	Stainless steel, 2 feet – 10 inches OD
Flanges	A105 BWRP
Bolting	A335

Refractory Specification

Type:	4LI
Thickness:	3 inches
Manufacturer:	Rescocast
Maximum working temperature:	2600 °F 1427 °C

Gas Supply Connections

Waste gas:	3 inch 150ANSI RFWN
Pilot gas:	¼ inch NPT
Fuel gas:	2 inch 150ANSI RFWN



QUESTOR Q100 INCINERATOR

TECHNICAL SPECIFICATIONS

Combustion Air

Natural draft: 3 openings c/w flame arrestor cells (Optional)

Pilot Gas Burner

Pilot Ignition Control: Profire 1100,
Number of Igniters: 1
Capacity at 3 psi: 34 m³/d

Fuel Gas Burner

Operating Pressure Range: 5-7 psig
Manifold material: Stainless steel 304

Waste Gas Burner

Operating Pressure Range: Atmospheric
Manifold material: Stainless steel 304

Control Panel – (Solar Power Battery)

NEMA 4, local control panel: 24 VDC controls
Ignition panel: NEMA 4 x enclosure

Surface Preparation

Sand blast: SP6
Top coat: High temperature aluminum



QUESTOR Q100 INCINERATOR

TECHNICAL SPECIFICATIONS

Optional Equipment

Stack top temperature:	2 – Alltemp Type K Thermocouple, Inconel 600 & Hastelloy X thermowell 2 – Rosemount 644 Temperature Transmitters
Air intake flame arrestors:	3 – Circular wrapped corrugated aluminum flash Back arrestors 4" thick x 17" diameter 1 – Zirco burner box housing flame arrestor
Inline flame arrestor:	1 - 3" 150ANSI RF flanged, CS body, SS element Flame arrestor
Matching base plate:	1 – ½" x 2' 7 ¾" plate with matching ⅞" bolt holes
Guy Wires	3 - ⅜" x 100' guy wires

ATTACHMENT N

Supporting Emission Calculations

Craig Compressor Station

Component	Reboiler (tpy)	Glycol Dehy (tpy)	TO (tpy)	Total Emissions (tpy)
Criteria Pollutants				
NO _x	4.84E-01	---	1.42	1.9
CO	4.06E-01	---	1.20	1.60
PM Total	3.67E-02	---	1.08E-01	0.14
PM ₁₀ Total	3.67E-02	---	1.08E-01	0.14
PM _{2.5} Total	3.67E-02	---	---	0.04
SO ₂	2.90E-03	---	8.54E-03	0.01
VOCs	2.66E-02	29.91	---	29.94
Greenhouse Gases				
CO ₂	566	---	1,665	2,231
CH ₄	1.07E-02	20.32	3.14E-02	20.36
N ₂ O	1.07E-03	---	3.14E-03	4.21E-03
CO ₂ e	566	507.91	1,667	2,741
Hazardous Air Pollutants				
Methylnaphthalene (2-)	1.16E-07	---	---	1.16E-07
Methylchloranthrene (3-)	8.70E-09	---	---	8.70E-09
Dimethybenz(a)anthracene (7,12-)	7.74E-08	---	---	7.74E-08
Acenaphthene	8.70E-09	---	---	8.70E-09
Acenaphthylene	8.70E-09	---	---	8.70E-09
Anthracene	1.16E-08	---	---	1.16E-08
Benz(a)anthracene	8.70E-09	---	---	8.70E-09
Benzene	1.02E-05	2.00E-01	---	2.00E-01
Benzo(a)pyrene	5.80E-09	---	---	5.80E-09
Benzo(b)fluoranthene	8.70E-09	---	---	8.70E-09
Benzo(g,h,i)perylene	5.80E-09	---	---	5.80E-09
Benzo(k)fluoranthene	8.70E-09	---	---	8.70E-09
Chrysene	8.70E-09	---	---	8.70E-09
Dibenzo(a,h)anthracene	5.80E-09	---	---	5.80E-09
Dichlorobenzene	5.80E-06	---	---	5.80E-06
Fluoranthene	1.45E-08	---	---	1.45E-08
Fluorene	1.35E-08	---	---	1.35E-08
Formaldehyde	3.63E-04	---	---	3.63E-04
Hexane, n-	8.70E-03	2.27E-01	---	2.36E-01
Indeno(1,2,3-cd)pyrene	8.70E-09	---	---	8.70E-09
Naphthalene	2.95E-06	---	---	2.95E-06
Phenanthrene	8.22E-08	---	---	8.22E-08
Pyrene	2.42E-08	---	---	2.42E-08
Toluene	1.64E-05	1.14	---	1.14
Arsenic	9.67E-07	---	---	9.67E-07
Beryllium	5.80E-08	---	---	5.80E-08
Cadmium	5.32E-06	---	---	5.32E-06
Chromium	6.77E-06	---	---	6.77E-06
Cobalt	4.06E-07	---	---	4.06E-07
Lead	2.42E-06	---	7.12E-06	9.54E-06
Manganese	1.84E-06	---	---	1.84E-06
Mercury	1.26E-06	---	---	1.26E-06
Nickel	1.02E-05	---	---	1.02E-05
Selenium	1.16E-07	---	---	1.16E-07
Ethylbenzene	---	1.93E-01	---	1.93E-01
Trimethylpentane (2,2,4-)	---	3.73E-01	---	3.73E-01
Xylene	---	7.82	---	7.82
Total HAP:	9.13E-03	9.95	7.12E-06	9.96

**Craig Compressor Station
Reboiler**

Source Designation:	
Manufacturer:	Diverse Energy Systems
Year Installed	2015
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,000
Heat Input (MMBtu/hr)	0.750
Fuel Consumption (mmscf/hr):	0.001
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)^a	Potential Emissions	
		(lb/hr)^b	(tons/yr)^c
NO _x	100	1.10E-01	4.84E-01
CO	84	9.27E-02	4.06E-01
SO ₂	0.6	6.62E-04	2.90E-03
PM Total	7.6	8.39E-03	3.67E-02
PM Condensable	5.7	6.29E-03	2.76E-02
PM ₁₀ (Filterable)	1.9	2.10E-03	9.19E-03
PM _{2.5} (Filterable)	1.9	2.10E-03	9.19E-03
VOC	5.5	6.07E-03	2.66E-02
Lead	5.00E-04	5.52E-07	2.42E-06
CO ₂ ^d	116,997	129.17	565.74
CH ₄ ^d	2.2	2.43E-03	1.07E-02
N ₂ O ^d	0.22	2.43E-04	1.07E-03

