



February 28, 2018

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

7017 1070 0000 4417 1754

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

RE: Dominion Energy Transmission, Inc. – General Permit Application (G35-D)
Class II Administrative Update
Collins Compressor Station

Dear Mr. Durham:

Enclosed are one complete original and two (2) cd copies of a G35-D General Permit application to update the dehydration unit potential to emit calculations to represent the recent actual operations at worst case scenarios at Dominion Energy Transmission, Inc.'s Collins Compressor Station in Doddridge County, WV. No other emission units at the facility are being updated.

A new wet gas BTEX sample was collected for Collins Station on 8/31/17. When the sample report was received, a GLYCalc run was completed using the new BTEX sample and revealed that the annual benzene emissions exceeded the annual benzene permit limit (Emission limit = 0.02 tons/yr; GLYCalc Run = 0.0274 tons/yr). As of 9/14/17, the lean glycol flow rate was limited to operate the dehydration unit below the annual benzene permit limit. WVDEP was also notified on 9/14/17 of the situation and the corrective actions going forward.

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

If you require any additional information, please contact Andy Gates at (804) 273-2950 or via email at Andy.Gates@dominionenergy.com.

Sincerely,

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

Amanda B. Tornabene
Director, Environmental Services (Air Program and Gas Infrastructure Group)



west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone (304) 926-0475
Fax (304) 926-0479
www.dep.wv.gov

G35-D GENERAL PERMIT REGISTRATION APPLICATION

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION, RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF NATURAL GAS COMPRESSOR AND/OR DEHYDRATION FACILITIES

- CONSTRUCTION
- MODIFICATION
- RELOCATION
- CLASS I ADMINISTRATIVE UPDATE
- CLASS II ADMINISTRATIVE UPDATE

SECTION I. GENERAL INFORMATION

Name of Applicant (as registered with the WV Secretary of State's Office): Dominion Energy Transmission, Inc.

Federal Employer ID No. (FEIN): 550629203

Applicant's Mailing Address: 925 White Oaks Blvd.

City: Bridgeport State: WV ZIP Code: 26330

Facility Name: Collins Compressor Station

Operating Site Physical Address: Arnolds Creek Road
If none available, list road, city or town and zip of facility.

City: West Union Zip Code: 26456 County: Doddridge

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.2543
Longitude: -80.7911

SIC Code: 4922 DAQ Facility ID No. (For existing facilities)
NAICS Code: 486210 017-00004

CERTIFICATION OF INFORMATION

This G35-D General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of the Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. **Any administratively incomplete or improperly signed or unsigned G35-D Registration Application will be returned to the applicant. Furthermore, if the G35-D forms are not utilized, the application will be returned to the applicant. No substitution of forms is allowed.**

I hereby certify that Brian C. Sheppard is an Authorized Representative and in that capacity shall represent the interest of the business (e.g., Corporation, Partnership, Limited Liability Company, Association Joint Venture or Sole Proprietorship) and may obligate and legally bind the business. If the business changes its Authorized Representative, a Responsible Official shall notify the Director of the Division of Air Quality immediately.

I hereby certify that all information contained in this G35-D General Permit Registration Application and any supporting documents appended hereto is, to the best of my knowledge, true, accurate and complete, and that all reasonable efforts have been made to provide the most comprehensive information possible.

Responsible Official Signature: [Signature]
Name and Title: Brian C. Sheppard, VP Eastern Pipeline Operations Phone: 681-842-3733 Fax: 681-842-3323
Email: Brian.C.Sheppard@dominionenergy.com Date:

If applicable:
Authorized Representative Signature: _____
Name and Title: Phone: Fax:
Email: Date:

If applicable:
Environmental Contact
Name and Title: Andy Gates Phone: 804-273-2950 Fax: 804-273-2964
Email: Andy.Gates@dominionenergy.com Date:

OPERATING SITE INFORMATION	
Briefly describe the proposed new operation and/or any change(s) to the facility: Increase in dehydration unit limits	
Directions to the facility: From the intersection of Route 50 and Route 18 at West Union, go West on Route 50 for 2.6 miles to Arnolds Creek Road. Turn left on Arnolds Creek Road and travel 0.6 miles. Turn left onto gravel road and continue 1.6 miles to the station (on right).	
ATTACHMENTS AND SUPPORTING DOCUMENTS	
I have enclosed the following required documents:	
Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22).	
<input checked="" type="checkbox"/> Check attached to front of application. <input type="checkbox"/> I wish to pay by electronic transfer. Contact for payment (incl. name and email address): <input type="checkbox"/> I wish to pay by credit card. Contact for payment (incl. name and email address):	
<input type="checkbox"/> \$500 (Construction, Modification, and Relocation) <input checked="" type="checkbox"/> \$300 (Class II Administrative Update) <input type="checkbox"/> \$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO and/or OOOOa ¹ <input checked="" type="checkbox"/> \$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH ²	
¹ Only one NSPS fee will apply. ² Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ. <i>NSPS and NESHAP fees apply to new construction or if the source is being modified.</i>	
<input checked="" type="checkbox"/> Responsible Official or Authorized Representative Signature (if applicable)	
<input type="checkbox"/> Single Source Determination Form (must be completed in its entirety) – Attachment A	
<input type="checkbox"/> Siting Criteria Waiver (if applicable) – Attachment B	<input checked="" type="checkbox"/> Current Business Certificate – Attachment C
<input checked="" type="checkbox"/> Process Flow Diagram – Attachment D	<input checked="" type="checkbox"/> Process Description – Attachment E
<input checked="" type="checkbox"/> Plot Plan – Attachment F	<input checked="" type="checkbox"/> Area Map – Attachment G
<input checked="" type="checkbox"/> G35-D Section Applicability Form – Attachment H	<input checked="" type="checkbox"/> Emission Units/ERD Table – Attachment I
<input type="checkbox"/> Fugitive Emissions Summary Sheet – Attachment J	
<input checked="" type="checkbox"/> Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment K	
<input type="checkbox"/> Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment L	
<input type="checkbox"/> Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment M	
<input type="checkbox"/> Tanker Truck Loading Data Sheet (if applicable) – Attachment N	
<input checked="" type="checkbox"/> Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment O	
<input type="checkbox"/> Pneumatic Controllers Data Sheet – Attachment P	
<input type="checkbox"/> Centrifugal Compressor Data Sheet – Attachment Q	
<input type="checkbox"/> Reciprocating Compressor Data Sheet – Attachment R	
<input checked="" type="checkbox"/> Blowdown and Pigging Operations Data Sheet – Attachment S	
<input type="checkbox"/> Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment T	
<input checked="" type="checkbox"/> Emission Calculations (please be specific and include all calculation methodologies used) – Attachment U	
<input checked="" type="checkbox"/> Facility-wide Emission Summary Sheet(s) – Attachment V	
<input checked="" type="checkbox"/> Class I Legal Advertisement – Attachment W	
<input checked="" type="checkbox"/> One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments	

All attachments must be identified by name, divided into sections, and submitted in order.

Attachment C

Current Business Certificate

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

ISSUED TO:
**DOMINION ENERGY TRANSMISSION, INC.
120 TREDEGAR ST
RICHMOND, VA 23219-4306**

BUSINESS REGISTRATION ACCOUNT NUMBER: 1038-3470

This certificate is issued on: **09/20/2017**

*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.

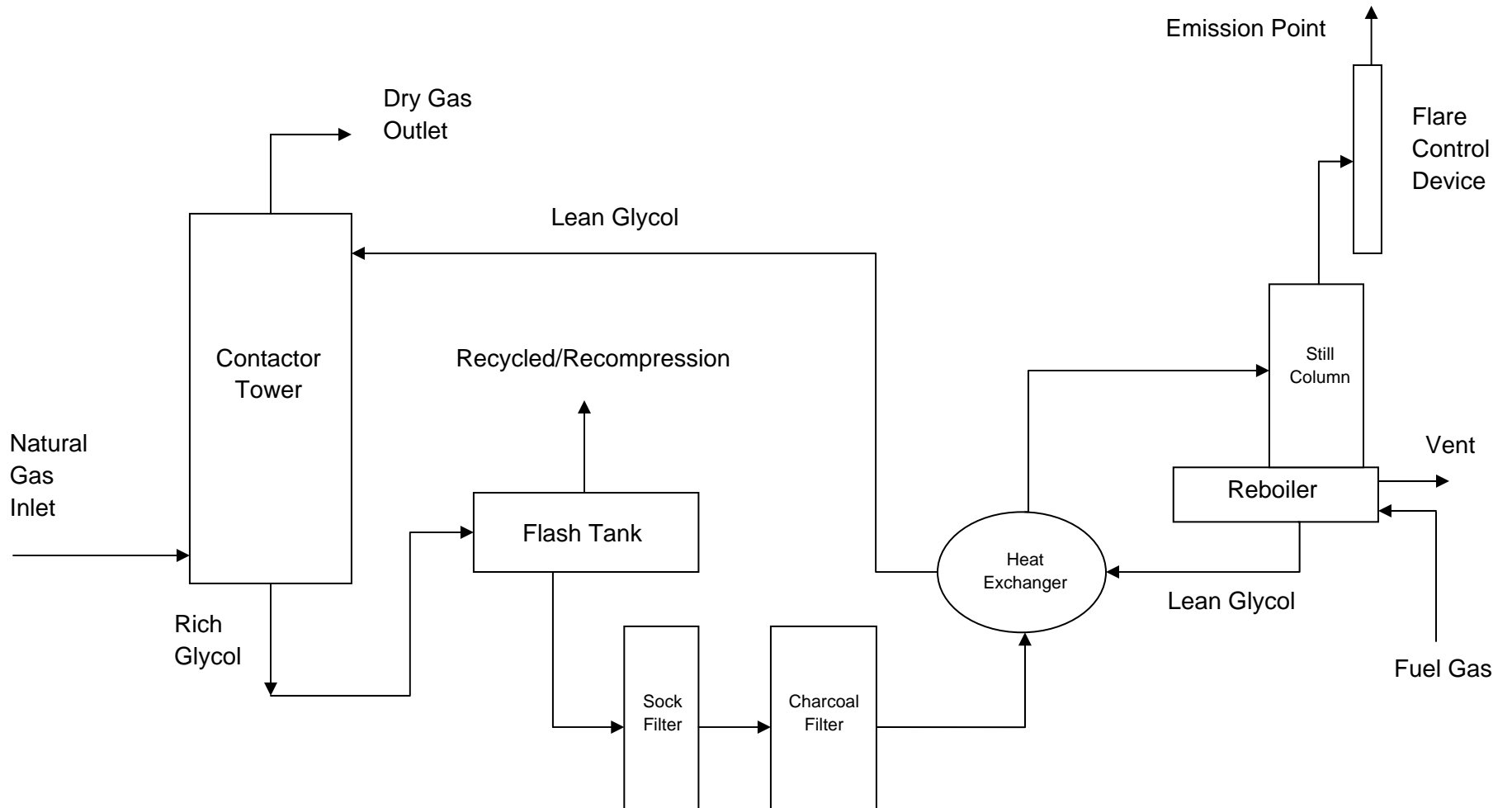
Attachment D

Process Flow Diagram

Dominion Energy Transmission, Inc.

