Dominion Resource Services, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060
dom.com

April 8, 2015

BY: U.S. CERTIFIED MAIL, RETURN RECEIPT REQUESTED
7014 3490 0000 0448 3870

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

RE: Dominion Transmission, Inc. – General Permit (G35-A) Application
Cassidy Mountain Compressor Station

Dear Mr. Durham:

Enclosed are one complete original and two (2) cd copies of a G35-A General Permit application for the proposed replacement of the existing flare and the addition of a new auxiliary emergency generator at Dominion Transmission, Inc.'s Cassidy Mountain Compressor Station in Randolph County, West Virginia.

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,

Amanda B. Tornabene
Director, Gas Environmental Services

APPLICATION FOR CLASS II GENERAL PERMIT G35-A

DOMINION TRANSMISSION, INC.
CASSITY MOUNTAIN STATION
FACILITY ID NO. 083-00123

Submitted By:

DOMINION TRANSMISSION, INC.
445 West Main Street
Clarksburg, WV 26301

Submitted To:

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304

Prepared By:

2393 Kimberton Road
PO Box 299
Kimberton, PA 19442

Submitted: April 2015

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

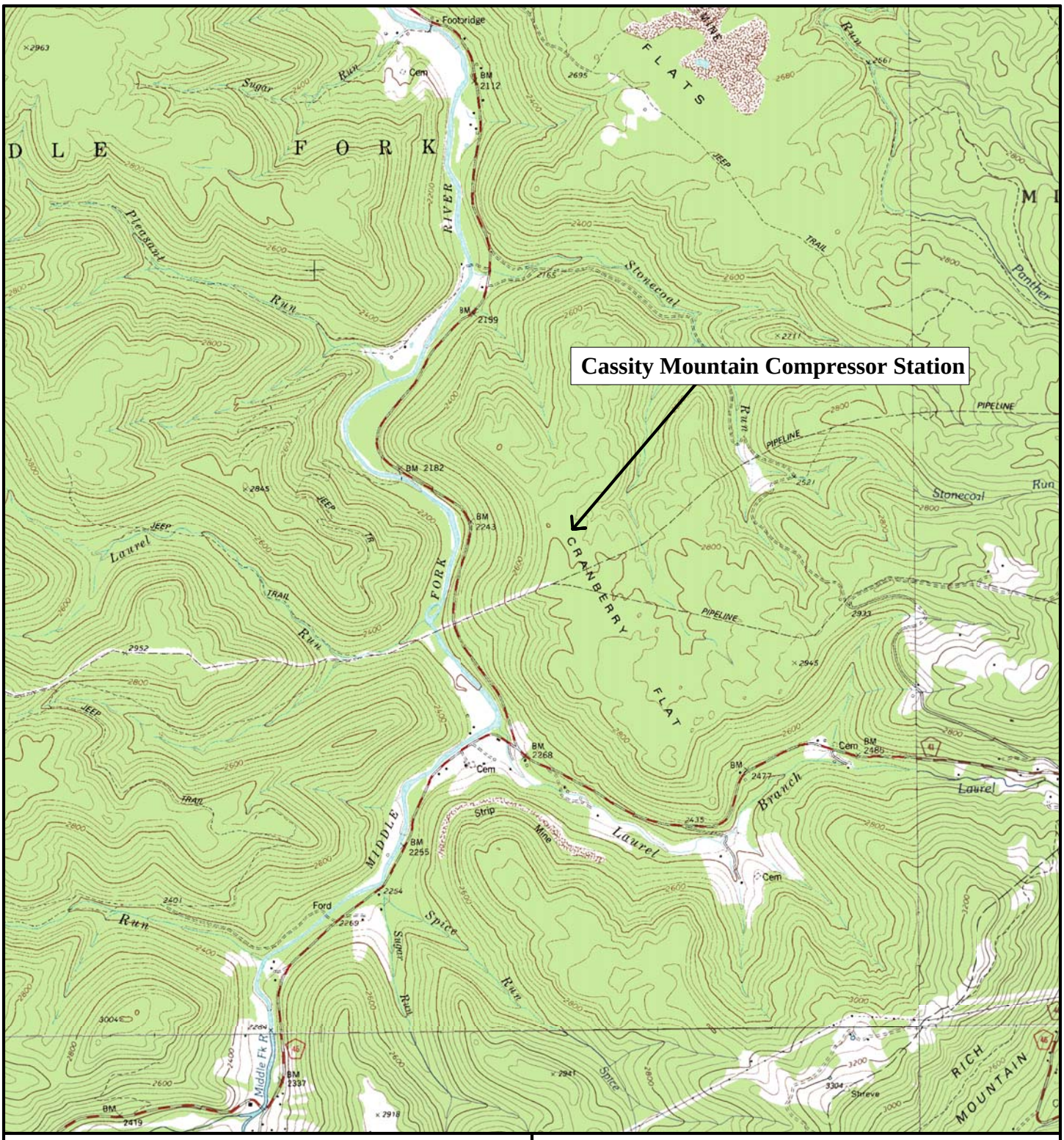
LIST OF APPENDICES

1. INTRODUCTION

Dominion Transmission, Inc. (Dominion) specializes in natural gas transmission and storage services. The Cassity Mountain Station (Station) is an existing natural gas compressor station that pumps natural gas prior to the point of custody transfer. The Station uses one (1) glycol dehydration unit to remove water from wet natural gas and transports the natural gas to a natural gas processing plant. Dominion is proposing to replace the existing flare at the Station. The flare serves as an air pollution control device for the glycol dehydration unit. In addition to the flare replacement, Dominion is proposing to install one (1) new Cummins Inc. (Cummins) auxiliary emergency generator at the Station.

1.1 EXISTING CASSITY MOUNTAIN STATION

The Station is located in Randolph County, West Virginia. Figure 1-1 shows the general location of the Station on a section of the Cassity, West Virginia, United States Geological Survey (USGS) quadrangle. The major source thresholds for 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 HAP, or 100 tpy of all other regulated pollutants. The Station does not have the potential to emit over 100 tpy of any pollutant, nor does the Station emit any individual HAP or any combination of HAPs above the 10 tpy and 25 tpy thresholds respectively. Therefore, the Station is classified as a nonmajor source for Title V purposes and is classified as an area source of HAPs. Because the Station is not a major source, it is not required to have an operating permit pursuant to Title V of the Federal Clean Air Act (CAA) as amended, and West Virginia 45 CSR30 regulations. However, the Station is required to have a General Permit pursuant to West Virginia 45 CSR13 regulations. The Station currently operates under a Class II General Permit G35-A027A, issued on April 26, 2011, with an effective date of April 26, 2011.



approximate quadrangle location

0 0.5 1

N

Based on USGS 1:24,000 topographical map for Cassity (1977), Adolph (1998), Beverly West (1998) and Mill Creek (1998).