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
Methylnaphthalene (2-)	2.40E-05	2.65E-08	1.16E-07
3-Methylchloranthrene	1.80E-06	1.99E-09	8.70E-09
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.77E-08	7.74E-08
Acenaphthene	1.80E-06	1.99E-09	8.70E-09
Acenaphthylene	1.80E-06	1.99E-09	8.70E-09
Anthracene	2.40E-06	2.65E-09	1.16E-08
Benzo(a)anthracene	1.80E-06	1.99E-09	8.70E-09
Benzene	2.10E-03	2.32E-06	1.02E-05
Benzo(a)pyrene	1.20E-06	1.32E-09	5.80E-09
Benzo(b)fluoranthene	1.80E-06	1.99E-09	8.70E-09
Benzo(g,h,i)perylene	1.20E-06	1.32E-09	5.80E-09
Benzo(k)fluoranthene	1.80E-06	1.99E-09	8.70E-09
Chrysene	1.80E-06	1.99E-09	8.70E-09
Dibenzo(a,h) anthracene	1.20E-06	1.32E-09	5.80E-09
Dichlorobenzene	1.20E-03	1.32E-06	5.80E-06
Fluoranthene	3.00E-06	3.31E-09	1.45E-08
Fluorene	2.80E-06	3.09E-09	1.35E-08
Formaldehyde	7.50E-02	8.28E-05	3.63E-04
Hexane	1.80E+00	1.99E-03	8.70E-03
Indo(1,2,3-cd)pyrene	1.80E-06	1.99E-09	8.70E-09
Naphthalene	6.10E-04	6.73E-07	2.95E-06
Phenanthrene	1.70E-05	1.88E-08	8.22E-08
Pyrene	5.00E-06	5.52E-09	2.42E-08
Toluene	3.40E-03	3.75E-06	1.64E-05
Arsenic	2.00E-04	2.21E-07	9.67E-07
Beryllium	1.20E-05	1.32E-08	5.80E-08
Cadmium	1.10E-03	1.21E-06	5.32E-06
Chromium	1.40E-03	1.55E-06	6.77E-06
Cobalt	8.40E-05	9.27E-08	4.06E-07
Manganese	3.80E-04	4.20E-07	1.84E-06
Mercury	2.60E-04	2.87E-07	1.26E-06
Nickel	2.10E-03	2.32E-06	1.02E-05
Selenium	2.40E-05	2.65E-08	1.16E-07
Total HAP		2.08E-03	9.13E-03

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

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

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

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

Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor from Subpart C (kg/MMBtu) × (2.205 lb/kg) × HHV (Btu/scf)

Thermal Oxidizer (2C) Emissions Calculations:

Combustor Rating 3.2 MMBtu/hr
Pilot Rating 0.06 MMBtu/hr
Higher Heating Value (HHV) 1,000 Btu/scf

Pollutant	Emission Factors ^a (lb/MMBtu)	Combustor Potential Emissions		Pilot Potential Emissions		TOTAL Potential Emissions	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
NO _x	0.100	3.19E-01	1.40E+00	6.00E-03	2.63E-02	3.25E-01	1.42E+00
CO	0.084	2.68E-01	1.17E+00	5.04E-03	2.21E-02	2.73E-01	1.20E+00
PM/PM ₁₀	0.008	2.42E-02	1.06E-01	4.56E-04	2.00E-03	2.47E-02	1.08E-01
SO ₂	0.0006	1.91E-03	8.38E-03	3.60E-05	1.58E-04	1.95E-03	8.54E-03
Lead	5.00E-07	1.60E-06	6.99E-06	3.00E-08	1.31E-07	1.63E-06	7.12E-06
CO ₂ ^b	116.997	373.2	1,634.7	7.0	30.7	380.2	1,665.5
CH ₄ ^b	0.002	7.03E-03	3.08E-02	1.32E-04	5.79E-04	7.17E-03	3.14E-02
N ₂ O ^b	0.000	7.03E-04	3.08E-03	1.32E-05	5.79E-05	7.17E-04	3.14E-03

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2.

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

Glycol Dehydrator Emission Calculations - GLY-CALC Output¹

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY			
Regenerator Emissions (Controlled)			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Methane	3.8654	92.770	16.9305
Ethane	1.2874	30.898	5.6388
Propane	0.8360	20.064	3.6617
Isobutane	0.1580	3.792	0.6920
n-Butane	0.3438	8.251	1.5058
Isopentane	0.1328	3.187	0.5817
n-Pentane	0.1239	2.974	0.5427
Cyclopentane	0.0004	0.010	0.0018
n-Hexane*	0.0432	1.037	0.1892
Cyclohexane	0.0358	0.859	0.1568
Other Hexanes	0.0558	1.339	0.2444
Heptanes	0.1402	3.365	0.6141
Methylcyclohexane	0.0013	0.031	0.0057
2,2,4-Trimethylpentane*	0.0709	1.702	0.3105
Benzene*	0.0381	0.914	0.1669
Toluene*	0.2171	5.210	0.9509
Ethylbenzene*	0.0368	0.883	0.1612
Xylenes*	1.4878	35.707	6.5166
C8 + Heavier Hydrocarbons	1.9686	47.246	8.6225
Total Emissions	10.8433	260.24	47.494
Total Hydrocarbon Emissions	10.8433	260.24	47.494
Total VOC Emissions	5.6905	136.57	24.924
Total HAP Emissions	1.8939	45.45	8.295

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY			
Flash Tank Emissions (Recycle/Recompression)			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Methane		0.00	0.000
Ethane		0.00	0.000
Propane		0.00	0.000
Isobutane		0.00	0.000
n-Butane		0.00	0.000
Isopentane		0.00	0.000
n-Pentane		0.00	0.000
Cyclopentane		0.00	0.000
n-Hexane*		0.00	0.000
Cyclohexane		0.00	0.000
Other Hexanes		0.00	0.000
Heptanes		0.00	0.000
Methylcyclohexane		0.00	0.000
2,2,4-Trimethylpentane*		0.00	0.000
Benzene*		0.00	0.000
Toluene*		0.00	0.000
Ethylbenzene*		0.00	0.000
Xylenes*		0.00	0.000
C8 + Heavier Hydrocarbons		0.00	0.000
Total Emissions	0.0000	0.00	0.000
Total Hydrocarbon Emissions	0.0000	0.00	0.000
Total VOC Emissions	0.0000	0.00	0.000
Total HAP Emissions	0.0000	0.00	0.000

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY ¹			
Controlled Total Emission Rates (w/ safety factor)			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Methane	4.6385	111.3235	20.3165
Ethane	1.5449	37.0771	6.7666
Propane	1.0032	24.0768	4.3940
Isobutane	0.1896	4.5504	0.8304
n-Butane	0.4126	9.9014	1.8070
Isopentane	0.1594	3.8246	0.6980
n-Pentane	0.1487	3.5683	0.6512
Cyclopentane	0.0005	0.0115	0.0021
n-Hexane*	0.0518	1.2442	0.2271
Cyclohexane	0.0430	1.0310	0.1882
Other Hexanes	0.0670	1.6070	0.2933
Heptanes	0.1682	4.0378	0.7369
Methylcyclohexane	0.0016	0.0374	0.0068
2,2,4-Trimethylpentane*	0.0851	2.0419	0.3727
Benzene*	0.0457	1.0973	0.2003
Toluene*	0.2605	6.2525	1.1411
Ethylbenzene*	0.0442	1.0598	0.1934
Xylenes*	1.7854	42.8486	7.8199
C8 + Heavier Hydrocarbons	2.3623	56.6957	10.3470
Total Emissions	13.0120	312.29	56.992
Total Hydrocarbon Emissions	13.0120	312.29	56.992
Total VOC Emissions	6.8286	163.89	29.909
Total HAP Emissions	2.2727	54.54	9.954

* HAPs

1. Based on GRI GlyCalc 4.0 run at dry gas flowrate of 18 MMscf/day and T and P of 120°F and 390 psig, respectively, controlled by a TO at 95% destruction efficiency
A safety factor of 20% is included in the total.