Collins Compressor Station

Dehydration Unit (F-2, RSV-1, and RBV-1) Process Flow Diagram



Attachment E

Process Description

PROCESS DESCRIPTION

Collins Station is a natural gas compressor station that services a natural gas pipeline system, located near West Union, Doddridge County, West Virginia. The function of this facility is to recompress natural gas flowing through a pipeline for transportation.

The purpose of this permit application is to update the dehydration unit emission limits based on a recent BTEX wet gas sample (in addition to a small change in stripping gas rate). A new wet gas BTEX sample was collected for Collins Station on 8/31/17. When the sample report was received, a GLYCalc run was completed using the new BTEX sample and revealed that the annual benzene emissions exceeded the annual benzene permit limit (Emission limit = 0.02 tons/yr; GLYCalc Run = 0.0274 tons/yr). As of 9/14/17, the lean glycol flow rate was limited to operate the dehydration unit below the annual benzene permit limit; therefore, the dehydration unit is operating within compliance.

National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart HH

The dehydration unit at Collins Station is subject to this Subpart. Collins Station, having the existing flare permitted for control efficiency, is considered an area source and thus is subject to the requirements of Subpart HH. The unit is exempted under §63.764(e)(1)(ii) from the requirements of the Subpart due to actual benzene emissions being less than 1 ton/yr as shown by the potential to emit for the unit.

West Virginia Minor Source Regulations (R13 – General Permit G35-D)

The update to the dehydration unit emissions does not trigger a modification to permitting as potential to emit calculations are below exemption thresholds of:

- 6 lbs/hr and 10 tons/yr, or
- 144 lbs/day, or
- 2 lbs/hr or 5 tons/yr of HAPs

Since the proposed increase in emissions from the dehydration unit are not above these threshold levels, this permit action will be a Class II Administrative Update to the existing general permit (G35 – A076).

Pollutant	Current PTE of Dehy Unit		New PTE with Updated Dehy Limits		Change in PTE Emissions		
	(lbs/hr)	(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)	(lbs/day)	(tons/yr)
VOC	0.82	3.62	1.59	6.93	+ 0.77	+ 18.48	+ 3.31
Benzene	0.01	0.02	0.03	0.11	+ 0.02	+ 0.48	+ 0.09
Ethylbenzene	0.01	0.06	--	--	- 0.01	- 0.24	- 0.06
n-Hexane	0.02	0.07	0.04	0.16	+ 0.02	+ 0.48	+ 0.09
Toluene	0.02	0.10	0.08	0.32	+ 0.06	+ 1.44	+ 0.22
Xylene	0.05	0.21	0.13	0.54	+ 0.08	+ 1.92	+ 0.33
Total HAPs	0.11	0.46	0.28	1.13	+ 0.17	+ 4.08	+ 0.67

****Note:** The potential to emit (PTE) calculations for the dehydration unit have been updated to represent actual operations at worst case scenarios. A new GLYCalc run has been processed and a 200% safety factor has been included to the VOC and HAP limits to help with variability in operating parameters and wet gas samples.

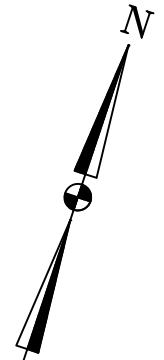
For example: VOC

GLYCalc = 3.4633 tons/yr

PTE Limits = $3.4633 * 2.0 = 6.93$ tons VOC/yr

Attachment F

Plot Plan



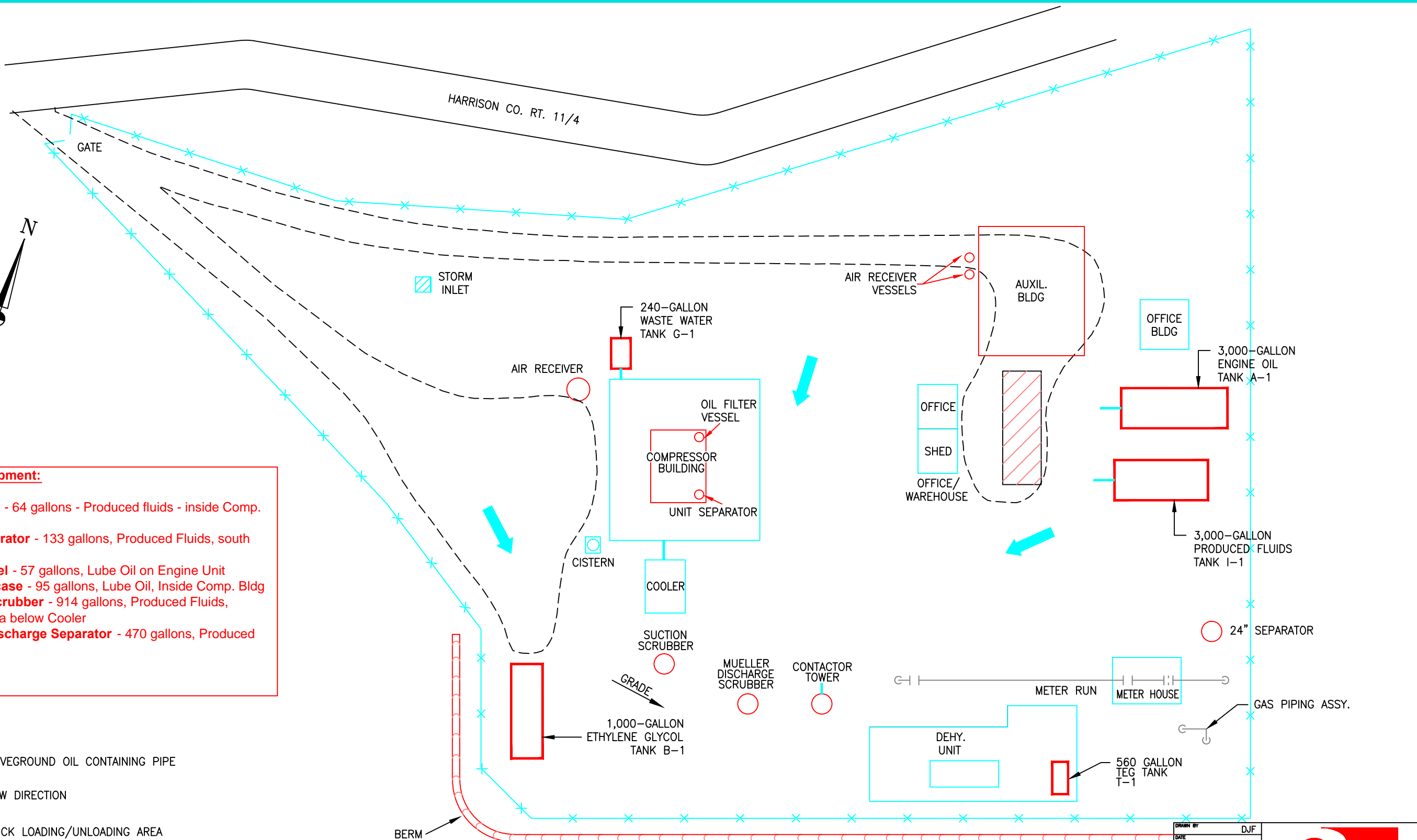
Oil Filled Equipment:

- Unit Separator** - 64 gallons - Produced fluids - inside Comp. Bldg.
- 24" Field Separator** - 133 gallons, Produced Fluids, south of tank I-1
- Oil Filter Vessel** - 57 gallons, Lube Oil on Engine Unit
- Engine Crankcase** - 95 gallons, Lube Oil, Inside Comp. Bldg
- 42" Suction Scrubber** - 914 gallons, Produced Fluids, Lower Yard area below Cooler
- 32" Mueller Discharge Separator** - 470 gallons, Produced Fluids

LEGEND:

- ABOVEGROUND OIL CONTAINING PIPE
- FLOW DIRECTION
- TRUCK LOADING/UNLOADING AREA

Note: Drums may be kept on site at various times dependent on Operational need and the number and type and location on site can vary during course of the year.



DRAWN BY	DJF
DATE	
CHECKED BY	
SET JOB NO.	205034
SET DWG FILE	COLLINSb01.dwg
DRAWING SCALE	N.T.S.



SYM.	DATE	BY	REVISION DESCRIPTION	PRJ/TSK	APP.	SCALE	N.T.S	DATE
						DRAWN	DJF (SE. TECH.)	
						CHECKED		
3	07/09/2013	JRB	PER TIM JACKSONS MARK UPS					
2	11/04/12	MPR	PER TIM JACKSONS MARK UPS					
1	4/27/10	JDB	PER RUSS EVANS MARK UPS					

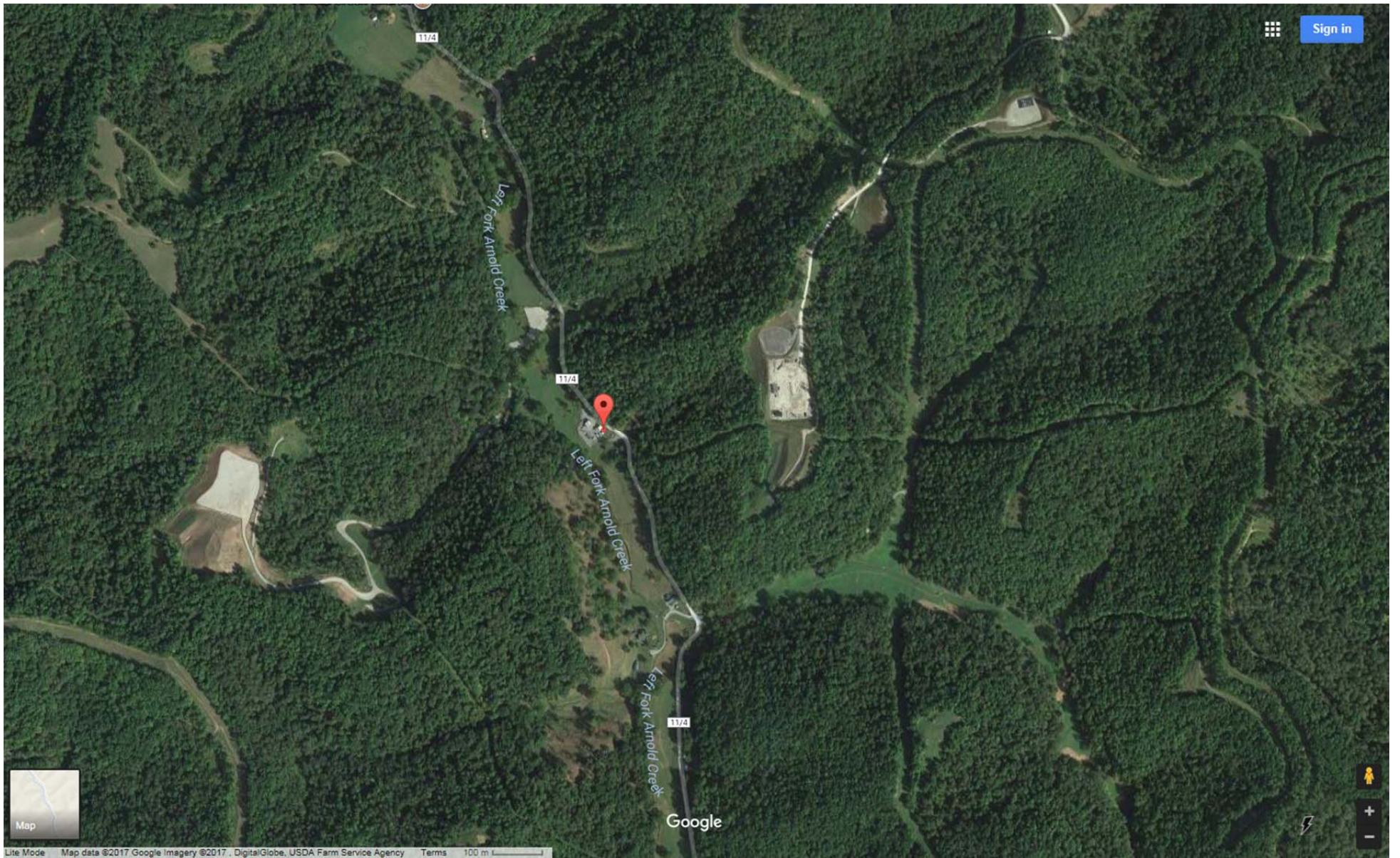
Dominion Transmission, Inc.
 445 West Main St. Clarksburg, West Virginia 26301 / Phone: (304) 623-8000