Dominion Transmission Inc.
Cassity Mountain Compressor Station
Randolph County, WV

Figure 1-1
Facility Location Map

1.2 PROJECT OVERVIEW

Dominion is submitting an Application for Class II General Permit G35-A to the West Virginia Department of Environmental Protection (WVDEP) for proposed modifications to the Station. Specifically, Dominion is proposing to remove the existing flare (Emission Point ID: F-1) that serves as a control device to the glycol dehydration unit and replace it with a new enclosed flare, which will also serve as an air pollution control device for the existing glycol dehydration unit. In addition, Dominion is proposing to install a Cummins natural gas-fired auxiliary emergency generator at the Station that will provide backup power to the Station in emergency situations.

Although 45 CSR§13-4.2(b) identifies a change in control equipment as a Class II administrative update, "flares" meet the 45 CSR§6-2 definition of "incinerator". Because the proposed enclosed flare meets the West Virginia definition of incinerator, the replacement of the control device (i.e., flare) is considered a minor modification. In accordance with 45 CSR§13-5, a Class II General Permit application must be submitted to WVDEP for review. This interpretation was confirmed on March 28, 2014 during a phone call with Beverly McKeone of the WVDEP. Additionally, the proposed installation of a new Cummins auxiliary emergency generator is considered a minor modification. Therefore, Dominion is submitting this Application for a G35-A General Permit for the proposed project changes.

Dominion plans to begin construction upon issuance of this permit (anticipated May, 2015). This Application includes the requisite WVDEP Application form, supporting Application attachments, supporting narrative, and the applicable Application fees.

1.3 APPLICATION ORGANIZATION

This Application is organized in a report format and includes the following sections and appendices:

Section 1 – Introduction

Section 2 – Process Description and Proposed Changes

Section 3 – Emissions Inventory

Section 4 – Regulatory Analysis

Section 5 – Summary of Application Forms and Supporting Information

Appendix A –Application Forms and Attachments

Appendix B – GRI-GLYCalc Emission Summary and Wet Gas Analysis

Appendix C – Flare Design Evaluation

2. PROCESS DESCRIPTION AND PROPOSED CHANGES

The Cassity Mountain Station is a natural gas compressor station used to compress gas for Dominion's pipeline system in West Virginia. The Station transports natural gas to a natural gas processing plant while serving the purpose of pumping natural gas from production and gathering lines to a Dominion pipeline. The Station operates under General Permit G35-A027A, which was issued on April 26, 2011. As part of operations at the Station, Dominion uses a glycol dehydration unit to remove water and impurities from the inlet natural gas stream. Water is removed from the rich natural gas stream via physical absorption while the natural gas stream flows countercurrent to circulating triethylene glycol (TEG) in a contactor. The rich TEG is sent to a flash tank to reduce volatile hydrocarbons (HC). Vapors from the flash tank are primarily vented to the atmosphere. Vapors from the reboiler pass through a still column that is controlled by the existing flare referenced as Emission Point ID: F-1.

Dominion proposes to replace the existing control device (i.e., flare) for the dehydration unit with a new enclosed flare. For the purposes of this Application, the new enclosed flare will be referenced as Emission Point ID: F-2. As part of the control device replacement, a blow-case will be installed between the still column and the enclosed flare. The installation of the blow-case is considered part of the control device installation, as it serves to enhance the efficiency of the enclosed flare. The installation of the blow-case is not considered a modification of the glycol dehydration unit. The glycol dehydration unit will not be debottlenecked as a result of the proposed project.

In addition to the installation of the new control device, Dominion proposes to install a new Cummins natural gas-fired auxiliary emergency generator to provide backup power in emergency situations. The changes associated with these modifications are summarized in Table 2-1.

Table 2-1
Emission Units Table
Dominion Transmission Inc. – Cassity Mountain Station

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type of Change	Control Device
F-1	F-1	Glycol Dehydration Unit Flare	2011	165 scfm	Removal	N/A
F-2	F-2	Glycol Dehydration Unit Enclosed Flare, Questor Q100 (95% control efficiency)	2015	46 scfm	New	N/A
GE-1	GE-1	Emergency Generator, Cummins Inc.	2015	97.5 HP	New	N/A

The existing flare (Emission Point ID: F-1) at the Station is proposed to be replaced with a new Questor Technologies Inc. (Questor) Q100 enclosed flare, referenced within the Application as Emission Point ID: FL-2. The new Questor Q100 enclosed flare will operate with a 95% control efficiency. The new emergency generator (Emission Point ID: GE-1) proposed to be installed is a Cummins model WSG-1068 natural gas-fired engine rated at 97.5 horsepower (HP).

The changes in emissions of criteria pollutants, greenhouse gases (GHG), and HAPs as a result of this project are discussed in Section 3. Emissions of lead (Pb) are insignificant from the proposed sources mentioned above and are not considered further.

3. EMISSIONS INVENTORY

Dominion proposes to replace the existing control device (i.e., flare) with a new control device (i.e., enclosed flare) for the glycol dehydration unit at the Station. Dominion is also proposing to install one (1) new natural gas-fired emergency generator to provide backup power during emergency situations. Dominion has quantified the potential emissions of particulate matter (PM), volatile organic compounds (VOC), nitrogen oxides (NO_X), carbon monoxide (CO), sulfur dioxide (SO_2), GHG, and HAPs that are associated with the project. Emissions of PM account for both condensable PM and filterable PM, where filterable PM is all PM less than or equal to 30 microns in diameter according the WVDEP Division of Air Quality Guidance for Pollutant Reporting. PM is conservatively assumed to be equivalent to PM less than 10 microns in diameter (PM_{10}) and PM less than 2.5 microns in diameter ($PM_{2.5}$).

3.1 GLYCOL DEHYDRATION UNIT CONTROL DEVICE

The proposed replacement control device is a Questor Q100 enclosed flare. A summary of the potential to emit (PTE) of NSR regulated pollutants from the new enclosed flare and the pilot flame is included in Table 3-1. The potential emissions of NO_X, CO, and SO_2 are based on vendor guarantees (see Attachment G, located in Appendix A, for the Questor vendor information sheets) which account for emissions associated with the combustion of natural gas (e.g. fuel gas and pilot gas) and waste gas. The potential emissions of VOC and HAPs are calculated using GRI-GLYCalc Version 4.0 using an updated wet gas analysis, a maximum stripping gas flowrate of 65 standard cubic feet per minute (scfm), and natural gas emission factors from AP-42 (Chapter 1.4, Table 1.4-2, 07/98) for VOC and total organic compounds (TOC). A summary of the GRI-GLYCalc inputs and results are included in Appendix B. The use of stripping gas lowers the saturation of the water in the glycol solution, thus increasing the glycol concentration. The GRI-GLYCalc Version 4.0 model is used to calculate the VOC and HAP emissions from the combustion of waste gas in the flare, while the AP-42 emission factors are used to calculate the emissions from the combustion of natural gas from the pilot stream and the additional natural gas fuel inlet stream.