Glycol Dehydrator Emission Calculations - GLY-CALC Output¹

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY			
Regenerator Emissions (Uncontrolled)			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Methane	77.3078	1855.39	338.608
Ethane	25.7488	617.97	112.780
Propane	16.7191	401.26	73.230
Isobutane	3.1606	75.85	13.843
n-Butane	6.8751	165.00	30.113
Isopentane	2.6559	63.74	11.633
n-Pentane	2.4779	59.47	10.853
Cyclopentane	0.0086	0.21	0.038
n-Hexane*	0.8637	20.73	3.783
Cyclohexane	0.7156	17.17	3.134
Other Hexanes	1.1162	26.79	4.889
Heptanes	2.8035	67.28	12.279
Methylcyclohexane	0.0250	0.60	0.110
2,2,4-Trimethylpentane*	1.4177	34.02	6.210
Benzene*	0.7616	18.28	3.336
Toluene*	4.3412	104.19	19.014
Ethylbenzene*	0.7350	17.64	3.219
Xylenes*	29.7566	714.16	130.334
C8 + Heavier Hydrocarbons	39.3729	944.95	172.453
Total Emissions	216.8628	5204.71	949.859
Total Hydrocarbon Emissions	216.8628	5204.71	949.859
Total VOC Emissions	113.8062	2731.35	498.471
Total HAP Emissions	37.8758	909.02	165.896

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY			
Flash Tank Off Gas Emissions			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Methane	37.1354	891.25	162.653
Ethane	14.9760	359.42	65.595
Propane	10.8554	260.53	47.547
Isobutane	2.2001	52.80	9.636
n-Butane	5.0045	120.11	21.920
Isopentane	1.9284	46.28	8.446
n-Pentane	1.8375	44.10	8.048
Cyclopentane	0.0042	0.10	0.018
n-Hexane*	0.5974	14.34	2.617
Cyclohexane	0.2348	5.64	1.028
Other Hexanes	0.8102	19.44	3.549
Heptanes	1.4711	35.31	6.443
Methylcyclohexane	0.0069	0.17	0.030
2,2,4-Trimethylpentane*	0.9455	22.69	4.141
Benzene*	0.0450	1.08	0.197
Toluene*	0.1752	4.20	0.767
Ethylbenzene*	0.0180	0.43	0.079
Xylenes*	0.5091	12.22	2.230
C8 + Heavier Hydrocarbons	4.2507	102.02	18.618
Total Emissions	83.0054	1992.13	363.564
Total Hydrocarbon Emissions	83.0054	1992.13	363.564
Total VOC Emissions	30.8940	741.46	135.316
Total HAP Emissions	2.2902	54.96	10.031

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY ¹			
Controlled Total Emission Rates (w/ safety factor)			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Methane	137.3318	3295.9642	601.5135
Ethane	48.8698	1172.8742	214.0495
Propane	33.0894	794.1456	144.9316
Isobutane	6.4328	154.3882	28.1758
n-Butane	14.2555	342.1325	62.4392
Isopentane	5.5012	132.0278	24.0951
n-Pentane	5.1785	124.2835	22.6817
Cyclopentane	0.0154	0.3686	0.0673
n-Hexane*	1.7533	42.0797	7.6795
Cyclohexane	1.1405	27.3715	4.9953
Other Hexanes	2.3117	55.4803	10.1252
Heptanes	5.1295	123.1085	22.4673
Methylcyclohexane	0.0383	0.9187	0.1677
2,2,4-Trimethylpentane*	2.8358	68.0602	12.4210
Benzene*	0.9679	23.2301	4.2395
Toluene*	5.4197	130.0723	23.7382
Ethylbenzene*	0.9036	21.6864	3.9578
Xylenes*	36.3188	871.6522	159.0765
C8 + Heavier Hydrocarbons	52.3483	1256.3597	229.2856
Total Emissions	359.8418	8636.20	1576.107
Total Hydrocarbon Emissions	359.8418	8636.20	1576.107
Total VOC Emissions	173.6402	4167.37	760.544
Total HAP Emissions	48.1992	1156.78	211.112

* HAPs

1. Based on GRI GlyCalc 4.0 run at dry gas flowrate of 18 MMscf/day and T and P of 120°F and 390 psig, respectively, controlled by a TO at 95% destruction efficiency. A safety factor of 20% is included in the total.

Pollutant	New Units (tpy)	Existing Units ¹ (tpy)	Δ PTE (tpy)
NOX	1.9	1.9	0
CO	1.6	1.6	0
PM Total	1.45E-01	1.45E-01	0
PM10 Total	1.45E-01	1.45E-01	0
PM2.5 Total	3.67E-02	3.67E-02	0
SO2	1.14E-02	1.14E-02	0
VOCs	29.9	38.4	-8
HAPS	10.0	13.7	-4

1. Based on GRI GlyCalc 4.0 run at dry gas flowrate of 25 MMscf/day and T and P of 120°F and 390 psig, respectively, controlled by a TO at 95% destruction efficiency. A safety factor of 20% is included in the total.

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Craig Compressor Station

File Name: W:\Dominion\WV - Craig_Deep Valley Yellow Creek\153902_0022 Dominion WV Dehy
Project\04 Deliverables\Craig\Attachment N - Emission Calculations\Craig
Station 1010am.ddf

Date: March 21, 2015

DESCRIPTION:

Description: 18MMScf/day new TEG dehydrator

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 120.00 deg. F
Pressure: 390.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.2390
Nitrogen	2.3860
Methane	75.3510
Ethane	12.9530
Propane	5.3710
Isobutane	0.7230
n-Butane	1.4720
Isopentane	0.4450
n-Pentane	0.3830
Cyclopentane	0.0005
n-Hexane	0.0840
Cyclohexane	0.0200
Other Hexanes	0.1270
Heptanes	0.1400
Methylcyclohexane	0.0005
2,2,4-Trimethylpentane	0.1070
Benzene	0.0030
Toluene	0.0100
Ethylbenzene	0.0010
Xylenes	0.0310
C8+ Heavies	0.1540

DRY GAS:

Flow Rate: 18.0 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.0 wt% H2O
Recirculation Ratio: 3.0 gal/lb H2O

PUMP:

Glycol Pump Type: Gas Injection
Gas Injection Pump Volume Ratio: 0.080 acfm gas/gpm glycol

FLASH TANK:

Flash Control: Recycle/recompression
Temperature: 150.0 deg. F
Pressure: 60.0 psig

STRIPPING GAS:

Source of Gas: Dry Gas
Gas Flow Rate: 39.984 scfm

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device: Combustion Device
Destruction Efficiency: 95.0 %
Excess Oxygen: 0.0 %
Ambient Air Temperature: 0.0 deg. F

Case Name: Craig Compressor Station
 File Name: P:\Craig Station_1010am.ddf
 Date: March 13, 2015

DESCRIPTION:

Description: 18MMScf/day new TEG dehydrator

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	3.8654	92.769	16.9304
Ethane	1.2874	30.899	5.6390
Propane	0.8360	20.063	3.6615
Isobutane	0.1580	3.793	0.6922
n-Butane	0.3438	8.250	1.5057
Isopentane	0.1328	3.187	0.5817
n-Pentane	0.1239	2.973	0.5427
Cyclopentane	0.0004	0.010	0.0019
n-Hexane	0.0432	1.036	0.1892
Cyclohexane	0.0358	0.859	0.1567
Other Hexanes	0.0558	1.339	0.2444
Heptanes	0.1402	3.364	0.6140
Methylcyclohexane	0.0013	0.030	0.0055
2,2,4-Trimethylpentane	0.0709	1.701	0.3105
Benzene	0.0381	0.914	0.1668
Toluene	0.2171	5.209	0.9507
Ethylbenzene	0.0368	0.882	0.1610
Xylenes	1.4878	35.708	6.5167
C8+ Heavies	1.9686	47.248	8.6227
Total Emissions	10.8432	260.236	47.4930
Total Hydrocarbon Emissions	10.8432	260.236	47.4930
Total VOC Emissions	5.6903	136.568	24.9236
Total HAP Emissions	1.8938	45.451	8.2948
Total BTEX Emissions	1.7797	42.713	7.7952