TITLE: **COLLINS STATION
 DODDRIDGE CO., WEST VIRGINIA
 ENVIRONMENTAL EMERGENCY SITE PLAN**

DIR:	GROUP	DWG. NO.	REV.
FILE:	PRJ/TSK:	PD X3997A	3

Attachment G

Area Map



Sign in

1174

Left Fork Arnold Creek

1174

Left Fork Arnold Creek

1174

Left Fork Arnold Creek

Google

Map

Lite Mode Map data ©2017 Google Imagery ©2017 DigitalGlobe, USDA Farm Service Agency Terms 100 m



Attachment H

G35-D Section Applicability Form

ATTACHMENT H – G35-D SECTION APPLICABILITY FORM

**General Permit G35-D Registration
Section Applicability Form**

General Permit G35-D was developed to allow qualified applicants to seek registration for a variety of sources. These sources include storage vessels, gas production units, in-line heaters, heater treaters, glycol dehydration units and associated reboilers, pneumatic controllers, centrifugal compressors, reciprocating compressors, reciprocating internal combustion engines (RICEs), tank truck loading, fugitive emissions, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

General Permit G35-D allows the registrant to choose which sections of the permit they are seeking registration under. Therefore, please mark which additional sections that you are applying for registration under. If the applicant is seeking registration under multiple sections, please select all that apply. Please keep in mind, that if this registration is approved, the issued registration will state which sections will apply to your affected facility.

GENERAL PERMIT G35-D APPLICABLE SECTIONS	
<input checked="" type="checkbox"/> Section 5.0	Storage Vessels Containing Condensate and/or Produced Water ¹
<input type="checkbox"/> Section 6.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)
<input checked="" type="checkbox"/> Section 7.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa and/or NESHAP Subpart HH
<input checked="" type="checkbox"/> Section 8.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
<input type="checkbox"/> Section 9.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO/OOOOa)
<input type="checkbox"/> Section 10.0	Centrifugal Compressor Affected Facility (NSPS, Subpart OOOO/OOOOa) ²
<input type="checkbox"/> Section 11.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO/OOOOa) ²
<input type="checkbox"/> Section 12.0	Reciprocating Internal Combustion Engines, Generator Engines. Microturbine Generators
<input type="checkbox"/> Section 13.0	Tanker Truck Loading ³
<input checked="" type="checkbox"/> Section 14.0	Glycol Dehydration Units ⁴
<input checked="" type="checkbox"/> Section 15.0	Blowdown and Pigging Operations
<input type="checkbox"/> Section 16.0	Fugitive Emission Components (NSPS, Subpart OOOOa)

- 1 Applicants that are subject to Section 5 may also be subject to Section 6 if the applicant is subject to the NSPS, Subpart OOOO/OOOOa control requirements or the applicable control device requirements of Section 7.*
- 2 Applicants that are subject to Section 10 and 11 may also be subject to the applicable RICE requirements of Section 12.*
- 3 Applicants that are subject to Section 13 may also be subject to control device and emission reduction device requirements of Section 7.*
- 4 Applicants that are subject to Section 14 may also be subject to the requirements of Section 8 (reboilers). Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 7.*

Attachment I

Emissions Units/ERD Table

ATTACHMENT I – EMISSION UNITS / EMISSION REDUCTION DEVICES (ERD) TABLE

Include ALL emission units and air pollution control devices/ERDs that will be part of this permit application review. Do not include fugitive emission sources in this table. Deminimis storage tanks shall be listed in the Attachment K table. This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

Emission Unit ID ¹	Emission Point ID ²	Emission Unit Description	Year Installed	Manufac. Date ³	Design Capacity	Type ⁴ and Date of Change	Control Device(s) ⁵	ERD(s) ⁶
RBV-1	RBV-1	Reboiler Vent	2012	N/A	0.384 MMBtu/hr	Existing	N/A	N/A
RSV-1	RSV-1	TEG Dehydration Unit (Cameron 150/275)	2012	N/A	5.3 MMscf/day	Existing	F-2 – Thermal Oxidizer	N/A
F-2	F-2	Thermal Oxidizer (QTI Q50)	2012	N/A	2.0 MMBtu/hr	Existing	N/A	N/A
T01	T01	Tank - Triethylene Glycol	2012	N/A	560 gallons	Existing	N/A	N/A
T02	T02	Tank - Produced Fluids	1997	N/A	3,000 gallons	Existing	N/A	N/A
T03	T03	Tank – Waste Water	2012	N/A	240 gallons	Existing	N/A	N/A
T04	T04	Tank – Lube Oil	2012	N/A	3,000 gallons	Existing	N/A	N/A
T05	T05	Tank – Ethylene Glycol	1991	N/A	1000 gallons	Existing	N/A	N/A
**Note: Tanks T01-T05 are existing tanks, but are being added to the G35-D general permit application as requested by WVDEP.								

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 When required by rule
⁴ New, modification, removal, existing
⁵ For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.
⁶ For ERDs use the following numbering system: 1D, 2D, 3D,... or other appropriate designation.

Attachment K

Storage Vessel Data Sheet

ATTACHMENT K – STORAGE VESSEL DATA SHEET

Complete this data sheet if you are the owner or operator of a storage vessel that contains condensate and/or produced water. This form must be completed for *each* new or modified bulk liquid storage vessel(s) that contains condensate and/or produced water. (If you have more than one (1) identical tank (i.e. 4-400 bbl condensate tanks), then you can list all on one (1) data sheet). **Include gas sample analysis, flashing emissions, working and breathing losses, USEPA Tanks, simulation software (ProMax, E&P Tanks, HYSYS, etc.), and any other supporting documents where applicable.**

The following information is REQUIRED:

- Composition of the representative sample used for the simulation
- For each stream that contributes to flashing emissions:
 - Temperature and pressure (inlet and outlet from separator(s))
 - Simulation-predicted composition
 - Molecular weight
 - Flow rate
- Resulting flash emission factor or flashing emissions from simulation
- Working/breathing loss emissions from tanks and/or loading emissions if simulation is used to quantify those emissions

Additional information may be requested if necessary.

GENERAL INFORMATION

1. Bulk Storage Area Name: Collins Station	2. Tank Name: Produced Fluids
3. Emission Unit ID number: T02	4. Emission Point ID number: T02
5. Date Installed , Modified or Relocated (<i>for existing tanks</i>) 1997 Was the tank manufactured after August 23, 2011? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6. Type of change: No change <input type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other <input type="checkbox"/> Relocation
7A. Description of Tank Modification (<i>if applicable</i>) N/A	
7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Was USEPA Tanks simulation software utilized? <input checked="" type="checkbox"/> Yes – E&P Tanks was used (see attached) <input type="checkbox"/> No	
<i>If Yes, please provide the appropriate documentation and items 8-42 below are not required.</i>	

TANK INFORMATION

8. Design Capacity (*specify barrels or gallons*). Use the internal cross-sectional area multiplied by internal height.

9A. Tank Internal Diameter (ft.)	9B. Tank Internal Height (ft.)
10A. Maximum Liquid Height (ft.)	10B. Average Liquid Height (ft.)
11A. Maximum Vapor Space Height (ft.)	11B. Average Vapor Space Height (ft.)

12. Nominal Capacity (*specify barrels or gallons*). This is also known as “working volume”.

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
---	---

14. Number of tank turnovers per year

15. Maximum tank fill rate (gal/min)

16. Tank fill method Submerged Splash Bottom Loading

17. Is the tank system a variable vapor space system? Yes No
 If yes, (A) What is the volume expansion capacity of the system (gal)?
 (B) What are the number of transfers into the system per year?

18. Type of tank (check all that apply):

Fixed Roof vertical horizontal flat roof cone roof dome roof other (describe)

External Floating Roof pontoon roof double deck roof

Domed External (or Covered) Floating Roof

Internal Floating Roof vertical column support self-supporting

Variable Vapor Space lifter roof diaphragm

Pressurized spherical cylindrical

Other (describe)

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

Does Not Apply Rupture Disc (psig)

Inert Gas Blanket of _____ Carbon Adsorption¹

Vent to Vapor Combustion Device¹ (vapor combustors, flares, thermal oxidizers, enclosed combustors)

Conservation Vent (psig) Condenser¹

Vacuum Setting Pressure Setting

Emergency Relief Valve (psig)

Vacuum Setting Pressure Setting

Thief Hatch Weighted Yes No

¹ Complete appropriate Air Pollution Control Device Sheet

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

Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method ¹
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	

¹ EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)
Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

TANK CONSTRUCTION AND OPERATION INFORMATION			
21. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunitite lined <input type="checkbox"/> Epoxy-coated rivets <input type="checkbox"/> Other (describe)			
21A. Shell Color:	21B. Roof Color:	21C. Year Last Painted:	
22. Shell Condition (if metal and unlined): <input type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable			
22A. Is the tank heated? <input type="checkbox"/> Yes <input type="checkbox"/> No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?	
23. Operating Pressure Range (psig): Must be listed for tanks using VRUs with closed vent system.			
24. Is the tank a Vertical Fixed Roof Tank ? <input type="checkbox"/> Yes <input type="checkbox"/> No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):	
25. Complete item 25 for Floating Roof Tanks <input type="checkbox"/> Does not apply <input type="checkbox"/>			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type (<i>check one</i>): <input type="checkbox"/> Metallic (mechanical) shoe seal <input type="checkbox"/> Liquid mounted resilient seal <input type="checkbox"/> Vapor mounted resilient seal <input type="checkbox"/> Other (describe):			
25C. Is the Floating Roof equipped with a secondary seal? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25D. If yes, how is the secondary seal mounted? (<i>check one</i>) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):			
25E. Is the floating roof equipped with a weather shield? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25F. Describe deck fittings:			
26. Complete the following section for Internal Floating Roof Tanks <input type="checkbox"/> Does not apply			
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	26B. For bolted decks, provide deck construction:		
26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft ²):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
27. Closed Vent System with VRU? <input type="checkbox"/> Yes <input type="checkbox"/> No			
28. Closed Vent System with Enclosed Combustor? <input type="checkbox"/> Yes <input type="checkbox"/> No			
SITE INFORMATION			
29. Provide the city and state on which the data in this section are based:			
30. Daily Avg. Ambient Temperature (°F):		31. Annual Avg. Maximum Temperature (°F):	
32. Annual Avg. Minimum Temperature (°F):		33. Avg. Wind Speed (mph):	
34. Annual Avg. Solar Insulation Factor (BTU/ft ² -day):		35. Atmospheric Pressure (psia):	
LIQUID INFORMATION			
36. Avg. daily temperature range of bulk liquid (°F):	36A. Minimum (°F):	36B. Maximum (°F):	
37. Avg. operating pressure range of tank (psig):	37A. Minimum (psig):	37B. Maximum (psig):	
38A. Minimum liquid surface temperature (°F):		38B. Corresponding vapor pressure (psia):	
39A. Avg. liquid surface temperature (°F):		39B. Corresponding vapor pressure (psia):	
40A. Maximum liquid surface temperature (°F):		40B. Corresponding vapor pressure (psia):	
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:			
41B. CAS number:			
41C. Liquid density (lb/gal):			
41D. Liquid molecular weight (lb/lb-mole):			
41E. Vapor molecular weight (lb/lb-mole):			

41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year. From: To:			
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.			