Table 3-1
Dominion Transmission, Inc. - Cassity Mountain Station
Project Related Potential Emissions Summary

Regulated Pollutant	Emission Points			
	RSV-2 (Controlled by F-2)		F-2 (New)	
	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
Criteria Pollutants				
PM[(a)]	-	-	0.05	0.24
VOC[(b)]	1.11	4.87	-	-
NO_X[(c)]	-	-	0.67	2.93
CO[(c)]	-	-	0.56	2.46
SO_2[(c)]	-	-	2.33E-03	0.01
Greenhouse Gas Pollutants[(d)]				
CO_2[(e)]	-	-	626.99	2753.75
CH_4[(f)]	-	-	1.78	7.82
N_2O[(g)]	-	-	7.37E-03	3.24E-02
CO_2e[(h)]	-	-	673.72	2,958.99
Hazardous Air Pollutants				
Total HAP[(b)]	0.35	1.54	-	-

[(a)] Potential emissions of PM include PTE from the combustion of natural gas from the pilot flame and the supplemental natural gas stream, calculated based on the AP-42, Chapter 1.4, Table 1.4-2 emission factor for PM (Total). The supplemental natural gas stream flowrate includes the flow of natural gas used as both fuel gas (20 Mscf/day) and stripping gas (93.6 Mscf/day). PM emissions also include PTE from enclosed flare's combustion of emissions from the dehydration still vent and waste fuel gas, calculated based on the AP-42, Chapter 13.5, Table 13.5-1 emission factor for soot, assuming a lightly smoking flare (40 µg/L). According to the May 2011 Emission Estimation Protocol for Petroleum Refineries, approved by the U.S. EPA on March 28, 2011, 40 µg/L is equivalent to 0.027 lb/MMBtu. PM is conservatively assumed to be equivalent to all filterable PM including PM_{10} and $PM_{2.5}$, and condensable fractions.

[(b)] Potential emissions of VOC and HAP include PTE from the pilot flame's natural gas combustion (i.e., pilot, fuel gas, and stripping gas streams) were calculated using AP-42 Chapter 1.4, Table 1.4-2. Emissions factors for VOC and TOC, and PTE from enclosed flare's combustion of emissions from the dehydration still vent's waste gas were calculated using GRI-GLYCalc Version 4.0 and an updated wet gas analysis . The VOC and HAP emissions from the dehydration still vent represent the sum of controlled regenerator emissions and flash tank off gas emissions generated using GRI-GLYCalc 4.0 with the incorporation of a 20% safety factor. To be consistent with the previous G35-A General Permit application that was submitted to West Virginia Department of Environmental Protection (WVDEP) on March 18, 2011, the Station's PTE is shown from the still vent which is controlled by the flare.

[(c)] Potential emissions of NO_X, CO, and SO_2 include PTE from the combustion of waste gas and fuel gas, with a maximum flowrate = 66 Mscf/day (46 scf/min) and a waste to fuel gas ratio of 1:0.2, based on vendor guarantees. NO_X, CO, and SO_2 emissions also include PTE from the combustion of natural gas used as stripping gas, with a flowrate = 93.6 Mscf/day (65 scf/min), calculated based on the AP-42, Chapter 1.4, Table 1.4-2 emission factors for natural gas combustion.

[(d)] Potential emissions of greenhouse gases are calculated from the combustion of natural gas from the pilot flame, the supplemental natural gas stream, and the waste gas in the enclosed flare. The supplemental natural gas stream flowrate includes the flow of natural gas used as both fuel gas (20 Mscf/day) and stripping gas (93.6 Mscf/day). Emissions from the supplemental natural gas fuel and the pilot flame natural gas were calculated using a fuel flowrate of 10,000 scf/day and a pilot flame flowrate of 1,200 scf/day (34 m^3/d) to the enclosed flare. Greenhouse gas pollutant emission factors for the combustion of natural gas were obtained from 40 CFR Part 98, Subpart C. The emissions from the combustion of waste gas use the methodologies outlined below:

[(e)] CO_2 is calculated assuming emissions from both natural gas and waste gas streams. in metric tons/year, calculated according to 40 CFR 98 Equation Y-1a, where:

$$CO_2 = 0.98 \times 0.001 \times \left(\sum_{p=1}^{n} \left[\frac{44}{12} \times (Flare)_p \times \frac{(MW)_p}{MVC} \times (CC)_p \right] \right)$$

Flare p = volume flare gas combusted = ~46 acfm.
MW = molecular weight flare gas = 21 kg/kg-mol.
MVC = molar conversion factor of 849.5 scf/kg-mol at 68°F.
CC = carbon concentration of flare gas = 7.87%.
0.98 = combustion efficiency of flare (used 0.95 for 95% efficiency)

[(f)] CH_4 is in metric tons/year, calculated according to 40 CFR 98 Equation Y-4, where:

$$CH_4 = \left(CO_2 \times \frac{EmF_{CH4}}{EmF} \right) + CO_2 \times \frac{0.02}{0.98} \times \frac{16}{44} \times f_{CH4}$$

EmF_{CH4} = Default CH_4 emission factor for "Fuel Gas" from Table C-2 .
EmF = default CO_2 emission factor for flare gas of 60 kg/CO_2/MMBtu.
CO_2 = emission rate of CO_2 from flared gas in metric tons/year.
f_{CH4} = default weight fraction of carbon in flare gas of 0.4.
0.98 = combustion efficiency of flare (used 0.95 for 95% efficiency)

[(g)] N_2O is in metric tons/year, calculated according to 40 CFR 98 Equation Y-5, where:

$$N_2O = \left(CO_2 \times \frac{EmF_{N2O}}{EmF} \right) \quad (Eq.\ Y\text{-}5)$$

CO_2 = emission rate of CO_2 from flared gas in metric tons/year.
EmF_{N2O} = Default N_2O emission factor for "Fuel Gas" from Table C-2 .
EmF = default CO_2 emission factor for flare gas of 60 kg/CO_2/MMBtu.

[(h)] CO_2e is carbon dioxide equivalent in metric tons/year, calculated according to 40 CFR 98 Equation A-1, where:

$$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i$$

GHG_i = mass emissions of each greenhouse gas listed in Table A-1, metric tons/year.
GWP_i = global warming potential for each greenhouse gas from Table A-1.
n = number of greenhouse gases emitted.