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	77.3078	1855.388	338.6083
Ethane	25.7488	617.972	112.7798
Propane	16.7191	401.258	73.2295
Isobutane	3.1606	75.854	13.8433
n-Butane	6.8751	165.003	30.1131
Isopentane	2.6559	63.743	11.6331
n-Pentane	2.4779	59.469	10.8531
Cyclopentane	0.0086	0.207	0.0379
n-Hexane	0.8637	20.729	3.7831
Cyclohexane	0.7156	17.174	3.1343

Other Hexanes	1.1162	26.789	4.8890
Heptanes	2.8035	67.285	12.2795
Methylcyclohexane	0.0250	0.601	0.1096
2,2,4-Trimethylpentane	1.4177	34.025	6.2096
Benzene	0.7616	18.279	3.3359
Toluene	4.3412	104.188	19.0144
Ethylbenzene	0.7350	17.640	3.2193
Xylenes	29.7566	714.159	130.3340
C8+ Heavies	39.3729	944.950	172.4534

Total Emissions	216.8630	5204.713	949.8601

Total Hydrocarbon Emissions	216.8630	5204.713	949.8601
Total VOC Emissions	113.8064	2731.354	498.4720
Total HAP Emissions	37.8759	909.021	165.8963
Total BTEX Emissions	35.5944	854.266	155.9036

FLASH GAS EMISSIONS

Note: Flash Gas Emissions are zero with the
Recycle/recompression control option.

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr

Methane	37.1354	891.251	162.6532
Ethane	14.9760	359.423	65.5947
Propane	10.8554	260.529	47.5466
Isobutane	2.2001	52.803	9.6366
n-Butane	5.0045	120.108	21.9197
Isopentane	1.9284	46.282	8.4465
n-Pentane	1.8375	44.099	8.0481
Cyclopentane	0.0042	0.100	0.0183
n-Hexane	0.5974	14.337	2.6165
Cyclohexane	0.2348	5.636	1.0286
Other Hexanes	0.8102	19.445	3.5488
Heptanes	1.4711	35.306	6.4433
Methylcyclohexane	0.0069	0.165	0.0301
2,2,4-Trimethylpentane	0.9455	22.692	4.1412
Benzene	0.0450	1.080	0.1972
Toluene	0.1752	4.204	0.7672
Ethylbenzene	0.0180	0.432	0.0789
Xylenes	0.5091	12.219	2.2299
C8+ Heavies	4.2507	102.017	18.6182

Total Emissions	83.0054	1992.130	363.5637

Total Hydrocarbon Emissions	83.0054	1992.130	363.5637
Total VOC Emissions	30.8940	741.456	135.3157
Total HAP Emissions	2.2902	54.964	10.0309
Total BTEX Emissions	0.7473	17.935	3.2732

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 0.00 deg. F
 Excess Oxygen: 0.00 %
 Combustion Efficiency: 95.00 %
 Supplemental Fuel Requirement: 9.89e-001 MM BTU/hr

Component	Emitted	Destroyed
Methane	5.00%	95.00%
Ethane	5.00%	95.00%
Propane	5.00%	95.00%
Isobutane	5.00%	95.00%
n-Butane	5.00%	95.00%
Isopentane	5.00%	95.00%
n-Pentane	5.00%	95.00%
Cyclopentane	5.00%	95.00%
n-Hexane	5.00%	95.00%
Cyclohexane	5.00%	95.00%
Other Hexanes	5.00%	95.00%
Heptanes	5.00%	95.00%
Methylcyclohexane	5.00%	95.00%
2,2,4-Trimethylpentane	5.00%	95.00%
Benzene	5.00%	95.00%
Toluene	5.00%	95.00%
Ethylbenzene	5.00%	95.00%
Xylenes	5.00%	95.00%
C8+ Heavies	5.00%	95.00%

ABSORBER

Calculated Absorber Stages: 1.85
 Specified Dry Gas Dew Point: 7.00 lbs. H2O/MMSCF
 Temperature: 120.0 deg. F
 Pressure: 390.0 psig
 Dry Gas Flow Rate: 18.0000 MMSCF/day
 Glycol Losses with Dry Gas: 0.3231 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 218.49 lbs. H2O/MMSCF
 Specified Lean Glycol Recirc. Ratio: 3.00 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	3.19%	96.81%
Carbon Dioxide	99.75%	0.25%
Nitrogen	99.98%	0.02%
Methane	99.98%	0.02%
Ethane	99.93%	0.07%
Propane	99.87%	0.13%
Isobutane	99.81%	0.19%
n-Butane	99.75%	0.25%
Isopentane	99.73%	0.27%
n-Pentane	99.67%	0.33%
Cyclopentane	98.60%	1.40%
n-Hexane	99.43%	0.57%
Cyclohexane	97.59%	2.41%
Other Hexanes	99.57%	0.43%
Heptanes	98.91%	1.09%

Methylcyclohexane	97.16%	2.84%
2,2,4-Trimethylpentane	99.48%	0.52%
Benzene	83.00%	17.00%
Toluene	75.60%	24.40%
Ethylbenzene	64.48%	35.52%
Xylenes	53.81%	46.19%
C8+ Heavies	92.02%	7.98%

FLASH TANK

Flash Control: Recycle/recompression
Flash Temperature: 150.0 deg. F
Flash Pressure: 60.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.83%	0.17%
Carbon Dioxide	18.80%	81.20%
Nitrogen	2.16%	97.84%
Methane	2.27%	97.73%
Ethane	6.99%	93.01%
Propane	13.91%	86.09%
Isobutane	18.73%	81.27%
n-Butane	22.78%	77.22%
Isopentane	24.88%	75.12%
n-Pentane	28.84%	71.16%
Cyclopentane	60.83%	39.17%
n-Hexane	40.84%	59.16%
Cyclohexane	73.10%	26.90%
Other Hexanes	35.00%	65.00%
Heptanes	56.88%	43.12%
Methylcyclohexane	77.09%	22.91%
2,2,4-Trimethylpentane	41.39%	58.61%
Benzene	94.61%	5.39%
Toluene	96.39%	3.61%
Ethylbenzene	97.84%	2.16%
Xylenes	98.53%	1.47%
C8+ Heavies	91.10%	8.90%

REGENERATOR

Regenerator Stripping Gas:
Dry Product Gas Stripping Gas Flow Rate: 39.9840 scfm

Component	Remaining in Glycol	Distilled Overhead
Water	21.83%	78.17%
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	1.33%	98.67%

n-Pentane	1.23%	98.77%
Cyclopentane	0.75%	99.25%
n-Hexane	0.99%	99.01%
Cyclohexane	4.15%	95.85%
Other Hexanes	2.18%	97.82%
Heptanes	0.78%	99.22%
Methylcyclohexane	4.96%	95.04%
2,2,4-Trimethylpentane	2.88%	97.12%
Benzene	5.24%	94.76%
Toluene	8.16%	91.84%
Ethylbenzene	10.60%	89.40%
Xylenes	13.08%	86.92%
C8+ Heavies	12.99%	87.01%

STREAM REPORTS:

WET GAS STREAM

Temperature: 120.00 deg. F
 Pressure: 404.70 psia
 Flow Rate: 7.54e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	4.60e-001	1.65e+002
Carbon Dioxide	2.38e-001	2.08e+002
Nitrogen	2.38e+000	1.32e+003
Methane	7.50e+001	2.39e+004
Ethane	1.29e+001	7.70e+003
Propane	5.35e+000	4.69e+003
Isobutane	7.20e-001	8.31e+002
n-Butane	1.47e+000	1.69e+003
Isopentane	4.43e-001	6.35e+002
n-Pentane	3.81e-001	5.47e+002
Cyclopentane	4.98e-004	6.94e-001
n-Hexane	8.36e-002	1.43e+002
Cyclohexane	1.99e-002	3.33e+001
Other Hexanes	1.26e-001	2.16e+002
Heptanes	1.39e-001	2.78e+002
Methylcyclohexane	4.98e-004	9.71e-001
2,2,4-Trimethylpentane	1.07e-001	2.42e+002
Benzene	2.99e-003	4.64e+000
Toluene	9.95e-003	1.82e+001
Ethylbenzene	9.95e-004	2.10e+000
Xylenes	3.09e-002	6.51e+001
C8+ Heavies	1.53e-001	5.19e+002
Total Components	100.00	4.32e+004

DRY GAS STREAM

Temperature: 120.00 deg. F
 Pressure: 404.70 psia
 Flow Rate: 7.50e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	1.47e-002	5.25e+000
Carbon Dioxide	2.39e-001	2.08e+002
Nitrogen	2.39e+000	1.32e+003
Methane	7.54e+001	2.39e+004
Ethane	1.30e+001	7.70e+003
Propane	5.37e+000	4.68e+003
Isobutane	7.22e-001	8.30e+002
n-Butane	1.47e+000	1.69e+003
Isopentane	4.44e-001	6.33e+002
n-Pentane	3.82e-001	5.45e+002
Cyclopentane	4.93e-004	6.84e-001
n-Hexane	8.36e-002	1.42e+002
Cyclohexane	1.95e-002	3.25e+001
Other Hexanes	1.27e-001	2.16e+002
Heptanes	1.39e-001	2.74e+002
Methylcyclohexane	4.86e-004	9.44e-001
2,2,4-Trimethylpentane	1.07e-001	2.41e+002
Benzene	2.49e-003	3.85e+000
Toluene	7.56e-003	1.38e+001
Ethylbenzene	6.45e-004	1.35e+000
Xylenes	1.67e-002	3.50e+001
C8+ Heavies	1.42e-001	4.78e+002
-----	-----	-----
Total Components	100.00	4.29e+004

LEAN GLYCOL STREAM

Temperature: 120.00 deg. F
Flow Rate: 7.91e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
-----	-----	-----
TEG	9.88e+001	4.40e+003
Water	9.99e-001	4.45e+001
Carbon Dioxide	1.18e-012	5.25e-011
Nitrogen	6.64e-013	2.96e-011
Methane	3.92e-018	1.75e-016
Ethane	5.86e-008	2.61e-006
Propane	5.65e-009	2.52e-007
Isobutane	1.06e-009	4.70e-008
n-Butane	2.32e-009	1.03e-007
Isopentane	1.90e-004	8.48e-003
n-Pentane	2.06e-004	9.16e-003
Cyclopentane	1.09e-006	4.87e-005
n-Hexane	9.13e-005	4.07e-003
Cyclohexane	5.94e-004	2.65e-002
Other Hexanes	2.13e-004	9.49e-003
Heptanes	3.40e-004	1.52e-002
Methylcyclohexane	2.58e-005	1.15e-003
2,2,4-Trimethylpentane	4.31e-004	1.92e-002
Benzene	9.31e-004	4.15e-002
Toluene	8.57e-003	3.82e-001
Ethylbenzene	1.95e-003	8.66e-002
Xylenes	1.00e-001	4.46e+000
C8+ Heavies	1.27e-001	5.65e+000

 Total Components 100.00 4.45e+003

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 120.00 deg. F
 Pressure: 404.70 psia
 Flow Rate: 8.59e+000 gpm
 NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
-----	-----	-----
TEG	9.19e+001	4.39e+003
Water	4.27e+000	2.04e+002
Carbon Dioxide	1.70e-002	8.11e-001
Nitrogen	4.41e-002	2.11e+000
Methane	7.95e-001	3.80e+001
Ethane	3.37e-001	1.61e+001
Propane	2.64e-001	1.26e+001
Isobutane	5.67e-002	2.71e+000
n-Butane	1.36e-001	6.48e+000
Isopentane	5.37e-002	2.57e+000
n-Pentane	5.40e-002	2.58e+000
Cyclopentane	2.24e-004	1.07e-002
n-Hexane	2.11e-002	1.01e+000
Cyclohexane	1.83e-002	8.73e-001
Other Hexanes	2.61e-002	1.25e+000
Heptanes	7.14e-002	3.41e+000
Methylcyclohexane	6.29e-004	3.00e-002
2,2,4-Trimethylpentane	3.38e-002	1.61e+000
Benzene	1.75e-002	8.36e-001
Toluene	1.02e-001	4.85e+000
Ethylbenzene	1.75e-002	8.35e-001
Xylenes	7.25e-001	3.46e+001
C8+ Heavies	9.99e-001	4.77e+001
-----	-----	-----
Total Components	100.00	4.78e+003

FLASH TANK OFF GAS STREAM

Temperature: 150.00 deg. F
 Pressure: 74.70 psia
 Flow Rate: 1.30e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	5.60e-001	3.45e-001
Carbon Dioxide	4.38e-001	6.58e-001
Nitrogen	2.16e+000	2.06e+000
Methane	6.77e+001	3.71e+001
Ethane	1.46e+001	1.50e+001
Propane	7.20e+000	1.09e+001
Isobutane	1.11e+000	2.20e+000
n-Butane	2.52e+000	5.00e+000
Isopentane	7.82e-001	1.93e+000
n-Pentane	7.45e-001	1.84e+000
Cyclopentane	1.75e-003	4.19e-003
n-Hexane	2.03e-001	5.97e-001

Cyclohexane	8.16e-002	2.35e-001
Other Hexanes	2.75e-001	8.10e-001
Heptanes	4.29e-001	1.47e+000
Methylcyclohexane	2.05e-003	6.88e-003
2,2,4-Trimethylpentane	2.42e-001	9.45e-001
Benzene	1.69e-002	4.50e-002
Toluene	5.56e-002	1.75e-001
Ethylbenzene	4.96e-003	1.80e-002
Xylenes	1.40e-001	5.09e-001
C8+ Heavies	7.30e-001	4.25e+000

Total Components	100.00	8.61e+001

FLASH TANK GLYCOL STREAM

Temperature: 150.00 deg. F
Flow Rate: 8.40e+000 gpm

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

TEG	9.36e+001	4.39e+003
Water	4.35e+000	2.04e+002
Carbon Dioxide	3.25e-003	1.52e-001
Nitrogen	9.69e-004	4.55e-002
Methane	1.84e-002	8.63e-001
Ethane	2.40e-002	1.13e+000
Propane	3.74e-002	1.75e+000
Isobutane	1.08e-002	5.07e-001
n-Butane	3.15e-002	1.48e+000
Isopentane	1.36e-002	6.39e-001
n-Pentane	1.59e-002	7.45e-001
Cyclopentane	1.39e-004	6.50e-003
n-Hexane	8.79e-003	4.12e-001
Cyclohexane	1.36e-002	6.38e-001
Other Hexanes	9.30e-003	4.36e-001
Heptanes	4.14e-002	1.94e+000
Methylcyclohexane	4.94e-004	2.32e-002
2,2,4-Trimethylpentane	1.42e-002	6.68e-001
Benzene	1.69e-002	7.91e-001
Toluene	9.97e-002	4.68e+000
Ethylbenzene	1.74e-002	8.17e-001
Xylenes	7.27e-001	3.41e+001
C8+ Heavies	9.27e-001	4.35e+001

Total Components	100.00	4.69e+003

FLASH GAS EMISSIONS

Control Method: Recycle/recompression
Control Efficiency: 100.00

Note: Flash Gas Emissions are zero with the
Recycle/recompression control option.