STORAGE TANK DATA TABLE

List all deminimis storage tanks (i.e. lube oil, glycol, diesel etc.)

Source ID # ¹	Status ²	Content ³	Volume ⁴
T01	EXIST	Triethylene Glycol	560
T03	EXIST	Waste Water	240
T04	EXIST	Lube Oil	3,000
T05	EXIST	Ethylene Glycol	1,000

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the compressor station. Tanks should be designated T01, T02, T03, etc.
2. Enter storage tank Status using the following:
 - EXIST Existing Equipment
 - NEW Installation of New Equipment
 - REM Equipment Removed
3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, diesel, mercaptan etc.
4. Enter the maximum design storage tank volume in gallons.

 * Project Setup Information *

 Project File : U:\Gas\Facilities\Collins\Collins - 2017 G35-D Increase Dehy Limits\Collins -
 Flowsheet Selection : Oil Tank with Separator
 Calculation Method : RVP Distillation
 Control Efficiency : 100.0%
 Known Separator Stream : Low Pressure Oil
 Entering Air Composition : No

 Well Name : Collins Station
 Well ID : Tank T02
 Date : 2018.02.15

 * Data Input *

 Separator Pressure : 21.00[psig]
 Separator Temperature : 88.00[F]
 Ambient Pressure : 14.70[psia]
 Ambient Temperature : 70.00[F]
 C10+ SG : 0.8496
 C10+ MW : 294.70

-- Low Pressure Oil -----

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.0050
4	N2	0.0150
5	C1	0.9500
6	C2	0.7810
7	C3	0.9740
8	i-C4	0.3100
9	n-C4	0.8550
10	i-C5	0.6900
11	n-C5	0.9510
12	C6	2.0730
13	C7	8.2610
14	C8	11.3560
15	C9	7.4810
16	C10+	60.3790
17	Benzene	0.1830
18	Toluene	0.4570
19	E-Benzene	0.4570
20	Xylenes	1.4610
21	n-C6	2.3600
22	224Trimethylp	0.0000

-- Sales Oil -----

Production Rate : 0.4[bb1/day]
 Days of Annual Operation : 365 [days/year]
 API Gravity : 40.88
 Reid Vapor Pressure : 1.84[psia]

 * Calculation Results *

-- Emission Summary -----

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
Total HAPs	0.000	0.000

Total HC	0.079	0.018
VOCs, C2+	0.066	0.015
VOCs, C3+	0.046	0.011

Uncontrolled Recovery Info.

Vapor	5.0500 x1E-3	[MSCFD]
HC Vapor	5.0100 x1E-3	[MSCFD]
GOR	12.92	[SCF/bbl]

-- Emission Composition -----

No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
1	H2S	0.000	0.000
2	O2	0.000	0.000
3	CO2	0.000	0.000
4	N2	0.000	0.000
5	C1	0.013	0.003
6	C2	0.020	0.005
7	C3	0.030	0.007
8	i-C4	0.003	0.001
9	n-C4	0.005	0.001
10	i-C5	0.001	0.000
11	n-C5	0.001	0.000
12	C6	0.001	0.000
13	C7	0.001	0.000
14	C8	0.001	0.000
15	C9	0.000	0.000
16	C10+	0.000	0.000
17	Benzene	0.000	0.000
18	Toluene	0.000	0.000
19	E-Benzene	0.000	0.000
20	Xylenes	0.000	0.000
21	n-C6	0.001	0.000
22	224Trimethylp	0.000	0.000
	Total	0.077	0.018

-- Stream Data -----

No.	Component	MW	LP Oil mol %	Flash Oil mol %	Sale Oil mol %	Flash Gas mol %	W&S Gas mol %	Total Emissions mol %
1	H2S	34.80	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	CO2	44.01	0.0050	0.0030	0.0000	0.1939	0.1698	0.1787
4	N2	28.01	0.0150	0.0021	0.0000	1.2551	0.1176	0.5362
5	C1	16.04	0.9500	0.3212	0.0000	61.4000	17.9792	33.9561
6	C2	30.07	0.7810	0.5743	0.0027	20.6572	31.9946	27.8230
7	C3	44.10	0.9740	0.8860	0.1968	9.4309	38.7707	27.9750
8	i-C4	58.12	0.3100	0.3004	0.2511	1.2331	3.0109	2.3568
9	n-C4	58.12	0.8550	0.8386	0.7757	2.4320	4.2956	3.6099
10	i-C5	72.15	0.6900	0.6895	0.6867	0.7423	0.8389	0.8034
11	n-C5	72.15	0.9510	0.9530	0.9552	0.7634	0.8322	0.8069
12	C6	86.16	2.0730	2.0897	2.1189	0.4652	0.4866	0.4787
13	C7	100.20	8.2610	8.3406	8.4807	0.6123	0.6423	0.6312
14	C8	114.23	11.3560	11.4715	11.6751	0.2632	0.2788	0.2731
15	C9	128.28	7.4810	7.5583	7.6945	0.0594	0.0674	0.0644
16	C10+	294.70	60.3790	61.0076	62.1175	0.0000	0.0000	0.0000
17	Benzene	78.11	0.1830	0.1846	0.1874	0.0309	0.0323	0.0318
18	Toluene	92.13	0.4570	0.4615	0.4695	0.0215	0.0226	0.0222
19	E-Benzene	106.17	0.4570	0.4617	0.4699	0.0070	0.0075	0.0073
20	Xylenes	106.17	1.4610	1.4760	1.5025	0.0194	0.0207	0.0202
21	n-C6	86.18	2.3600	2.3803	2.4157	0.4132	0.4323	0.4253
22	224Trimethylp	114.24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MW		217.00	218.99	222.30	25.65	37.03	32.85
	Stream Mole Ratio		1.0000	0.9897	0.9720	0.0103	0.0177	0.0280
	Heating Value	[BTU/SCF]				1500.55	2132.37	1899.89
	Gas Gravity	[Gas/Air]				0.89	1.28	1.13
	Bubble Pt. @ 100F	[psia]	40.47	17.83	2.13			
	RVP @ 100F	[psia]	7.41	5.03	1.84			

Spec. Gravity @ 100F	0.709	0.710	0.711
----------------------	-------	-------	-------

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

For: Dominion Transmission, Inc.
P. O. Box 2450
Clarksburg, West Virginia 26301

Sample: Weston GMC 13139
Separator Hydrocarbon Liquid
Sampled @ 21 psig & 88 °F

Date Sampled: 09/10/13

Job Number: 35596.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.015	0.002	0.002
Carbon Dioxide	0.005	0.001	0.001
Methane	0.950	0.192	0.070
Ethane	0.781	0.249	0.108
Propane	0.974	0.320	0.198
Isobutane	0.310	0.121	0.083
n-Butane	0.825	0.310	0.221
2,2 Dimethylpropane	0.031	0.014	0.010
Isopentane	0.690	0.301	0.230
n-Pentane	0.951	0.411	0.316
2,2 Dimethylbutane	0.077	0.038	0.031
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.105	0.051	0.042
2 Methylpentane	1.184	0.586	0.470
3 Methylpentane	0.707	0.344	0.281
n-Hexane	2.360	1.157	0.937
Heptanes Plus	<u>90.034</u>	<u>95.902</u>	<u>97.000</u>
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

Specific Gravity -----	0.8291	(Water=1)
°API Gravity -----	39.17	@ 60°F
Molecular Weight -----	233.8	
Vapor Volume -----	11.26	CF/Gal
Weight -----	6.91	Lbs/Gal

Characteristics of Total Sample:

Specific Gravity -----	0.8197	(Water=1)
°API Gravity -----	41.12	@ 60°F
Molecular Weight -----	217.0	
Vapor Volume -----	11.99	CF/Gal
Weight -----	6.83	Lbs/Gal

Base Conditions: 14.650 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: XG
Processor: JCdjv
Cylinder ID: W-1013

David Dannhaus 361-661-7015

TANKS DATA INPUT REPORT

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.005	0.001	0.001
Nitrogen	0.015	0.002	0.002
Methane	0.950	0.192	0.070
Ethane	0.781	0.249	0.108
Propane	0.974	0.320	0.198
Isobutane	0.310	0.121	0.083
n-Butane	0.855	0.324	0.231
Isopentane	0.690	0.301	0.230
n-Pentane	0.951	0.411	0.316
Other C-6's	2.073	1.020	0.824
Heptanes	8.261	4.324	3.698
Octanes	11.356	6.427	5.703
Nonanes	7.481	4.894	4.383
Decanes Plus	60.379	79.137	82.018
Benzene	0.183	0.061	0.066
Toluene	0.457	0.182	0.194
E-Benzene	0.457	0.210	0.224
Xylenes	1.461	0.668	0.715
n-Hexane	2.360	1.157	0.937
2,2,4 Trimethylpentane	<u>0.000</u>	<u>0.000</u>	<u>0.000</u>
Totals:	100.000	100.000	100.000

Characteristics of Total Sample:

Specific Gravity -----	0.8197	(Water=1)
°API Gravity -----	41.12	@ 60°F
Molecular Weight-----	217.0	
Vapor Volume -----	11.99	CF/Gal
Weight -----	6.83	Lbs/Gal

Characteristics of Decanes (C10) Plus:

Specific Gravity -----	0.8496	(Water=1)
Molecular Weight-----	294.7	

Characteristics of Atmospheric Sample:

°API Gravity -----	40.88	@ 60°F
Reid Vapor Pressure (ASTM D-5191)-----	1.84	psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
Cylinder Number	-----	W-1013*	W-1586
Pressure, PSIG	21	18	19
Temperature, °F	88	70	70