Table A-1: Global Warming Potentials	
Pollutant	*GWP (100 year)*
CO_2	1
CH_4	25
N_2O	298

Potential emissions of PM include emissions from the combustion of supplemental natural gas used for the pilot flame and the natural gas fuel stream (calculated using the emission factor from AP-42, Chapter 1.4, Table 1.4-2, 07/98 for PM-Total). The potential emissions of PM also include emissions from the combustion of waste gas in the enclosed flare (calculated using AP-42 Chapter 13.5, Table 13.5-1, 09/91 emission factors for soot, conservatively assuming a lightly smoking flare).

Potential emissions of GHG from the new enclosed flare include emissions from the combustion of waste gas from the glycol dehydration unit and the combustion of supplemental natural gas used for the pilot flame and the natural gas fuel inlet stream. GHG emissions were calculated on a carbon dioxide equivalent (CO_2e) basis. This method adds the potential emissions of carbon dioxide (CO_2), nitrous oxide (N_2O) and methane (CH_4), using emission factors, global warming potentials (GWP), and methodologies obtained from 40 CFR Part 98, Subparts C and Y. GHG emissions from the combustion of the still overhead were calculated pursuant to 40 CFR Part 98, Subpart Y (Petroleum Refineries). This method was used rather than 40 CFR Part 98, Subpart W (Petroleum and Natural Gas Systems) because Subpart Y more appropriately estimates GHG emissions based on flare specifications rather than Subpart W, which estimates GHG emissions based on the specifications of glycol dehydration units. GHG emissions from the combustion of supplemental natural gas used for the pilot flame and the natural gas fuel inlet stream were calculated based on emission factors obtained from 40 CFR Part 98, Subpart C, Tables C-1 and C-2, and the maximum natural gas flowrate supplied to the enclosed flare.

The PTE of the new enclosed flare is calculated by assuming 8,760 operating hours per year, and a maximum waste gas volumetric flowrate of approximately 46 standard cubic feet per minute (scf/min), based on the design capacity of the new Questor Q100 enclosed flare.

3.2 AUXILIARY EMERGENCY GENERATOR

The proposed new auxiliary emergency generator is a natural gas-fired Cummins model WSG-1068 with a rated capacity of 97.5 HP. A summary of PTE of NSR regulated pollutants and HAPs from the emergency generator is included in Table 3-2.

Table 3-2
Proposed Emergency Generator Potential Emissions
Dominion Transmission, Inc. - Cassity Mountain Station

Pollutant	Emission Factor		Reference	Potential Emissions	
	Value	Unit		(lb/hr)	(tons/yr)
Criteria Pollutants					
PM	7.71E-05	lb/MMBtu	(b)	6.64E-05	1.66E-05
VOC[(c)]	1.20	g/HP-hr	(a)	0.26	0.06
NO_X	6.10	g/HP-hr	(a)	1.31	0.33
CO	50.30	g/HP-hr	(a)	10.80	2.70
SO_2	5.88E-04	lb/MMBtu	(b)	5.06E-04	1.27E-04
Green House Gas Pollutants					
CO_2	53.06	kg/MMBtu	(d)	100.72	25.18
CH_4	1.00E-03	kg/MMBtu	(d)	1.90E-03	4.75E-04
N_2O	1.00E-04	kg/MMBtu	(d)	1.90E-04	4.75E-05
CO_2e				100.82	25.21
Hazardous Air Pollutants					
Formaldehyde	0.05	lb/MMBtu	(b)	0.05	0.01
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	(b)	3.44E-05	8.61E-06
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	(b)	2.74E-05	6.84E-06
1,1-Dichloroethane	2.36E-05	lb/MMBtu	(b)	2.03E-05	5.08E-06
1,2-Dichloroethane	2.36E-05	lb/MMBtu	(b)	2.03E-05	5.08E-06
1,2-Dichloropropane	2.69E-05	lb/MMBtu	(b)	2.32E-05	5.79E-06
1,3-Butadiene	2.67E-04	lb/MMBtu	(b)	2.30E-04	5.75E-05
1,3-Dichloropropene	2.64E-05	lb/MMBtu	(b)	2.27E-05	5.68E-06
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	(b)	2.15E-04	5.38E-05
Acrolein	5.14E-03	lb/MMBtu	(b)	4.43E-03	1.11E-03
Acetaldehyde	8.36E-03	lb/MMBtu	(b)	7.20E-03	1.80E-03
Benzene	4.40E-04	lb/MMBtu	(b)	3.79E-04	9.47E-05
Biphenyl	2.12E-04	lb/MMBtu	(b)	1.83E-04	4.56E-05
Carbon Tetrachloride	3.67E-05	lb/MMBtu	(b)	3.16E-05	7.90E-06
Chlorobenzene	3.04E-05	lb/MMBtu	(b)	2.62E-05	6.54E-06
Chloroform	2.85E-05	lb/MMBtu	(b)	2.45E-05	6.13E-06
Ethylbenzene	3.97E-05	lb/MMBtu	(b)	3.42E-05	8.55E-06
Ethylene Dibromide	4.43E-05	lb/MMBtu	(b)	3.81E-05	9.54E-06
Methanol	2.50E-03	lb/MMBtu	(b)	2.15E-03	5.38E-04
Methylene Chloride	2.00E-05	lb/MMBtu	(b)	1.72E-05	4.31E-06
n-Hexane	1.11E-03	lb/MMBtu	(b)	9.56E-04	2.39E-04

Table 3-2
Proposed Emergency Generator Potential Emissions
Dominion Transmission, Inc. - Cassity Mountain Station

Pollutant	Emission Factor		Reference	Potential Emissions	
	Value	Unit		(lb/hr)	(tons/yr)
Naphthalene	7.44E-05	lb/MMBtu	(b)	6.41E-05	1.60E-05
Phenol	2.40E-05	lb/MMBtu	(b)	2.07E-05	5.17E-06
Styrene	2.36E-05	lb/MMBtu	(b)	2.03E-05	5.08E-06
Toluene	4.08E-04	lb/MMBtu	(b)	3.51E-04	8.78E-05
Vinyl Chloride	1.49E-05	lb/MMBtu	(b)	1.28E-05	3.21E-06
Xylene	1.84E-04	lb/MMBtu	(b)	1.58E-04	3.96E-05
2-Methylnaphthalene	3.32E-05	lb/MMBtu	(b)	3.78E-04	1.66E-03
Acenaphthene	1.25E-06	lb/MMBtu	(b)	1.42E-05	6.24E-05
Acenaphthlene	5.53E-06	lb/MMBtu	(b)	6.30E-05	2.76E-04
Benzo(b)fluoranthene	1.66E-07	lb/MMBtu	(b)	1.89E-06	8.28E-06
Benzo(e)pyrene	4.15E-07	lb/MMBtu	(b)	4.73E-06	2.07E-05
Benzo(ghi)perylene	4.14E-07	lb/MMBtu	(b)	4.71E-06	2.07E-05
Chrysene	6.93E-07	lb/MMBtu	(b)	7.89E-06	3.46E-05
Fluoranthene	1.11E-06	lb/MMBtu	(b)	1.26E-05	5.54E-05
Fluorene	5.67E-06	lb/MMBtu	(b)	6.46E-05	2.83E-04
Phenanthrene	1.04E-05	lb/MMBtu	(b)	1.18E-04	5.19E-04
Pyrene	1.36E-06	lb/MMBtu	(b)	1.55E-05	6.78E-05
Total HAP				**0.06**	**0.02**

[(a)] Emission factors are obtained from engine manufacturer's technical data sheet.