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F

Pressure: 14.70 psia
 Flow Rate: 6.06e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	5.54e+001	1.59e+002
Carbon Dioxide	1.16e-001	8.16e-001
Nitrogen	9.55e-001	4.27e+000
Methane	3.02e+001	7.73e+001
Ethane	5.36e+000	2.57e+001
Propane	2.37e+000	1.67e+001
Isobutane	3.41e-001	3.16e+000
n-Butane	7.41e-001	6.88e+000
Isopentane	2.31e-001	2.66e+000
n-Pentane	2.15e-001	2.48e+000
Cyclopentane	7.72e-004	8.64e-003
n-Hexane	6.28e-002	8.64e-001
Cyclohexane	5.33e-002	7.16e-001
Other Hexanes	8.11e-002	1.12e+000
Heptanes	1.75e-001	2.80e+000
Methylcyclohexane	1.60e-003	2.50e-002
2,2,4-Trimethylpentane	7.77e-002	1.42e+000
Benzene	6.11e-002	7.62e-001
Toluene	2.95e-001	4.34e+000
Ethylbenzene	4.34e-002	7.35e-001
Xylenes	1.76e+000	2.98e+001
C8+ Heavies	1.45e+000	3.94e+001
-----	-----	-----
Total Components	100.00	3.81e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 1.32e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Methane	6.94e+001	3.87e+000
Ethane	1.23e+001	1.29e+000
Propane	5.46e+000	8.36e-001
Isobutane	7.83e-001	1.58e-001
n-Butane	1.70e+000	3.44e-001
Isopentane	5.30e-001	1.33e-001
n-Pentane	4.94e-001	1.24e-001
Cyclopentane	1.77e-003	4.32e-004
n-Hexane	1.44e-001	4.32e-002
Cyclohexane	1.22e-001	3.58e-002
Other Hexanes	1.86e-001	5.58e-002
Heptanes	4.03e-001	1.40e-001
Methylcyclohexane	3.67e-003	1.25e-003
2,2,4-Trimethylpentane	1.79e-001	7.09e-002
Benzene	1.40e-001	3.81e-002
Toluene	6.78e-001	2.17e-001
Ethylbenzene	9.97e-002	3.68e-002
Xylenes	4.03e+000	1.49e+000
C8+ Heavies	3.33e+000	1.97e+000
-----	-----	-----
Total Components	100.00	1.08e+001



Certificate of Analysis

Number: 1030-14020166-003A

Houston Laboratories

8820 Interchange Drive

Houston, TX 77054

Phone 713-660-0901

W. Steven Kiser
Dominion Transmission
335 US Highway 33 West
Weston, 26452

Feb. 18, 2014

Station Name: Craig Station
Sample Point: Inlet Dehy
Cylinder No: 712
Analyzed: 02/13/2014 06:08:09 by JD

Sampled By: DF
Sample Of: Gas Spot
Sample Date: 01/17/2014 10:00
Sample Conditions: 253 psig, @ 110 °F
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia		
Nitrogen	1.175	1.554		GPM TOTAL C2+	6.207
Carbon Dioxide	0.155	0.322		GPM TOTAL C3+	2.555
Methane	76.490	57.921		GPM TOTAL iC5+	0.372
Ethane	13.640	19.359	3.652		
Propane	5.505	11.458	1.518		
Iso-butane	0.699	1.918	0.229		
n-Butane	1.382	3.791	0.436		
Iso-pentane	0.354	1.206	0.130		
n-Pentane	0.285	0.971	0.103		
Hexanes Plus	0.315	1.500	0.139		
	100.000	100.000	6.207		

Physical Properties	Total	C6+
Relative Density Real Gas	0.7338	3.4621
Calculated Molecular Weight	21.19	100.27
Compressibility Factor	0.9964	

GPA 2172-09 Calculation:

Calculated Gross BTU per ft³ @ 14.696 psia & 60°F

Real Gas Dry BTU	1268	5391
Water Sat. Gas Base BTU	1245	5297

Comments: H2O Mol% : 1.744 ; Wt% : 1.487
H2S 0 ppm

Hydrocarbon Laboratory Manager

Quality Assurance:

The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



Certificate of Analysis

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Sample Conditions: 253 psig, @ 110 °F
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia	
Nitrogen	1.175	1.554		GPM TOTAL C2+
Carbon Dioxide	0.155	0.322		GPM TOTAL C3+
Hydrogen Sulfide	NIL	NIL		GPM TOTAL iC5+
Methane	76.490	57.921		
Ethane	13.640	19.359	3.652	
Propane	5.505	11.458	1.518	
Iso-Butane	0.699	1.918	0.229	
n-Butane	1.382	3.791	0.436	
Iso-Pentane	0.354	1.206	0.130	
n-Pentane	0.285	0.971	0.103	
Hexanes	0.120	0.479	0.049	
Heptanes Plus	0.195	1.021	0.090	
	100.000	100.000	6.207	

Physical Properties	Total	C7+
Relative Density Real Gas	0.7338	3.7729
Calculated Molecular Weight	21.19	109.27
Compressibility Factor	0.9964	

GPA 2172-09 Calculation:

Calculated Gross BTU per ft³ @ 14.696 psia & 60°F

Real Gas Dry BTU	1268	5807
Water Sat. Gas Base BTU	1245	5706

Comments: H2O Mol% : 1.744 ; Wt% : 1.487
H2S 0 ppm

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



Certificate of Analysis

Number: 1030-14020166-003A

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Feb. 18, 2014

Station Name: Craig Station
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Cylinder No: 712
Analyzed: 02/13/2014 06:08:09 by JD

Sampled By: DF
Sample Of: Gas Spot
Sample Date: 01/17/2014 10:00
Sample Conditions: 253 psig, @ 110 °F
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia	
Nitrogen	1.175	1.554		
Methane	76.490	57.921		
Carbon Dioxide	0.155	0.322		
Hydrogen Sulfide	NIL	NIL		
Ethane	13.640	19.359	3.652	
Propane	5.505	11.458	1.518	
Iso-Butane	0.699	1.918	0.229	
n-Butane	1.382	3.791	0.436	
Iso-Pentane	0.354	1.206	0.130	
n-Pentane	0.285	0.971	0.103	
i-Hexanes	0.075	0.295	0.030	
n-Hexane	0.045	0.184	0.019	
Benzene	0.002	0.006	NIL	
Cyclohexane	0.010	0.040	0.003	
i-Heptanes	0.045	0.205	0.019	
n-Heptane	0.018	0.087	0.009	
Toluene	0.005	0.020	0.002	
i-Octanes	0.044	0.229	0.020	
n-Octane	0.009	0.049	0.005	
Ethylbenzene	NIL	NIL	NIL	
Xylenes	0.014	0.064	0.005	
i-Nonanes	0.016	0.105	0.009	
n-Nonane	0.007	0.041	0.004	
i-Decanes	0.016	0.101	0.008	
n-Decane	0.003	0.023	0.002	
Undecanes	0.004	0.035	0.003	
Dodecanes	0.002	0.016	0.001	
Tridecanes	NIL	NIL	NIL	
Tetradecanes Plus	NIL	NIL	NIL	
	100.000	100.000	6.207	



Certificate of Analysis

Number: 1030-14020166-003A

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335 US Highway 33 West
Weston, 26452