* Sample used for analysis

TOTAL EXTENDED REPORT

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.015	0.002	0.002
Carbon Dioxide	0.005	0.001	0.001
Methane	0.950	0.192	0.070
Ethane	0.781	0.249	0.108
Propane	0.974	0.320	0.198
Isobutane	0.310	0.121	0.083
n-Butane	0.825	0.310	0.221
2,2 Dimethylpropane	0.031	0.014	0.010
Isopentane	0.690	0.301	0.230
n-Pentane	0.951	0.411	0.316
2,2 Dimethylbutane	0.077	0.038	0.031
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.105	0.051	0.042
2 Methylpentane	1.184	0.586	0.470
3 Methylpentane	0.707	0.344	0.281
n-Hexane	2.360	1.157	0.937
Methylcyclopentane	0.735	0.310	0.285
Benzene	0.183	0.061	0.066
Cyclohexane	0.802	0.325	0.311
2-Methylhexane	1.372	0.761	0.634
3-Methylhexane	1.168	0.639	0.540
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	0.771	0.411	0.352
n-Heptane	3.412	1.877	1.576
Methylcyclohexane	2.359	1.131	1.068
Toluene	0.457	0.182	0.194
Other C-8's	5.444	3.126	2.765
n-Octane	3.553	2.170	1.870
E-Benzene	0.457	0.210	0.224
M & P Xylenes	0.585	0.270	0.286
O-Xylene	0.877	0.397	0.429
Other C-9's	4.225	2.710	2.458
n-Nonane	3.255	2.184	1.924
Other C-10's	5.577	3.931	3.631
n-decane	2.597	1.900	1.703
Undecanes(11)	6.665	4.820	4.515
Dodecanes(12)	5.370	4.195	3.985
Tridecanes(13)	4.936	4.134	3.981
Tetradecanes(14)	3.907	3.506	3.421
Pentadecanes(15)	3.427	3.293	3.254
Hexadecanes(16)	2.663	2.735	2.725
Heptadecanes(17)	2.386	2.592	2.607
Octadecanes(18)	2.065	2.361	2.388
Nonadecanes(19)	1.988	2.368	2.410
Eicosanes(20)	1.565	1.938	1.984
Heneicosanes(21)	1.422	1.852	1.907
Docosanes(22)	1.203	1.633	1.691
Tricosanes(23)	0.987	1.390	1.447
Tetracosanes(24)	0.829	1.209	1.265
Pentacosanes(25)	0.848	1.283	1.348
Hexacosanes(26)	0.761	1.193	1.260
Heptacosanes(27)	0.717	1.166	1.236
Octacosanes(28)	0.542	0.911	0.969
Nonacosanes(29)	0.519	0.900	0.961
Triacotanes(30)	0.408	0.730	0.781
Hentriacotanes Plus(31+)	<u>8.997</u>	<u>29.097</u>	<u>32.550</u>
Total	100.000	100.000	100.000

Attachment O

Glycol Dehydration Unit Data Sheets

ATTACHMENT O – GLYCOL DEHYDRATION UNIT DATA SHEET

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

Manufacturer: Cameron		Model: 150/275			
Max. Dry Gas Flow Rate: 5.3 MMscf/day		Reboiler Design Heat Input: 0.384 MMBTU/hr			
Design Type: <input checked="" type="checkbox"/> TEG <input type="checkbox"/> DEG <input type="checkbox"/> EG		Source Status ¹ : ES			
Date Installed/Modified/Removed ² : 2012		Regenerator Still Vent APCD/ERD ³ : TO			
Control Device/ERD ID# ³ : Thermal Oxidizer / F-2		Fuel HV (BTU/scf): 1,000			
H ₂ S Content (gr/100 scf): 0.25		Operation (hours/year): 8,760			
Pump Rate (scfm): 3,680.6 (5.3 MMscf/day)					
Water Content (wt %) in: Wet Gas: Saturated Dry Gas: 7.0 lbs H ₂ O/MMscf					
Is the glycol dehydration unit exempt from 40CFR63 Section 764(d)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No: If Yes, answer the following:					
The actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters per day, as determined by the procedures specified in §63.772(b)(1) of this subpart. <input type="checkbox"/> Yes <input type="checkbox"/> No					
The actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram per year (1 ton per year), as determined by the procedures specified in §63.772(b)(2) of this subpart. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No					
Is the glycol dehydration unit located within an Urbanized Area (UA) or Urban Cluster (UC)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
Is a lean glycol pump optimization plan being utilized? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
Recycling the glycol dehydration unit back to the flame zone of the reboiler. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Is the reboiler configured to accept flash drum vapors (straight from the glycol dehydrator)? <input type="checkbox"/> Yes <input type="checkbox"/> No Is the reboiler configured to accept still vent vapors (after a condenser)? <input type="checkbox"/> Yes <input type="checkbox"/> No Is the reboiler configured to accept both in the same operation? <input type="checkbox"/> Yes <input type="checkbox"/> No					
Recycling the glycol dehydration unit back to the flame zone of the reboiler and mixed with fuel. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
What happens when temperature controller shuts off fuel to the reboiler? <input type="checkbox"/> Still vent emissions to the atmosphere. <input checked="" type="checkbox"/> Still vent emissions to the flare. <input type="checkbox"/> Still vent emissions stopped with valve. <input type="checkbox"/> Still vent emissions to glow plug.					
Please indicate if the following equipment is present. <input checked="" type="checkbox"/> Flash Tank <input type="checkbox"/> Burner management system that continuously burns condenser or flash tank vapors					
Control Device Technical Data					
Pollutants Controlled			Manufacturer's Guaranteed Control Efficiency (%)		
VOC, HAPs			95%		
Emissions Data					
Emission Unit ID / Emission Point ID ⁴	Description	Calculation Methodology ⁵	PTE ⁶	Controlled Maximum Hourly Emissions (lb/hr)	Controlled Maximum Annual Emissions (tpy)
RBV-1	Reboiler Vent	MD	NO _x	0.03	0.13
		MD	CO	0.02	0.09
		MD	VOC	0.03	0.15
		AP	SO ₂	1.85E-04	8.09E-04

		AP	PM ₁₀ (filterable + condensible)	2.34E-03	0.01
		OT	GHG (CO ₂ e)	44.97	196.95
RSV-1	Glycol Regenerator Still Vent **Note: Includes Safety Factor	GRI-GlyCalc™	VOC	1.59	6.93
		GRI-GlyCalc™	Benzene	0.03	0.11
		GRI-GlyCalc™	Toluene	0.08	0.32
		GRI-GlyCalc™	Ethylbenzene	--	--
		GRI-GlyCalc™	Xylenes	0.13	0.54
		GRI-GlyCalc™	n-Hexane	0.04	0.16
GFT-1**	Glycol Flash Tank	GRI-GlyCalc™	VOC	N/A	N/A
		GRI-GlyCalc™	Benzene	N/A	N/A
		GRI-GlyCalc™	Toluene	N/A	N/A
		GRI-GlyCalc™	Ethylbenzene	N/A	N/A
		GRI-GlyCalc™	Xylenes	N/A	N/A
		GRI-GlyCalc™	n-Hexane	N/A	N/A

****Note: The flash tank is recycled/recompressed back into the process. Therefore, there are no emissions to the atmosphere.**

- 1 Enter the Source Status using the following codes:
NS Construction of New Source ES Existing Source
MS Modification of Existing Source
- 2 Enter the date (or anticipated date) of the glycol dehydration unit's installation (construction of source), modification or removal.
- 3 Enter the Air Pollution Control Device (APCD)/Emission Reduction Device (ERD) type designation using the following codes and the device ID number:
NA None CD Condenser FL Flare
CC Condenser/Combustion Combination TO Thermal Oxidizer O Other (please list)
- 4 Enter the appropriate Emission Unit ID Numbers and Emission Point ID Numbers for the glycol dehydration unit reboiler vent and glycol regenerator still vent. The glycol dehydration unit reboiler vent and glycol regenerator still vent should be designated RBV-1 and RSV-1, respectively. If the compressor station incorporates multiple glycol dehydration units, a Glycol Dehydration Emission Unit Data Sheet shall be completed for each, using Source Identification RBV-2 and RSV-2, RBV-3 and RSV-3, etc.
- 5 Enter the Potential Emissions Data Reference designation using the following codes:
MD Manufacturer's Data AP AP-42
GR GRI-GLYCalc™ OT Other 40 CFR Part 98 (please list)
- 6 Enter the Reboiler Vent and Glycol Regenerator Still Vent Potential to Emit (PTE) for the listed regulated pollutants in lbs per hour and tons per year. The Glycol Regenerator Still Vent potential emissions may be determined using the most recent version of the thermodynamic software model GRI-GLYCalc™ (Radian International LLC & Gas Research Institute). **Attach all referenced Potential Emissions Data (or calculations) and the GRI-GLYCalc™ Aggregate Calculations Report (shall include emissions reports, equipment reports, and stream reports) to this Glycol Dehydration Emission Unit Data Sheet(s). Backup pumps do not have to be considered as operating for purposes of PTE.** This PTE data shall be incorporated in the Emissions Summary Sheet.

Table B-1
Section 60.18 Demonstration

Collins Station	
Type	Unassisted
Throat Diameter (inches)	13.2

GLYCalc	INPUT mole	1850	scf/h
		Compound Net Heating Value (Btu/scf)	Mixture Net Heating Value (Btu/scf)
Compound	percent		
water	75.700	0	0.0
carbon dioxide	0.047	0	0.0
nitrogen	0.159	0	0.0
methane	17.000	913	155.2
ethane	3.100	1641	50.9
propane	1.400	2385	33.4
Isobutane	0.236	3105	7.3
n-butane	0.503	3113	15.7
Isopentane	0.157	3716	5.8
n-pentane	0.151	3709	5.6
cyclopentane	0.000	3516	0.0
n-hexane	0.083	4412	3.7
cyclohexane	0.048	4185	2.0
other hexanes	0.030	4870	1.5
heptane	0.094	4925	4.6
benzene	0.065	3601	2.3
toluene	0.158	4284	6.8
ethylbenzene	0.000	4977	0.0
xylene	0.238	4980	11.9
octane (C8+)	0.700	5804	40.6
hydrogen sulfide	0.000	596	0.0
TOTALS:	100		347.2

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	0.0	scfh
Composite net heating value	361.86	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)	347	13.0
$V_{max} = 10 \sqrt{(LHV+28.2)/31.7}$ for V_{max} in m/sec and LHV in MJ/scm	m/sec	ft/sec
(1 m = 3.28 ft)	20.8	68.1
V_{max} limit based on 40 CFR 60.18(b)(4)(iii)	20.8	68.1

Actual flare exit velocity:

Total volumetric flow (vent gas + assist gas in scfh/3600 sec/hr) =	0.51	scf/sec
Total volumetric flow at 180F & atmospheric pressure =	0.66	cf/sec
Flare exit cross-sectional area based on throat diameter =	0.95	ft ²
Velocity = volumetric flow / cross-sectional area =	0.7	ft/sec

FESCO, Ltd.
104 FESCO Run - Bridgeport, West Virginia 26330

For: Dominion Transmission, Inc.
 P. O. Box 2450
 Clarksburg, West Virginia 26302

Sample: Collins Station
 Port ID No. 4638
 Spot Gas Sampled @ 220 psig & 102 °F

Date Sampled: 08/30/17

Job Number: 01968.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2286

COMPONENT	MOL%	GPM
Oxygen	0.006	
Nitrogen	0.736	
Carbon Dioxide	0.116	
Methane	79.022	
Ethane	12.600	3.381
Propane	4.602	1.272
Isobutane	0.641	0.210
n-Butane	1.166	0.369
2-2 Dimethylpropane	0.000	0.000
Isopentane	0.340	0.125
n-Pentane	0.278	0.101
Hexanes	0.265	0.110
Heptanes Plus	<u>0.228</u>	<u>0.099</u>
Totals	100.000	5.667