[(b)] Emission factors are from AP-42, Section 3.2, Table 3.2-2 Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines (7/00).

[(c)] Emission factor includes non-methane hydrocarbons, VOC, precursor organic compounds, and reactive organic compounds constituents.

[(d)] Emission factors are from 40 CFR Part 98 Subpart C. Carbon dioxide equivalent (CO_2e) is calculated according to 40 CFR 98 Equation A-1.

The potential emissions of NO_X, CO, and VOC are based on vendor guarantees (Attachment P, located in Appendix A, Cummins vendor information sheets), while the potential emissions of PM, SO_2 and HAPs are calculated based on emission factors for natural gas-fired 4-stroke lean burn reciprocating engines (4SLB) in AP-42, Chapter 3.2, Table 3.2-2, 07/00. The PTE of the new emergency generator is calculated by assuming 500 operating hours per year.

A summary of project related changes in emissions are shown below in Table 3-3. Additionally, a Station-wide emissions summary as a result of the replacement of the existing control device (i.e., flare) and the installation of the emergency generator can be found in Attachment G, located in Appendix A.

Table 3-3
Dominion Transmission, Inc. - Cassity Mountain Station
Project Related Changes in Potential Emissions Summary

Regulated Pollutant	Existing Potential Emissions (tons/yr)[a]			Project Related Potential Emissions (tons/yr)[b]				Change in Potential Emissions (tons/yr)[c]				Summary of Changes in Potential Emissions[d]
	RBV-2	RSV-2	FL-1	RBV-2	RSV-2	GE-1	FL-2	RBV-2	RSV-2	GE-1	FL-2	
Criteria Pollutants												
PM	<0.01	-	-	<0.01	-	1.66E-05	0.24	0.00	-	1.66E-05	0.24	**0.24**
VOC	0.18	19.64	-	0.18	4.87	0.06	-	0.00	-14.77	0.06	-	**-14.71**
NO_X	0.30	-	0.79	0.30	-	0.33	2.93	0.00	-	0.33	2.14	**2.47**
CO	0.26	-	2.30	0.26	-	2.70	2.46	0.00	-	2.70	0.16	**2.86**
SO_2	<0.01	-	-	<0.01	-	0.00	0.01	0.00	-	1.27E-04	0.01	**0.01**
Greenhouse Gas Pollutants												
CO_2e	442.40	-	8,554.53	442.40	-	25.21	2,958.99	0.00	-	25.21	-5,595.54	**-5,570.34**
Hazardous Air Pollutants												
Total HAP	<0.01	4.38	-	<0.01	1.54	0.02	-	0.00	-2.84	0.02	-	**-2.82**

[a] As reported in Attachment I of the General Permit application submitted to the West Virginia Department of Environmental Protection (WVDEP) on March 18, 2011.

[b] As calculated in Table 3-1 of this General Permit application.

[c] Change in Potential Emissions = ([Project Related Potential Emissions] - [Existing Potential Emissions]).

[d] Summary of Changes in Potential Emissions represents the increase or decrease in potential emissions from the Station as a result of the proposed project. The decrease in the Station's VOC and HAP emissions is attributed to an updated wet gas analysis.

4. REGULATORY ANALYSIS

Dominion has reviewed the Federal and State of West Virginia air quality regulations for potentially applicable air quality requirements that could impact the proposed project. The following sections address only those air regulations that could apply to the proposed project.

4.1 FEDERAL AIR QUALITY REGULATIONS

For the purpose of this application, potentially applicable Federal air quality regulations include the following:

- New Source Performance Standards (NSPS)
- National Emission Standards for Hazardous Air Pollutants (NESHAP)
- Compliance Assurance Monitoring (CAM)
- New Source Review (NSR)

A discussion of each specific Federal requirement is presented in the following subsections.

4.1.1 New Source Performance Standards (NSPS)

The United States Environmental Protection Agency (U.S. EPA) has promulgated standards of performance for new, modified, or reconstructed sources of air pollution at 40 CFR Part 60, referred to as NSPS. Although the enclosed flare and the glycol dehydration unit are not subject to an NSPS regulation, the proposed emergency generator is subject to the requirements discussed in 40 CFR Part 60. The following Part 60 Subparts apply to the proposed project:

- Subpart A – General Provisions
- Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

4.1.1.1 40 CFR Part 60, Subpart A – General Provisions

NSPS promulgated under 40 CFR Part 60 apply to new, modified and reconstructed affected facilities in specific source categories. Because the installation of the new Cummins emergency generator is subject to the provisions in 40 CFR Part 60, Subpart JJJJ, 40 CFR Part 60, Subpart A is generally applicable and Dominion will comply with the provisions as appropriate.

4.1.1.2 40 CFR Part 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

The provisions of 40 CFR Part 60, Subpart JJJJ apply to owners and/or operators of stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. Since the new Cummins auxiliary emergency generator is located at an area source of HAP and is an engine greater than 25 HP that was manufactured on or after July 1, 2008, the generator must meet the requirements contained in 40 CFR Part 60, Subpart JJJJ.

The new Cummins auxiliary emergency generator must meet the NO_X + HC and CO emission standards as defined in Table 4-1, pursuant to 40 CFR §60.4233(d), and listed in Table 1 of Subpart JJJJ:

Table 4-1
Emission Standards Table for New Emergency Generator
Dominion Transmission Inc. – Cassity Mountain Station

Engine Type	Maximum Engine Power	Emission Standard (g/HP-hr)	
		NO_X + HC	CO
Emergency	25<HP<130	10	387

Pursuant to §60.4243(b)(1) and §60.4243(a)(1), the Station will appropriately maintain the RICE and keep records to demonstrate compliance with Subpart JJJJ.

Pursuant to §60.4243(d), there is no time limit on the use of the emergency stationary RICE in emergency situations. However, for the proposed engine to meet the definition of an emergency stationary RICE under Subpart JJJJ, the new emergency generator must limit maintenance checks and readiness testing to a maximum of 100 hours per year, and must limit non-emergency operation to a maximum of 50 hours per year, included in 100 hours of maintenance and testing. In order to document the hours of operation of this engine in emergency and non-emergency situations, a non-resettable hour meter will be installed.

Additionally, the station will comply with the recordkeeping requirements codified at §60.4245(a).