Feb. 18, 2014

Station Name: Craig Station
Sample Point: Inlet Dehy
Cylinder No: 712
Analyzed: 02/13/2014 06:08:09 by JD

Sampled By: DF
Sample Of: Gas Spot
Sample Date: 01/17/2014 10:00
Sample Conditions: 253 psig, @ 110 °F
Method: GPA 2286

Physical Properties	Total
Calculated Molecular Weight	21.186
GPA 2172-09 Calculation:	
Calculated Gross BTU per ft³ @ 14.696 psia & 60°F	
Real Gas Dry BTU	1267.5
Water Sat. Gas Base BTU	1245
Relative Density Real Gas	0.7338
Compressibility Factor	0.9964
Comments: H2S 0 ppm	

Hydrocarbon Laboratory Manager

Quality Assurance:

The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



Certificate of Analysis

Number: 1030-14020166-004A

Houston Laboratories
8820 Interchange Drive
Houston, TX 77054
Phone 713-660-0901

W. Steven Kiser
Dominion Transmission
335 US Highway 33 West
Weston, 26452

Feb. 18, 2014

Station Name: Craig Station
Sample Point: Inlet Dehy
Cylinder No: 145
Analyzed: 02/13/2014 07:13:50 by JD

Sampled By: DF
Sample Of: Gas Spot
Sample Date: 01/17/2014 10:10
Sample Conditions: 253 psig, @ 110 °F
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia		
Nitrogen	2.386	3.081		GPM TOTAL C2+	6.261
Carbon Dioxide	0.239	0.485		GPM TOTAL C3+	2.793
Methane	75.351	55.725		GPM TOTAL iC5+	0.609
Ethane	12.953	17.955	3.468		
Propane	5.371	10.918	1.482		
Iso-butane	0.723	1.937	0.237		
n-Butane	1.472	3.944	0.465		
Iso-pentane	0.445	1.480	0.163		
n-Pentane	0.383	1.274	0.139		
Hexanes Plus	0.677	3.201	0.307		
	100.000	100.000	6.261		

Physical Properties	Total	C6+
Relative Density Real Gas	0.7515	3.5359
Calculated Molecular Weight	21.69	102.41
Compressibility Factor	0.9962	

GPA 2172-09 Calculation:

Calculated Gross BTU per ft³ @ 14.696 psia & 60°F

Real Gas Dry BTU	1272	5506
Water Sat. Gas Base BTU	1250	5410

Comments: H2O Mol% : 1.744 ; Wt% : 1.453
H2S 0 ppm

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



Certificate of Analysis

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Weston, 26452

Feb. 18, 2014

Station Name: Craig Station
Sample Point: Inlet Dehy
Cylinder No: 145
Analyzed: 02/13/2014 07:13:50 by JD

Sampled By: DF
Sample Of: Gas Spot
Sample Date: 01/17/2014 10:10
Sample Conditions: 253 psig, @ 110 °F
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia		
Nitrogen	2.386	3.081		GPM TOTAL C2+	6.261
Carbon Dioxide	0.239	0.485		GPM TOTAL C3+	2.793
Hydrogen Sulfide	NIL	NIL		GPM TOTAL iC5+	0.609
Methane	75.351	55.725			
Ethane	12.953	17.955	3.468		
Propane	5.371	10.918	1.482		
Iso-Butane	0.723	1.937	0.237		
n-Butane	1.472	3.944	0.465		
Iso-Pentane	0.445	1.480	0.163		
n-Pentane	0.383	1.274	0.139		
Hexanes	0.211	0.831	0.086		
Heptanes Plus	0.466	2.370	0.221		
	100.000	100.000	6.261		

Physical Properties	Total	C7+
Relative Density Real Gas	0.7515	3.8022
Calculated Molecular Weight	21.69	110.12
Compressibility Factor	0.9962	

GPA 2172-09 Calculation:

Calculated Gross BTU per ft³ @ 14.696 psia & 60°F

Real Gas Dry BTU	1272	5870
Water Sat. Gas Base BTU	1250	5768

Comments: H2O Mol% : 1.744 ; Wt% : 1.453
H2S 0 ppm

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



Certificate of Analysis

Number: 1030-14020166-004A

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Weston , 26452

Feb. 18, 2014

Station Name: Craig Station
Sample Point: Inlet Dehy
Cylinder No: 145
Analyzed: 02/13/2014 07:13:50 by JD

Sampled By: DF
Sample Of: Gas Spot
Sample Date: 01/17/2014 10:10
Sample Conditions: 253 psig, @ 110 °F
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia	
Nitrogen	2.386	3.081		GPM TOTAL C2+ 6.261
Methane	75.351	55.725		
Carbon Dioxide	0.239	0.485		
Hydrogen Sulfide	NIL	NIL		
Ethane	12.953	17.955	3.468	
Propane	5.371	10.918	1.482	
Iso-Butane	0.723	1.937	0.237	
n-Butane	1.472	3.944	0.465	
Iso-Pentane	0.445	1.480	0.163	
n-Pentane	0.383	1.274	0.139	
i-Hexanes	0.127	0.496	0.051	
n-Hexane	0.084	0.335	0.035	
Benzene	0.003	0.011	0.001	
Cyclohexane	0.020	0.078	0.007	
i-Heptanes	0.096	0.423	0.042	
n-Heptane	0.044	0.204	0.021	
Toluene	0.010	0.043	0.003	
i-Octanes	0.107	0.533	0.049	
n-Octane	0.026	0.138	0.014	
Ethylbenzene	0.001	0.006	0.001	
Xylenes	0.031	0.155	0.012	
i-Nonanes	0.049	0.282	0.026	
n-Nonane	0.019	0.110	0.011	
i-Decanes	0.044	0.278	0.024	
n-Decane	0.007	0.047	0.004	
Undecanes	0.008	0.053	0.005	
Dodecanes	0.001	0.009	0.001	
Tridecanes	NIL	NIL	NIL	
Tetradecanes Plus	NIL	NIL	NIL	
	100.000	100.000	6.261	



Certificate of Analysis

Number: 1030-14020166-004A

Houston Laboratories

8820 Interchange Drive

Houston, TX 77054

Phone 713-660-0901

W. Steven Kiser
Dominion Transmission
335 US Highway 33 West
Weston, 26452

Feb. 18, 2014

Station Name: Craig Station
Sample Point: Inlet Dehy
Cylinder No: 145
Analyzed: 02/13/2014 07:13:50 by JD

Sampled By: DF
Sample Of: Gas Spot
Sample Date: 01/17/2014 10:10
Sample Conditions: 253 psig, @ 110 °F
Method: GPA 2286

Physical Properties	Total
Calculated Molecular Weight	21.693
GPA 2172-09 Calculation:	
Calculated Gross BTU per ft³ @ 14.696 psia & 60°F	
Real Gas Dry BTU	1272.2
Water Sat. Gas Base BTU	1250
Relative Density Real Gas	0.7515
Compressibility Factor	0.9962
Comments: H2S 0 ppm	

Hydrocarbon Laboratory Manager

Quality Assurance:

The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

ATTACHMENT O

Monitoring/Recordkeeping/Reporting/Testing Plans

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

Plan Type	Emission unit	Pollutant	Requirements	Frequency	Method of Measurement	Regulatory Reference
Recordkeeping	Dehydration Unit	HAP	Maintain following records: Actual annual natural gas throughput OR actual average annual benzene emissions	Annual	Station natural gas throughput flowmeter	40 CFR 63.774(d)(1)

ATTACHMENT P

Public Notice

AIR QUALITY PERMIT NOTICE

Notice of Application

Notice is given that Dominion Transmission, Inc. has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a modification permit (R-13) to modify the natural gas compressor station (the Craig Compressor Station) located near the Town of Smithville, in Ritchie County, West Virginia. The site latitude and longitude coordinates are: 39.07118 N, 81.09838 W.