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity ----- 3.494 (Air=1)
 Molecular Weight ----- 100.85
 Gross Heating Value ----- 5341 BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity ----- 0.718 (Air=1)
 Compressibility (Z) ----- 0.9965
 Molecular Weight ----- 20.71
 Gross Heating Value
 Dry Basis ----- 1253 BTU/CF
 Saturated Basis ----- 1232 BTU/CF

Base Conditions: 14.730 PSI & 60 Deg F

Sampled By: Dominion
 Analyst: DH
 Processor: AC
 Cylinder ID: Dominion

Certified: Fesco, Ltd. - Bridgeport, West Virginia

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2286
TOTAL REPORT

COMPONENT	MOL %	GPM	WT %
Oxygen	0.006		0.009
Nitrogen	0.736		0.996
Carbon Dioxide	0.116		0.247
Methane	79.022		61.215
Ethane	12.600	3.381	18.295
Propane	4.602	1.272	9.799
Isobutane	0.641	0.210	1.799
n-Butane	1.166	0.369	3.273
2,2 Dimethylpropane	0.000	0.000	0.000
Isopentane	0.340	0.125	1.185
n-Pentane	0.278	0.101	0.969
2,2 Dimethylbutane	0.011	0.005	0.046
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.022	0.009	0.092
2 Methylpentane	0.086	0.036	0.358
3 Methylpentane	0.048	0.020	0.200
n-Hexane	0.098	0.040	0.408
Methylcyclopentane	0.017	0.006	0.069
Benzene	0.003	0.001	0.011
Cyclohexane	0.015	0.005	0.061
2-Methylhexane	0.023	0.011	0.111
3-Methylhexane	0.021	0.010	0.102
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.028	0.012	0.134
n-Heptane	0.032	0.015	0.155
Methylcyclohexane	0.026	0.010	0.123
Toluene	0.005	0.002	0.022
Other C8's	0.031	0.014	0.165
n-Octane	0.010	0.005	0.055
Ethylbenzene	0.000	0.000	0.000
M & P Xylenes	0.003	0.001	0.015
O-Xylene	0.001	0.000	0.005
Other C9's	0.009	0.005	0.055
n-Nonane	0.002	0.001	0.012
Other C10's	0.001	0.001	0.007
n-Decane	0.001	0.001	0.007
Undecanes (11)	<u>0.000</u>	<u>0.000</u>	<u>0.000</u>
Totals	100.000	5.667	100.000

Computed Real Characteristics of Total Sample

Specific Gravity -----	0.718	(Air=1)
Compressibility (Z) -----	0.9965	
Molecular Weight -----	20.71	

Gross Heating Value

Dry Basis -----	1253	BTU/CF
Saturated Basis -----	1232	BTU/CF

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Collins Station PTE Emissions

File Name: C:\Users\dani659\Desktop\Collins Station PTE Emissions.ddf

Date: November 09, 2017

DESCRIPTION:

Description: Collins Station PTE Emissions
 Extended Wet Gas Analysis Sample Date:
 8/30/2017

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 120.00 deg. F
 Pressure: 265.00 psig
 Wet Gas Water Content: Saturated

Component	Conc. (vol %)
-----	-----
Carbon Dioxide	0.1160
Nitrogen	0.7360
Methane	79.0220
Ethane	12.6000
Propane	4.6020
Isobutane	0.6410
n-Butane	1.1660
Isopentane	0.3400
n-Pentane	0.2780
n-Hexane	0.0980
Cyclohexane	0.0150
Other Hexanes	0.0440
Heptanes	0.0600
Methylcyclohexane	0.0260
Benzene	0.0030
Toluene	0.0050
Xylenes	0.0040
C8+ Heavies	0.0540

DRY GAS:

Flow Rate: 5.3 MMSCF/day
 Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
 Water Content: 0.3 wt% H2O
 Flow Rate: 3.0 gpm

PUMP:

Glycol Pump Type: Electric/Pneumatic

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: 6.500 scfm

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device: Combustion Device
Destruction Efficiency: 95.0 %
Excess Oxygen: 5.0 %
Ambient Air Temperature: 68.0 deg. F

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Collins Station PTE Emissions

File Name: C:\Users\dani659\Desktop\Collins Station PTE Emissions.ddf

Date: November 09, 2017

DESCRIPTION:

Description: Collins Station PTE Emissions

Extended Wet Gas Analysis Sample Date:

8/30/2017

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.6660	15.984	2.9170
Ethane	0.2269	5.445	0.9937
Propane	0.1508	3.618	0.6603
Isobutane	0.0334	0.802	0.1463
n-Butane	0.0712	1.709	0.3119
Isopentane	0.0277	0.664	0.1211
n-Pentane	0.0265	0.636	0.1161
n-Hexane	0.0174	0.418	0.0764
Cyclohexane	0.0099	0.237	0.0433
Other Hexanes	0.0063	0.151	0.0275
Heptanes	0.0231	0.554	0.1010
Methylcyclohexane	0.0245	0.587	0.1071
Benzene	0.0123	0.295	0.0538
Toluene	0.0354	0.850	0.1551
Xylenes	0.0616	1.480	0.2700
C8+ Heavies	0.2907	6.977	1.2734
Total Emissions	1.6836	40.406	7.3740
Total Hydrocarbon Emissions	1.6836	40.406	7.3740
Total VOC Emissions	0.7907	18.977	3.4633
Total HAP Emissions	0.1268	3.043	0.5553
Total BTEX Emissions	0.1093	2.624	0.4789

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	13.3196	319.671	58.3400
Ethane	4.5376	108.903	19.8748
Propane	3.0152	72.364	13.2065
Isobutane	0.6681	16.033	2.9261
n-Butane	1.4240	34.176	6.2371
Isopentane	0.5531	13.275	2.4226
n-Pentane	0.5301	12.723	2.3220
n-Hexane	0.3487	8.369	1.5274
Cyclohexane	0.1979	4.749	0.8667
Other Hexanes	0.1255	3.012	0.5496

Heptanes	0.4613	11.071	2.0204
Methylcyclohexane	0.4890	11.737	2.1420
Benzene	0.2455	5.893	1.0754
Toluene	0.7083	16.998	3.1022
Xylenes	1.2330	29.591	5.4004
C8+ Heavies	5.8144	139.546	25.4672

Total Emissions	33.6713	808.112	147.4804
Total Hydrocarbon Emissions	33.6713	808.112	147.4804
Total VOC Emissions	15.8141	379.538	69.2656
Total HAP Emissions	2.5355	60.852	11.1054
Total BTEX Emissions	2.1868	52.482	9.5780

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	1.0971	26.330	4.8053
Ethane	0.8184	19.640	3.5844
Propane	0.5628	13.508	2.4651
Isobutane	0.1213	2.910	0.5311
n-Butane	0.2420	5.807	1.0598
Isopentane	0.0906	2.175	0.3970
n-Pentane	0.0796	1.910	0.3486
n-Hexane	0.0380	0.912	0.1664
Cyclohexane	0.0069	0.166	0.0303
Other Hexanes	0.0162	0.388	0.0709
Heptanes	0.0302	0.726	0.1324
Methylcyclohexane	0.0141	0.338	0.0616
Benzene	0.0014	0.033	0.0061
Toluene	0.0028	0.066	0.0121
Xylenes	0.0020	0.049	0.0090
C8+ Heavies	0.0665	1.595	0.2911

Total Emissions	3.1897	76.554	13.9711
Total Hydrocarbon Emissions	3.1897	76.554	13.9711
Total VOC Emissions	1.2743	30.583	5.5814
Total HAP Emissions	0.0442	1.060	0.1935
Total BTEX Emissions	0.0062	0.149	0.0271

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature:	68.00 deg. F
Excess Oxygen:	5.00 %
Combustion Efficiency:	95.00 %

Supplemental Fuel Requirement: 1.69e-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%
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%
Benzene	5.00%	95.00%
Toluene	5.00%	95.00%
Xylenes	5.00%	95.00%
C8+ Heavies	5.00%	95.00%

ABSORBER

Calculated Absorber Stages: 1.68
 Specified Dry Gas Dew Point: 7.00 lbs. H2O/MMSCF
 Temperature: 120.0 deg. F
 Pressure: 265.0 psig
 Dry Gas Flow Rate: 5.3000 MMSCF/day
 Glycol Losses with Dry Gas: 0.0935 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 305.80 lbs. H2O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 2.73 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	2.27%	97.73%
Carbon Dioxide	99.77%	0.23%
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	99.65%	0.35%
n-Hexane	99.39%	0.61%
Cyclohexane	97.39%	2.61%
Other Hexanes	99.54%	0.46%
Heptanes	98.77%	1.23%
Methylcyclohexane	96.79%	3.21%
Benzene	82.08%	17.92%
Toluene	73.67%	26.33%
Xylenes	50.23%	49.77%
C8+ Heavies	89.19%	10.81%

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	99.98%	0.02%
Carbon Dioxide	70.99%	29.01%
Nitrogen	18.76%	81.24%
Methane	19.46%	80.54%
Ethane	43.78%	56.22%
Propane	62.23%	37.77%
Isobutane	70.15%	29.85%
n-Butane	75.04%	24.96%
Isopentane	76.98%	23.02%
n-Pentane	80.39%	19.61%
n-Hexane	87.41%	12.59%
Cyclohexane	96.52%	3.48%
Other Hexanes	84.41%	15.59%
Heptanes	93.01%	6.99%
Methylcyclohexane	97.17%	2.83%
Benzene	99.46%	0.54%
Toluene	99.64%	0.36%
Xylenes	99.86%	0.14%
C8+ Heavies	98.99%	1.01%

REGENERATOR

Regenerator Stripping Gas:
Dry Product Gas
Stripping Gas Flow Rate: 6.5000 scfm

Component	Remaining in Glycol	Distilled Overhead
Water	7.09%	92.91%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.65%	99.35%
n-Pentane	0.62%	99.38%
n-Hexane	0.57%	99.43%
Cyclohexane	3.31%	96.69%
Other Hexanes	1.18%	98.82%
Heptanes	0.54%	99.46%
Methylcyclohexane	4.12%	95.88%
Benzene	5.03%	94.97%
Toluene	7.93%	92.07%
Xylenes	12.93%	87.07%
C8+ Heavies	12.15%	87.85%

STREAM REPORTS:

WET GAS STREAM

 Temperature: 120.00 deg. F
 Pressure: 279.70 psia
 Flow Rate: 2.22e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	6.44e-001	6.80e+001
Carbon Dioxide	1.15e-001	2.98e+001
Nitrogen	7.33e-001	1.20e+002
Methane	7.87e+001	7.39e+003
Ethane	1.25e+001	2.21e+003
Propane	4.58e+000	1.18e+003
Isobutane	6.38e-001	2.17e+002
n-Butane	1.16e+000	3.95e+002
Isopentane	3.38e-001	1.43e+002
n-Pentane	2.77e-001	1.17e+002
n-Hexane	9.76e-002	4.93e+001
Cyclohexane	1.49e-002	7.36e+000
Other Hexanes	4.38e-002	2.21e+001
Heptanes	5.97e-002	3.51e+001
Methylcyclohexane	2.59e-002	1.49e+001
Benzene	2.99e-003	1.37e+000
Toluene	4.98e-003	2.69e+000
Xylenes	3.98e-003	2.48e+000
C8+ Heavies	5.38e-002	5.37e+001
-----	-----	-----
Total Components	100.00	1.21e+004