4.1.2 National Emission Standards for Hazardous Air Pollutants (NESHAP)

U.S. EPA has promulgated National Emission Standards for Hazardous Air Pollutants (NESHAP) at 40 CFR Part 63. Several existing emission units at the Station are already subject to a NESHAP. The proposed project will not impact the Station's ability to comply with previously applicable requirements. The following Part 63 Subparts potentially apply to the proposed project:

- Subpart A – General Provisions
- Subpart HH – NESHAP for Oil and Natural Gas Production Facilities
- Subpart HHH – NESHAP for Natural Gas Transmission and Storage Facilities
- Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines

4.1.2.1 40 CFR Part 63, Subpart A – General Provisions

Pursuant to the Clean Air Act Amendments of 1990, process-specific NESHAPs are promulgated at 40 CFR Part 63. NESHAPs promulgated under 40 CFR Part 63, also referred to as Maximum Achievable Control Technology (MACT) standards, apply to identified source categories that are considered area sources or major sources of HAPs. As previously mentioned in Section 1.1, the potential emissions of HAPs from the Station are less than the major source thresholds. Therefore, the Station qualifies as an area source of HAPs as defined in §63.2. As an area source of HAPs, the glycol dehydration unit at the Station is subject to MACT standards codified at 40 CFR Part 63. Note that the existing flare serving as a control device for the glycol dehydration unit is subject to the control device and work practice requirements specified in Condition No. 10.1.4 of General Permit G35-A027A, which are based on provisions in 40 CFR §63.11 (Subpart A). The replacement flare will be subject to the same requirements.

4.1.2.2 40 CFR Part 63, Subpart HH – NESHAP for Oil and Natural Gas Production Facilities

The Station is subject to 40 CFR Part 63, Subpart HH – *National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities* (Subpart HH) because the Station transports natural gas to a natural gas processing plant. The Station is subject to the area source requirements and the only affected source is the glycol dehydration unit. The glycol dehydration unit at the Station meets the definition of a large glycol dehydration unit because its

actual annual gas flowrate is greater than 85 thousand standard cubic meters per day (Mm^3/day), and its uncontrolled benzene emissions are greater than 0.90 megagrams per year (Mg/yr), or 1 tpy. The Station is not located within an urbanized area plus offset (UA plus offset) and urban cluster (UC) boundary. A map depicting the location determination is included in Attachment F, located in Appendix A.

The glycol dehydration unit actual average benzene emissions (i.e., controlled emissions) are less than 0.90 Mg/yr (1 tpy), as determined in accordance with §63.772(b)(2)(i). Therefore, the glycol dehydration unit meets the exemption criteria as specified by §63.764(e)(ii). Potential actual average benzene emissions following the replacement of the control device will remain less than 0.90 Mg/yr (1 tpy), due to the emissions reductions associated with the federally enforceable controls (i.e., replacement enclosed flare) in place per §63.772(b)(2). Because the control device replacement ensures that the potential annual benzene emissions will remain less than 0.90 Mg/yr (1 tpy), the dehydration unit will remain exempt from the requirements of §63.764(d)(1)(i) through (iii). Records associated with this determination will be maintained in accordance with §63.774(d)(1). Although the dehydration unit is not subject to control device requirements of 40 CFR 63 Subpart HH or Subpart A, the proposed dehydration unit control device (replacement enclosed flare) will be subject to the control device and work practice requirements specified in §63.11 (Subpart A), as required per Condition No. 10.1.4 of General Permit G35-A027A.

4.1.2.3 Condition 40 CFR Part 63, Subpart HHH – NESHAP for Natural Gas Transmission and Storage Facilities

The provisions of 40 CFR Part 63, Subpart HHH apply to glycol dehydration units located at natural gas transmission and storage facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final end user. Because the Station is associated with a natural gas production facility, HHH does not apply.

4.1.2.4 Condition40 CFR Part 63, Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines

The provisions of 40 CFR Part 63, Subpart ZZZZ apply to owners and/or operators of stationary RICE located an area source of HAP emissions. The proposed natural gas fired emergency

generator meets the definition of RICE as defined in 40 CFR Part 63, Subpart ZZZZ and will meet the requirements of this subpart by complying with 40 CFR Part 60 Subpart JJJJ.

4.1.3 Compliance Assurance Monitoring (CAM)

U.S. EPA promulgated the Compliance Assurance Monitoring (CAM) rule at 40 CFR Part 64 on October 22, 1997 with an effective date of November 21, 1997. According to 40 CFR §64.2(a), a unit located at a nonmajor source that is not required to obtain Title V permit, is exempt from CAM. Therefore, the Station is not subject to CAM requirements.

4.1.4 New Source Review (NSR)

U.S. EPA has approved West Virginia's NSR regulations through their incorporation into the West Virginia State Implementation Plan (SIP). The state-specific NSR regulations are codified in West Virginia 45 CSR§14 and 19.

4.1.4.1 Prevention of Significant Deterioration (PSD)

The Prevention of Significant Deterioration (PSD) regulations ensure that major new sources and major modifications to existing sources will not result in the significant deterioration of air quality in areas designated by U.S. EPA as in attainment of National Ambient Air Quality Standards (NAAQS). Because the replacement of the existing control device (i.e. replacement enclosed flare) is not a major modification and since the Station is not a major source under the PSD rules, PSD does not apply.

4.1.4.2 Nonattainment New Source Review (NNSR)

The NNSR regulations ensure that major new sources and major modifications to existing sources located in areas of nonattainment of NAAQS will not adversely impact the area's progress toward achieving NAAQS. Because the change does not meet major source criteria when considered alone and as the Station is not an existing major source under the NNSR rules, the NNSR rules do not apply.

4.2 STATE OF WEST VIRGINIA REQUIREMENTS

The proposed project is potentially subject to the following West Virginia air quality regulations as codified in Title 45 – Division of Air Quality Code. It should be noted that none of the existing Title 45 regulations that currently apply to the Station will be impacted by the proposed project.

- 45 CSR6 – To Prevent and Control Air Pollution from Combustion of Refuse
- 45 CSR10 – To Prevent and Control Air Pollution from the Emission of Sulfur Oxides
- 45 CSR13 – Permits for Construction, Modification, Relocation, and Operation of Stationary Sources of Air Pollutants
- 45 CSR30 – Requirements of Operating Permits
- 45 CSR30A – Deferral of Nonmajor and Area Sources from Permitting Requirements
- 45 CSR34 – Emission Standards for Hazardous Air Pollutants

4.2.1 45 CSR6 – To Prevent and Control Air Pollution from Combustion of Refuse

The provisions of this rule establish emission standards for PM and requirements for activities involving incineration of refuse which are not subject to, or are exempted from regulation under a federal counterpart for specific combustion sources. The proposed control device (i.e., enclosed flare) for the glycol dehydration unit at the Station meets the definition of an "incinerator" in 45 CSR§6-2, and therefore is subject to the 45 CSR6 regulations. The monitoring requirements, testing requirements, recordkeeping requirements, and reporting requirements of this rule therefore apply.