The applicant estimates that the change in potential to emit for the facility of the following Regulated Air Pollutants will be:

Particulate Matter (PM) = ~0 tpy
Sulfur Dioxide (SO₂) = ~0 tpy
Volatile Organic Compounds (VOC) = -8 tpy
Carbon Monoxide (CO) = ~0 tpy
Nitrogen Oxides (NO_x) = ~0 tpy
Hazardous Air Pollutants (HAPs) = -4 tpy

Startup of operation will begin during or about November of 2015. 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 1215, during normal business hours.

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

By: Dominion Transmission, Inc.
Brian Sheppard
Vice President, Pipeline Operations
445 West Main Street
Clarksburg WV 26301

ATTACHMENT S

Title V Permit Revision Information

Attachment S

Title V Permit Revision Information

1. New Applicable Requirements Summary

Mark all applicable requirements associated with the changes involved with this permit revision:

<input checked="" type="checkbox"/> SIP	<input type="checkbox"/> FIP
<input checked="" type="checkbox"/> Minor source NSR (45CSR13)	<input type="checkbox"/> PSD (45CSR14)
<input type="checkbox"/> NESHAP (45CSR15)	<input type="checkbox"/> Nonattainment NSR (45CSR19)
<input type="checkbox"/> Section 111 NSPS (Subpart(s) _____)	<input checked="" type="checkbox"/> Section 112(d) MACT standards (Subpart(s) <u>Subpart HH</u> _____)
<input type="checkbox"/> Section 112(g) Case-by-case MACT	<input type="checkbox"/> 112(r) RMP
<input type="checkbox"/> Section 112(i) Early reduction of HAP	<input type="checkbox"/> Consumer/commercial prod. reqts., section 183(e)
<input type="checkbox"/> Section 129 Standards/Reqts.	<input type="checkbox"/> Stratospheric ozone (Title VI)
<input type="checkbox"/> Tank vessel reqt., section 183(f)	<input type="checkbox"/> Emissions cap 45CSR§30-2.6.1
<input type="checkbox"/> NAAQS, increments or visibility (temp. sources)	<input type="checkbox"/> 45CSR27 State enforceable only rule
<input type="checkbox"/> 45CSR4 State enforceable only rule	<input type="checkbox"/> Acid Rain (Title IV, 45CSR33)
<input type="checkbox"/> Emissions Trading and Banking (45CSR28)	<input type="checkbox"/> Compliance Assurance Monitoring (40CFR64) ⁽¹⁾
<input type="checkbox"/> NO _x Budget Trading Program Non-EGUs (45CSR1)	<input type="checkbox"/> NO _x Budget Trading Program EGUs (45CSR26)

⁽¹⁾ If this box is checked, please include **Compliance Assurance Monitoring (CAM) Form(s)** for each Pollutants Specific Emission Unit (PSEU) (See Attachment H to Title V Application). If this box is not checked, please explain why **Compliance Assurance Monitoring** is not applicable:

Unit is exempt from CAM because it is subject to emission standards proposed after 11/15/90 to Section 112 of the Act (i.e., 40 CFR 63, Subpart HH)

2. Non Applicability Determinations

List all requirements, which the source has determined not applicable to this permit revision and for which a permit shield is requested. The listing shall also include the rule citation and a rationale for the determination.

40 CFR 60, Subparts D, Da, Db, Dc, OOOO

40 CFR 63, Subparts HHH, DDDDD, JJJJJ

45 CSR 21

45 CSR 27

See rationale for determination in Attachment D.

☐ **Permit Shield Requested** (not applicable to Minor Modifications)

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

3. Suggested Title V Draft Permit Language

Are there any changes involved with this Title V Permit revision outside of the scope of the NSR Permit revision? ☐ Yes ☒ No If Yes, describe the changes below.

Also, please provide **Suggested Title V Draft Permit language** for the proposed Title V Permit revision (including all applicable requirements associated with the permit revision and any associated monitoring /recordkeeping/ reporting requirements), OR attach a marked up pages of current Title V Permit. Please include appropriate citations (Permit or Consent Order number, condition number and/or rule citation (e.g. 45CSR§7-4.1)) for those requirements being added / revised.

4. Active NSR Permits/Permit Determinations/Consent Orders Associated With This Permit Revision

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
R30-08500004-2011	12/20/2011	
	/ /	
	/ /	


5. Inactive NSR Permits/Obsolete Permit or Consent Orders Conditions Associated With This Revision

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
	MM/DD/YYYY	
	/ /	
	/ /	

6. Change in Potential Emissions

Pollutant	Change in Potential Emissions (+ or -), TPY
Nitrogen Oxides	~ 0
Carbon Dioxide	~ 0
Particulate Matter	~ 0
Sulfur Dioxide	~ 0
Volatile Organic Compounds	-8 tpy
Hazardous Air Pollutants	-4 tpy

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

7. Certification For Use Of Minor Modification Procedures <i>(Required Only for Minor Modification Requests)</i>	
<i>Note:</i>	<i>This certification must be signed by a responsible official. Applications without a signed certification will be returned as incomplete. The criteria for allowing the use of Minor Modification Procedures are as follows:</i>
<div style="margin-left: 40px;"> i. Proposed changes do not violate any applicable requirement; ii. Proposed changes do not involve significant changes to existing monitoring, reporting, or recordkeeping requirements in the permit; iii. Proposed changes do not require or change a case-by-case determination of an emission limitation or other standard, or a source-specific determination for temporary sources of ambient air quality impacts, or a visibility increment analysis; iv. Proposed changes do not seek to establish or change a permit term or condition for which there is no underlying applicable requirement and which permit or condition has been used to avoid an applicable requirement to which the source would otherwise be subject (synthetic minor). Such terms and conditions include, but are not limited to a federally enforceable emissions cap used to avoid classification as a modification under any provision of Title I or any alternative emissions limit approved pursuant to regulations promulgated under § 112(j)(5) of the Clean Air Act; v. Proposed changes do not involve preconstruction review under Title I of the Clean Air Act or 45CSR14 and 45CSR19; vi. Proposed changes are not required under any rule of the Director to be processed as a significant modification; </div> <p style="margin-top: 20px;">Notwithstanding subparagraph 45CSR§30-6.5.a.1.A. (items i through vi above), minor permit modification procedures may be used for permit modifications involving the use of economic incentives, marketable permits, emissions trading, and other similar approaches, to the extent that such minor permit modification procedures are explicitly provided for in rules of the Director which are approved by the U.S. EPA as a part of the State Implementation Plan under the Clean Air Act, or which may be otherwise provided for in the Title V operating permit issued under 45CSR30.</p>	
<p>Pursuant to 45CSR§30-6.5.a.2.C., the proposed modification contained herein meets the criteria for use of Minor permit modification procedures as set forth in Section 45CSR§30-6.5.a.1.A. The use of Minor permit modification procedures are hereby requested for processing of this application.</p>	
(Signed):	<div style="text-align: center;">  (Please use blue ink) </div>
Date:	<div style="text-align: center;"> 03 / 27 / 15 (Please use blue ink) </div>
Named (typed):	<div style="text-align: center;"> Brian Sheppard Vice President, Pipeline Operations </div>

Note: Please check if the following included (if applicable):	
<input type="checkbox"/>	Compliance Assurance Monitoring Form(s)
<input type="checkbox"/>	Suggested Title V Draft Permit Language
<i>All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.</i>	