DRY GAS STREAM

 Temperature: 120.00 deg. F
 Pressure: 279.70 psia
 Flow Rate: 2.21e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	1.47e-002	1.55e+000
Carbon Dioxide	1.16e-001	2.97e+001
Nitrogen	7.38e-001	1.20e+002
Methane	7.92e+001	7.39e+003
Ethane	1.26e+001	2.21e+003
Propane	4.61e+000	1.18e+003
Isobutane	6.41e-001	2.17e+002
n-Butane	1.17e+000	3.94e+002
Isopentane	3.40e-001	1.43e+002
n-Pentane	2.78e-001	1.17e+002
n-Hexane	9.76e-002	4.90e+001
Cyclohexane	1.46e-002	7.17e+000
Other Hexanes	4.39e-002	2.20e+001
Heptanes	5.94e-002	3.46e+001
Methylcyclohexane	2.52e-002	1.44e+001
Benzene	2.47e-003	1.12e+000
Toluene	3.69e-003	1.98e+000
Xylenes	2.01e-003	1.24e+000
C8+ Heavies	4.83e-002	4.79e+001

 Total Components 100.00 1.20e+004

LEAN GLYCOL STREAM

 Temperature: 120.00 deg. F
 Flow Rate: 3.00e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.96e+001	1.68e+003
Water	3.00e-001	5.07e+000
Carbon Dioxide	4.03e-013	6.81e-012
Nitrogen	1.33e-013	2.24e-012
Methane	2.71e-018	4.58e-017
Ethane	4.06e-008	6.87e-007
Propane	3.59e-009	6.06e-008
Isobutane	7.21e-010	1.22e-008
n-Butane	1.42e-009	2.40e-008
Isopentane	1.16e-004	1.97e-003
n-Pentane	1.20e-004	2.03e-003
n-Hexane	8.92e-005	1.51e-003
Cyclohexane	3.76e-004	6.35e-003
Other Hexanes	6.14e-005	1.04e-003
Heptanes	1.28e-004	2.16e-003
Methylcyclohexane	1.18e-003	1.99e-002
Benzene	7.63e-004	1.29e-002
Toluene	3.59e-003	6.07e-002
Xylenes	1.08e-002	1.83e-001
C8+ Heavies	4.69e-002	7.93e-001
Total Components	100.00	1.69e+003

RICH GLYCOL STREAM

 Temperature: 120.00 deg. F
 Pressure: 279.70 psia
 Flow Rate: 3.16e+000 gpm
 NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.50e+001	1.68e+003
Water	4.04e+000	7.15e+001
Carbon Dioxide	3.85e-003	6.81e-002
Nitrogen	1.27e-003	2.24e-002
Methane	7.70e-002	1.36e+000
Ethane	8.22e-002	1.46e+000
Propane	8.42e-002	1.49e+000
Isobutane	2.30e-002	4.06e-001
n-Butane	5.48e-002	9.70e-001
Isopentane	2.22e-002	3.94e-001
n-Pentane	2.29e-002	4.06e-001
n-Hexane	1.70e-002	3.02e-001
Cyclohexane	1.12e-002	1.98e-001
Other Hexanes	5.87e-003	1.04e-001
Heptanes	2.44e-002	4.33e-001
Methylcyclohexane	2.81e-002	4.98e-001

Benzene	1.46e-002	2.58e-001
Toluene	4.34e-002	7.68e-001
Xylenes	8.00e-002	1.42e+000
C8+ Heavies	3.72e-001	6.59e+000

Total Components	100.00	1.77e+003
------------------	--------	-----------

FLASH TANK OFF GAS STREAM

Temperature: 150.00 deg. F
 Pressure: 74.70 psia
 Flow Rate: 4.56e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	5.09e-001	1.10e-002
Carbon Dioxide	3.73e-001	1.97e-002
Nitrogen	5.41e-001	1.82e-002
Methane	5.69e+001	1.10e+000
Ethane	2.26e+001	8.18e-001
Propane	1.06e+001	5.63e-001
Isobutane	1.73e+000	1.21e-001
n-Butane	3.46e+000	2.42e-001
Isopentane	1.04e+000	9.06e-002
n-Pentane	9.17e-001	7.96e-002
n-Hexane	3.66e-001	3.80e-002
Cyclohexane	6.83e-002	6.91e-003
Other Hexanes	1.56e-001	1.62e-002
Heptanes	2.51e-001	3.02e-002
Methylcyclohexane	1.19e-001	1.41e-002
Benzene	1.48e-002	1.39e-003
Toluene	2.48e-002	2.75e-003
Xylenes	1.60e-002	2.05e-003
C8+ Heavies	3.24e-001	6.65e-002
Total Components	100.00	3.24e+000

FLASH TANK GLYCOL STREAM

Temperature: 150.00 deg. F
 Flow Rate: 3.15e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.52e+001	1.68e+003
Water	4.05e+000	7.15e+001
Carbon Dioxide	2.74e-003	4.83e-002
Nitrogen	2.38e-004	4.21e-003
Methane	1.50e-002	2.65e-001
Ethane	3.61e-002	6.37e-001
Propane	5.25e-002	9.27e-001
Isobutane	1.61e-002	2.85e-001
n-Butane	4.12e-002	7.28e-001
Isopentane	1.72e-002	3.03e-001
n-Pentane	1.85e-002	3.26e-001
n-Hexane	1.49e-002	2.64e-001
Cyclohexane	1.08e-002	1.92e-001
Other Hexanes	4.96e-003	8.76e-002
Heptanes	2.28e-002	4.02e-001

Methylcyclohexane	2.74e-002	4.83e-001
Benzene	1.45e-002	2.56e-001
Toluene	4.33e-002	7.65e-001
Xylenes	8.00e-002	1.41e+000
C8+ Heavies	3.69e-001	6.52e+000

Total Components	100.00	1.77e+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: 1.85e+003 scfh

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

Water	7.57e+001	6.64e+001
Carbon Dioxide	4.70e-002	1.01e-001
Nitrogen	1.59e-001	2.17e-001
Methane	1.70e+001	1.33e+001
Ethane	3.10e+000	4.54e+000
Propane	1.40e+000	3.02e+000
Isobutane	2.36e-001	6.68e-001
n-Butane	5.03e-001	1.42e+000
Isopentane	1.57e-001	5.53e-001
n-Pentane	1.51e-001	5.30e-001
n-Hexane	8.30e-002	3.49e-001
Cyclohexane	4.82e-002	1.98e-001
Other Hexanes	2.99e-002	1.25e-001
Heptanes	9.44e-002	4.61e-001
Methylcyclohexane	1.02e-001	4.89e-001
Benzene	6.45e-002	2.46e-001
Toluene	1.58e-001	7.08e-001
Xylenes	2.38e-001	1.23e+000
C8+ Heavies	7.00e-001	5.81e+000

Total Components	100.00	1.00e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 2.23e+001 scfh

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

Methane	7.07e+001	6.66e-001
Ethane	1.28e+001	2.27e-001
Propane	5.82e+000	1.51e-001
Isobutane	9.79e-001	3.34e-002

n-Butane	2.09e+000	7.12e-002
Isopentane	6.53e-001	2.77e-002
n-Pentane	6.26e-001	2.65e-002
n-Hexane	3.44e-001	1.74e-002
Cyclohexane	2.00e-001	9.89e-003
Other Hexanes	1.24e-001	6.27e-003
Heptanes	3.92e-001	2.31e-002
Methylcyclohexane	4.24e-001	2.45e-002
Benzene	2.68e-001	1.23e-002
Toluene	6.54e-001	3.54e-002
Xylenes	9.89e-001	6.16e-002
C8+ Heavies	2.91e+000	2.91e-001
-----	-----	-----
Total Components	100.00	1.68e+000

Attachment S

Blowdown and Pigging Operations Data Sheet

**ATTACHMENT S – BLOWDOWN AND PIGGING OPERATIONS
DATA SHEET**

Will there be any blowdown and pigging operations that occur at this facility?

Yes No

Please list:

Type of Event	# of Events (event/yr)	Amount Vented per event (scf/event)	MW of vented gas (lb/lb-mol)	Total Emissions (ton/yr)	VOC weight fraction	VOC emissions (ton/yr)
Compressor Blowdown	3	2,000	378	0.16	18.16%	0.03
Compressor Startup	3	2,000	378	0.16	18.16%	0.03
Plant Shutdown	6	12,000	378	1.92	18.16%	0.35
Low Pressure Pig Venting	0	0	0	0	0	0
High Pressure Pig Venting	0	0	0	0	0	0

Type of Event	# of Events (event/yr)	Amount Vented per event (scf/event)	MW of vented gas (lb/lb-mol)	Total Emissions (ton/yr)	HAP weight fraction	HAP emissions (ton/yr)
Compressor Blowdown						
Compressor Startup						
Plant Shutdown						
Low Pressure Pig Venting						
High Pressure Pig Venting						

Attachment U

Emission Calculations

Reboiler (RBV-1) Potential Emissions
Dominion Energy Transmission, Inc.
Collins Compressor Station

Updated: Feb 2018

Input Data: NATCO 150/275
 Design Class: Natural Gas-Fired
 Fuel Input: 0.384 MMBtu/hr
 Heating Value of Natural Gas: 1,247 Btu/scf (Dominion Spec Sheet 2/20/12)
 Fuel Input: 0.00031 MMscf/hr
 2.70 MMscf/yr
 Maximum Hours of Operation: 8,760 hrs/yr

Emission Calculations

Pollutant	Emission Factor		Potential Emissions	
			(lb/hr)	(tons/yr)
Criteria Pollutants				
PM (filterable)	1.9	lb/MMscf	5.85E-04	2.56E-03
PM-10 (filterable)	1.9	lb/MMscf	5.85E-04	2.56E-03
PM-2.5 (filterable)	1.9	lb/MMscf	5.85E-04	2.56E-03
PM (condensibles)	5.7	lb/MMscf	1.75E-03	0.01
SO ₂	0.6	lb/MMscf	1.85E-04	8.09E-04
CO	0.09	tons/yr	0.02	0.09
NO _x	0.13	tons/yr	0.03	0.13
VOC	0.15	tons/yr	0.03	0.15
Greenhouse Gases				
CO ₂	117.0	lb/MMBtu	44.92	196.75
CH ₄	2.20E-03	lb/MMBtu	0.00	0.00
N ₂ O	2.20E-04	lb/MMBtu	0.00	0.00
CO ₂ e	117.1	lb/MMBtu	44.97	196.95
Hazardous Air Pollutants				
Arsenic	2.00E-04	lb/MMscf	6.16E-08	2.70E-07
Benzene	2.10E-03	lb/MMscf	6.47E-07	2.83E-06
Beryllium	1.20E-05	lb/MMscf	3.69E-09	1.62E-08
Cadmium	1.10E-03	lb/MMscf	3.39E-07	1.48E-06
Chromium	1.40E-03	lb/MMscf	4.31E-07	1.89E-06
Cobalt	8.40E-05	lb/MMscf	2.59E-08	1.13E-07
Dichlorobenzene	1.20E-03	lb/MMscf	3.69E-07	1.62E-06
Formaldehyde	7.50E-02	lb/MMscf	2.31E-05	1.01E-04
Hexane	1.80E+00	lb/MMscf	5.54E-04	2.43E-03
Manganese	3.80E-04	lb/MMscf	1.17E-07	5.12E-07
Mercury	2.60E-04	lb/MMscf	8.01E-08	3.51E-07
Naphthalene	6.10E-04	lb/MMscf	1.88E-07	8.23E-07
Nickel	2.10E-03	lb/MMscf	6.47E-07	2.83E-06
Selenium	2.40E-05	lb/MMscf	7.39E-09	3.24E-08
Toluene	3.40E-03	lb/MMscf	1.05E-06	4.59E-06
TOTAL HAP:			0.001	0.003