Based on 45 CSR§6-4, the allowable PM emissions for the flare are calculated using the following formula:

$$PM_{allowable}\left(\frac{lb}{hr}\right) = Incinerator\ Capacity\ (\frac{tons}{hr})\ x\ F$$

Where: F = Factor for determining maximum allowable particulate emissions. For incinerators with a capacity less than 15,000 lb/hr: F = 5.43.
Incinerator Capacity = design capacity of the flare (estimated total flow rate to the flare, including materials to be burned, carrier gases, auxiliary fuel, etc.).

The allowable PM limit calculation is provided below:

$$PM_{allowable} = 143\,\frac{lb}{hr}\,x\,5.43\,(F\ factor)x\,\frac{1\ ton}{2000\ lb}\ =\ 0.39\ lb/hr,$$

Based on AP-42, the enclosed flare will comply with the allowable PM emission limit determined in accordance with 45 CSR§6-4.

4.2.2 45 CSR10 – To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

The provisions of this rule regulate emissions of sulfur oxides (SO_X). The existing control device (i.e., flare) is subject to the applicable emission limits specified in 45 CSR§10-4.1 Standards for Manufacturing Process Source Operations and 45 CSR§10-5.1 Combustion of Refinery or Process Gas Streams. The existing source-specific emission limits will not change as a result of the proposed project. The new enclosed flare and the new auxiliary emergency generator are exempt from the testing, monitoring, recordkeeping, and reporting requirements of 45 CSR§10-8 because both combust natural gas (CSR§10-10.3).

4.2.3 45 CSR13 – Permits for Construction, Modification, Relocation, and Operation of Stationary Sources of Air Pollutants

The provisions of this rule set forth the procedures for stationary source reporting, and the criteria for obtaining a permit to modify a nonmajor stationary source. The proposed project is a modification to a nonmajor source as defined in 45 CSR13, and therefore requires a General Permit.

4.2.4 45 CSR30 – Requirements of Operating Permits and 45 CSR30A – Deferral of Nonmajor and Area Sources From Permitting Requirements

45 CSR30 provides for the establishment of a comprehensive air permitting system consistent with the requirements of Title V of the CAA. The provisions of 45 CSR30A provide for the deferral of nonmajor and area sources from the obligation to obtain a permit under 45 CSR30. Because the Station is a nonmajor source and is an area source, the provisions of 45 CSR30 do not apply.

4.2.5 45 CSR34 – Emission Standards for Hazardous Air Pollutants (HAP)

The provisions of this rule incorporate 40 CFR Parts 61 and 63 by reference including any required methods, performance specifications, and all test methods which are approved to flare standards. Exclusions are identified at 45 CSR§34-4. The proposed project does not affect the applicability of 45 CSR34. Therefore, the standards set forth by 40 CFR Part 63, Subpart HH will continue to apply.

5. SUMMARY OF APPLICATION FORMS AND SUPPORTING INFORMATION

Dominion is including a check payable to the "West Virginia Department of Environmental Protection – Division of Air Quality" in the amount of $3,000, as established in 45 CSR13 and 45 CSR22, to cover the G35-A General Permit Application fee ($500) and the fee applicable to sources subject to NESHAP requirements ($2,500).

The following attachments included as Appendix A provide supporting information for the General Permit G35-A Application:

- Attachment A – Business Certificate
- Attachment B – Process Description
- Attachment D – Process Flow Diagram
- Attachment E – Plot Plan
- Attachment F – Area Map
- Attachment G – Equipment Data Sheets
- Attachment H – Air Pollution Control Device Sheets
- Attachment I – Emission Calculations
- Attachment J – Class I Legal Advertisement
- Attachment L – General Permit Registration Application Fee
- Attachment P – Other Supporting Documents (Emergency Generator Vendor Information)

**Note – There are no Attachments C, H, K, M, N and O for this permit application

APPENDIX A
APPLICATION FORMS AND ATTACHMENTS

WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street, SE
Charleston, WV 25304
Phone: (304) 926-0475 • *www.dep.wv.gov/daq*

APPLICATION FOR GENERAL PERMIT REGISTRATION

CONSTRUCT, MODIFY, RELOCATE OR ADMINISTRATIVELY UPDATE

A STATIONARY SOURCE OF AIR POLLUTANTS

☐ CONSTRUCTION ☒ **MODIFICATION** ☐ RELOCATION ☐ CLASS I ADMINISTRATIVE UPDATE
☐ CLASS II ADMINISTRATIVE UPDATE

CHECK WHICH TYPE OF GENERAL PERMIT REGISTRATION YOU ARE APPLYING FOR:

☐ G10-D – Coal Preparation and Handling
☐ G20-B – Hot Mix Asphalt
☐ G30-D – Natural Gas Compressor Stations
☐ G33-A – Spark Ignition Internal Combustion Engines
☒ **G35-A – Natural Gas Compressor Stations (Flare/Glycol Dehydration Unit)**
☐ G40-C – Nonmetallic Minerals Processing
☐ G50-B – Concrete Batch
☐ G60-C - Class II Emergency Generator
☐ G65-C – Class I Emergency Generator
☐ G70-A – Class II Oil and Natural Gas Production Facility

SECTION I. GENERAL INFORMATION

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. Applicant's mailing address:
445 West Main Street
Clarksburg, WV 26301

4. Applicant's physical address:
Cassity, Randolph County
West Virginia 26301

5. If applicant is a subsidiary corporation, please provide the name of parent corporation: ***N/A***

6. **WV 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 LLC / Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A**.

SECTION II. FACILITY INFORMATION

7. Type of plant or facility (stationary source) to be constructed, modified, relocated or administratively updated (e.g., coal preparation plant, primary crusher, etc.):

Replacement enclosed flare control device (for dehydration unit), and

Installation of one (1) new spark ignition engine driven emergency generator.

8a. Standard Industrial AND

8b. North American Industry Classification

Classification (SIC) code: ***4922*** System (NAICS) code: ***486210***

9. DAQ Plant ID No. (for existing facilities only): ***083 – 00123***	10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only): ***G35-A027A***

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site: ***Cassity Mountain Station***	12A. Address of primary operating site: Mailing: ***445 West Main Street*** ***Clarksburg, WV 2630*** Physical: ***Cassity, Randolph County*** ***WV 26301***

13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☒ ***YES***

- IF **YES**, please explain: ***The applicant owns the proposed site.***
- IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14A.
- For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;
- For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

From Route 33, go west from Weston. Turn right onto 151 and go ½ mile. Turn right and go3/10 mile to Pumpkintown Road. Turn left onto Pumpkintown Road and go 4 miles. Turn left and go11 miles (through the towns of Mabie and Cassity) to Dominion gate on left of road. Turn left, station is 4 miles.