(1) NO_x, CO, and VOC emission factors from Dominion Spec Sheet 2/20/12

(2) PM, PM₁₀, PM_{2.5}, VOC, SO₂ emission factors from AP-42, Section 1.4, Natural Gas Combustion, Table 1.4-2, 7/98

(3) HAP emission factors from AP-42, Section 1.4, Natural Gas Combustion, Tables 1.4-3, 4, 7/98

(4) Lb/MMBtu numbers based on 40 CFR Part 98 Tables C-1 and C-2 for natural gas

$$\text{For example: } \text{CO}_2 = (53.06 \text{ kg CO}_2/\text{MMBtu}) / (0.453592 \text{ kg/lb}) = 117.0 \text{ lb/MMBtu}$$

(5) Global Warming Potentials = 25 for CH₄ and 298 for N₂O (per 40 CFR Part 98 Table A-1 to Subpart A)

$$\text{For example: } \text{CO}_2\text{e} = (117.0 \text{ lb/MMBtu}) + (0.0022 \text{ lb/MMBtu} * 25) + (0.00022 \text{ lb/MMBtu} * 298) \\ = 117.1 \text{ lb/MMBtu}$$

Input Data: Cameron (NATCO)
Design Data TEG
Maximum Hours of Operation: 8,760 hrs/yr
Process Throughput Maximum: 5.3 MMscf/day
Wet Gas Temperature 120.00 degree F
Wet Gas Pressure 265.00 psig
Dry Gas Water Content 7.0 lbs H2O/MMscf
Glycol
Lean Glycol Water Content 0.3 % H2O
Flow Rate 3.0 gal/min
Glycol Pump Type Electric
Flash Tank
Flash Control Recycle/Recompression
Control Efficiency 95 %
Temperature 150 degree F
Pressure 60 psig
Stripping Gas
Source of Gas Dry Gas
Gas Flow Rate 6.5 scfm
Regenerator Overheads Control Device
Control Device Combustion Device
Destruction Efficiency 95 %
Excess Oxygen 5.0 %
Ambient Air Temperature 68.0 degree F

For Application: Wet Gas Composition	
Component	Concentration (vol%)
Carbon Dioxide	0.116
Nitrogen	0.736
Methane	79.022
Ethane	12.6
Propane	4.602
Isobutane	0.641
n-Butane	1.166
Isopentane	0.34
n-Pentane	0.278
n-Hexane	0.098
Cyclohexane	0.015
Other Hexanes	0.044
Heptanes	0.06
Methylcyclohexane	0.026
Benzene	0.003
Toluene	0.005
Xylenes	0.004
C8+ Heavies	0.054

Emission Calculations - GLYCalc

Pollutant	Dehy PTE		Dehy PTE With Safety Factor	
	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
Methane	0.6660	2.9170	1.3320	5.8340
Ethane	0.2269	0.9937	0.4538	1.9874
Propane	0.1508	0.6603	0.3016	1.3206
Isobutane	0.0334	0.1463	0.0668	0.2926
n-Butane	0.0712	0.3119	0.1424	0.6238
Isopentane	0.0277	0.1211	0.0554	0.2422
n-Pentane	0.0265	0.1161	0.0530	0.2322
n-Hexane	0.0174	0.0764	0.0348	0.1528
Cyclohexane	0.0099	0.0433	0.0198	0.0866
Other Hexanes	0.0063	0.0275	0.0126	0.0550
Heptanes	0.0231	0.1010	0.0462	0.2020
Methylcyclohexane	0.0245	0.1071	0.0490	0.2142
Benzene	0.0123	0.0538	0.0246	0.1076
Toluene	0.0354	0.1551	0.0708	0.3102
Xylenes	0.0616	0.2700	0.1232	0.5400
C8+ Heavies	0.2907	1.2734	0.5814	2.5468
Total VOCs	0.7907	3.4633	1.5814	6.9266
Total HAP	0.1268	0.5553	0.2536	1.1106
Total BTEX	0.1093	0.4789	0.2186	0.9578

(1) Emission rates for Dehydration Still estimated from GRI-GLYCalc V4.0, with a 95% destruction efficiency of the thermal oxidizer.
(2) Safety factor = 200%

Thermal Oxidizer (F-2) Potential Emissions
Dominion Energy Transmission, Inc.
Collins Compressor Station

Updated: Feb 2018

Input Data: QTI Q50
 Combustor Rating: 2.00 MMBtu/hr
 Pilot Rating: 0.43 MMBtu/hr
 Higher Heating Value (HHV): 1,247 Btu/scf

Pollutant	Emission Factors ^a (lb/MMBtu)	Emission Factors ^b (lb/MMBtu)	Combustor Potential Emissions		Pilot Potential Emissions		TOTAL Potential Emissions	
			(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
NO _x	8.02E-02	6.80E-02	0.14	0.6	3.45E-02	1.51E-01	0.170	0.747
CO	--	--	--	--	--	--	0.01	0.04
VOC	4.41E-03	--	1.90E-03	8.31E-03	--	--	1.90E-03	8.31E-03
PM/PM ₁₀	6.09E-03	--	1.22E-02	5.34E-02	2.62E-03	1.15E-02	0.01	0.06
SO ₂	4.81E-04	--	9.62E-04	4.21E-03	2.07E-04	9.06E-04	1.17E-03	5.12E-03
Lead	4.01E-07	--	8.02E-07	3.51E-06	1.72E-07	7.55E-07	9.74E-07	4.27E-06

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

^b Emission factors from AP-42 Section 13.5 "Industrial Flares" Tables 13.5-1, 13.5-2. Used for Combustor.

****Note:** The CO emission factor is from the Dominion Spec Sheet 2/20/12

Gas Analysis

Constituent	MW (g/g mole)	Composition ³ (mole %)	Density of Constituent Gases (g/l)	Contribution to Overall Sample Density by Species (g/l)	Composition (weight %)
Methane	16	79.431%	0.675	0.536	62.16%
Ethane	30	12.672%	1.266	0.160	18.59%
Propane	44	4.346%	1.857	0.081	9.35%
Butane(s)	58	1.845%	2.448	0.045	5.23%
Pentane(s)	72	0.595%	3.039	0.018	2.10%
Hexanes+	86	0.352%	3.630	0.013	1.48%
Nitrogen	28	0.697%	1.182	0.008	0.95%
CO2	44	0.062%	1.857	0.001	0.13%
TOTAL	378	100.000%		0.863	100.000%

3. Gas Analysis Sample #38100 dated 8/17/17 (Collins Sta After Dehy)

Gas density	53,885 lb/MMcf
VOC content	18.16% weight %
VOC content	9786.56 lb/MMcf
Methane content	62.16% weight %
Methane content	33493.57 lb/MMcf
Total Hydrocarbon content	98.91% weight %
Total Hydrocarbon content	53298.99 lb/MMcf
HAP content	1.48% weight %
HAP content	797.80 lb/MMcf

(Hexanes+ used as surrogate for HAPs)

Pigging/Blowdown Calculations

	# of Events/yr	Amount Vented per Event (scf/event)	VOC Emissions per Event		VOC Emissions per Year	
			(lbs VOC/event)	(tons VOC/event)	(lbs VOC/yr)	(tons VOC/yr)
Compressor Blowdowns	3	2,000	19.57	0.01	58.72	0.03
Compressor Startup	3	2,000	19.57	0.01	58.72	0.03
Plant Shutdown	6	12,000	117.44	0.06	704.63	0.35
Low Pressure Pig Venting	0	0	0.00	0.00	0.00	0.00
High Pressure Pig Venting	0	0	0.00	0.00	0.00	0.00

Total = 0.41

Total HAP Emissions per Event		Total HAP Emissions per Year	
(lbs HAP/event)	(tons HAP/event)	(lbs HAP/yr)	(tons HAP/yr)
1.60	7.98E-04	4.79	2.39E-03
1.60	7.98E-04	4.79	2.39E-03
9.57	4.79E-03	57.44	0.03
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00

Total = 0.03

Total Hydrocarbon Emissions per Event		Total Hydrocarbon Emissions per Year	
(lbs THC/event)	(tons THC/event)	(lbs THC/yr)	(tons THC/yr)
106.60	0.05	319.79	0.16
106.60	0.05	319.79	0.16
639.59	0.32	3837.53	1.92
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00

Total = 2.24

Attachment V

Facility Wide Emission Summary Sheets

ATTACHMENT V – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	NO _x		CO		VOC		SO ₂		PM ₁₀ **		PM _{2.5} **		GHG (CO ₂ e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
RBV-1	0.03	0.13	0.02	0.09	0.03	0.15	1.85E-04	8.09E-04	2.34E-03	0.01	2.34E-03	0.01	44.97	196.95
RSV-1	--	--	--	--	1.59	6.93	--	--	--	--	--	--	--	--
F-2	0.17	0.75	0.01	0.04	1.90E-03	8.31E-03	1.17E-03	5.12E-03	0.01	0.06	0.01	0.06	--	--
T02	--	--	--	--	0.01	0.05	--	--	--	--	--	--	--	--
TOTAL	0.2	0.88	0.03	0.13	1.63	7.14	1.36E-03	5.93E-03	0.01	0.07	0.01	0.07	44.97	196.95

****PM10 and PM2.5 = Filterable and Condensable**

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators. According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

ATTACHMENT V – FACILITY-WIDE HAP CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
RBV-1	2.31E-05	1.01E-04	6.47E-07	2.83E-06	1.05E-06	4.59E-06	--	--	--	--	5.54E-04	2.43E-03	0.001	0.003
RSV-1	--	--	0.03	0.11	0.08	0.32	--	--	0.13	0.54	0.04	0.16	0.11	0.46
F-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T02	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL	2.31E-05	1.01E-04	0.03	0.11	0.08	0.32	--	--	0.13	0.54	0.04	0.16	0.11	0.46

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators. According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

Attachment W

Class I Legal Advertisement

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Dominion Energy Transmission, Inc. Collins Compressor Station has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G35-D General Permit Class II Administrative Update for a natural gas compressor and dehydration facility located on Arnolds Creek Road, West Union, Doddridge County, West Virginia. The latitude and longitude coordinates are:

Latitude = 39.2543
Longitude = -80.7911

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

VOC	+3.31	tons/yr
Benzene	+0.09	tons/yr
Ethylbenzene	-0.06	tons/yr
n-Hexane	+0.09	tons/yr
Toluene	+0.22	tons/yr
Xylene	+0.33	tons/yr

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

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

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

By: Dominion Energy Transmission, Inc.
Brian C. Sheppard
VP – Eastern Pipeline Operations
925 White Oaks Blvd.
Bridgeport, WV 26330