15A. Nearest city or town: ***Cassity***	16A. County: ***Randolph***	17A. UTM Coordinates: Northing (KM): ***4,292.294*** Easting (KM): ***584.773*** Zone: ***17***

18A. Briefly describe the proposed new operation or change (s) to the facility: ***Dominion Transmission, Inc. (Dominion) is proposing to construct one (1) new enclosed flare to replace the existing flare utilized as control devices on the existing glycol dehydration system located at the Cassity Mountain Station. Dominion is also proposing to install one (1) new spark ignition emergency generator at the Station.***	19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: ***38.7753*** Longitude: ***-80.0241***

B: 1ST ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits)

11B. Name of 1st alternate operating site: ***N/A***	12B. Address of 1st alternate operating site: Mailing: ***N/A*** Physical: ***N/A***

13B. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ***N/A***

- IF **YES**, please explain: ***N/A***
- IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14B. – For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;

– For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

N/A

15B. Nearest city or town:	16B. County:	17B. UTM Coordinates:
N/A	***N/A***	Northing (KM): ***N/A*** Easting (KM): ***N/A*** Zone: ***N/A***

18B. Briefly describe the proposed new operation or change (s) to the facility:	19B. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
N/A	Latitude: ***N/A*** Longitude: ***N/A***

C: 2ND ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits):

11C. Name of 2nd alternate operating site:	12C. Address of 2nd alternate operating site:
N/A	Mailing: ***N/A*** Physical: ***N/A***

13C**.** Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ***N/A***

– IF **YES**, please explain: ***N/A***

– IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14C. – For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;

– For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

N/A

15C. Nearest city or town:	16C. County:	17C. UTM Coordinates:
N/A	***N/A***	Northing (KM): ***N/A*** Easting (KM): ***N/A*** Zone: ***N/A***

18C. Briefly describe the proposed new operation or change (s) to the facility:	19C. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
N/A	Latitude: ***N/A*** Longitude: ***N/A***

20. Provide the date of anticipated installation or change:	21. Date of anticipated Start-up if registration is granted:
N/A ☐ If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: : **_ *N/A***	***N/A***

22. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application if other than 8760 hours/year. (Note: anything other than 24/7/52 may result in a restriction to the facility's operation).

Hours per day ***N/A*** Days per week ***N/A*** Weeks per year ***N/A*** Percentage of operation ***N/A***

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

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

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

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

25. Please check all attachments included with this permit application. Please refer to the appropriate reference document for an explanation of the attachments listed below.

- ☒ **ATTACHMENT A : CURRENT BUSINESS CERTIFICATE**
- ☒ **ATTACHMENT B: PROCESS DESCRIPTION**
- ☐ ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS
- ☒ **ATTACHMENT D: PROCESS FLOW DIAGRAM**
- ☒ **ATTACHMENT E: PLOT PLAN**
- ☒ **ATTACHMENT F: AREA MAP**
- ☒ **ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM**
- ☒ **ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS**
- ☒ **ATTACHMENT I: EMISSIONS CALCULATIONS**
- ☒ **ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT**
- ☐ ATTACHMENT K: ELECTRONIC SUBMITTAL
- ☒ **ATTACHMENT L: GENERAL PERMIT REGISTRATION APPLICATION FEE**
- ☐ ATTACHMENT M: SITING CRITERIA WAIVER
- ☐ ATTACHMENT N: MATERIAL SAFETY DATA SHEETS (MSDS)
- ☐ ATTACHMENT O: EMISSIONS SUMMARY SHEETS
- ☒ **ATTACHMENT P: OTHER SUPPORTING DOCUMENTATION (Emergency Generator Vendor Information)**

Please mail an original and two copies of the complete General Permit Registration Application with the signature(s) to the DAQ Permitting Section, at the address shown on the front page of this application. Please DO NOT fax permit applications. For questions regarding applications or West Virginia Air Pollution Rules and Regulations, please refer to the website shown on the front page of the application or call the phone number also provided on the front page of the application.

SECTION IV. CERTIFICATION OF INFORMATION

This 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 a 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, Emission Inventory, Certified Emission Statement, 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 Registration Application will be returned to the applicant.

FOR A CORPORATION (domestic or foreign)

☒ I certify that I am a President, Vice President, Secretary, Treasurer or in charge of a principal business function of the corporation

FOR A PARTNERSHIP

☐ I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

☐ I certify that I am a General Partner or General Manager

FOR AN ASSOCIATION

☐ I certify that I am the President or a member of the Board of Directors

FOR A JOINT VENTURE

☐ I certify that I am the President, General Partner or General Manager

FOR A SOLE PROPRIETORSHIP

☐ I certify that I am the Owner and Proprietor

I hereby certify that (please print or type) ***Brian 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 Office of Air Quality immediately, and/or,

I hereby certify that all information contained in this 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

Signature _____ 04-02-15
(please use blue ink) Responsible Official Date

Name & Title ***Brian Sheppard, Vice President, Pipeline Operations***
(please print or type)

Signature _____
(please use blue ink) Authorized Representative (if applicable) Date

Applicant's Name ***Dominion Transmission, Inc.***

Phone & Fax ***304-627-3733*** ***304-627-3323***
Phone Fax

Email ***Brian.C.Sheppard@dom.com***

ATTACHMENT A
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.

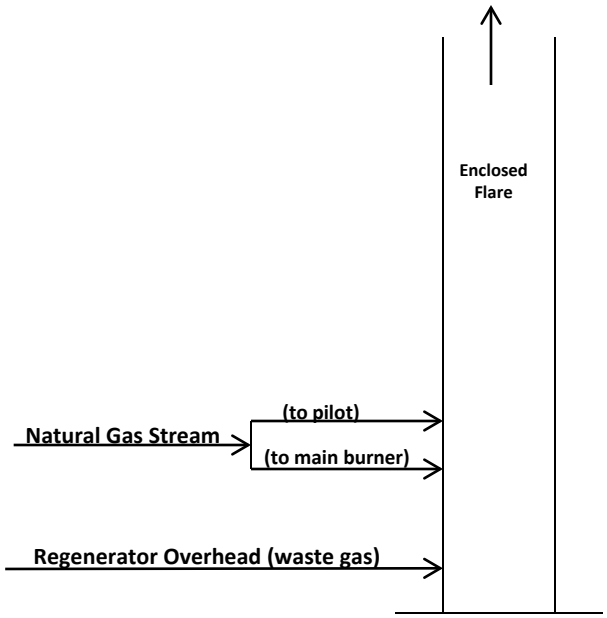
TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

atL006 v.4
L0228957312

ATTACHMENT B
PROCESS DESCRIPTION (IN SECTION 2 OF TEXT)

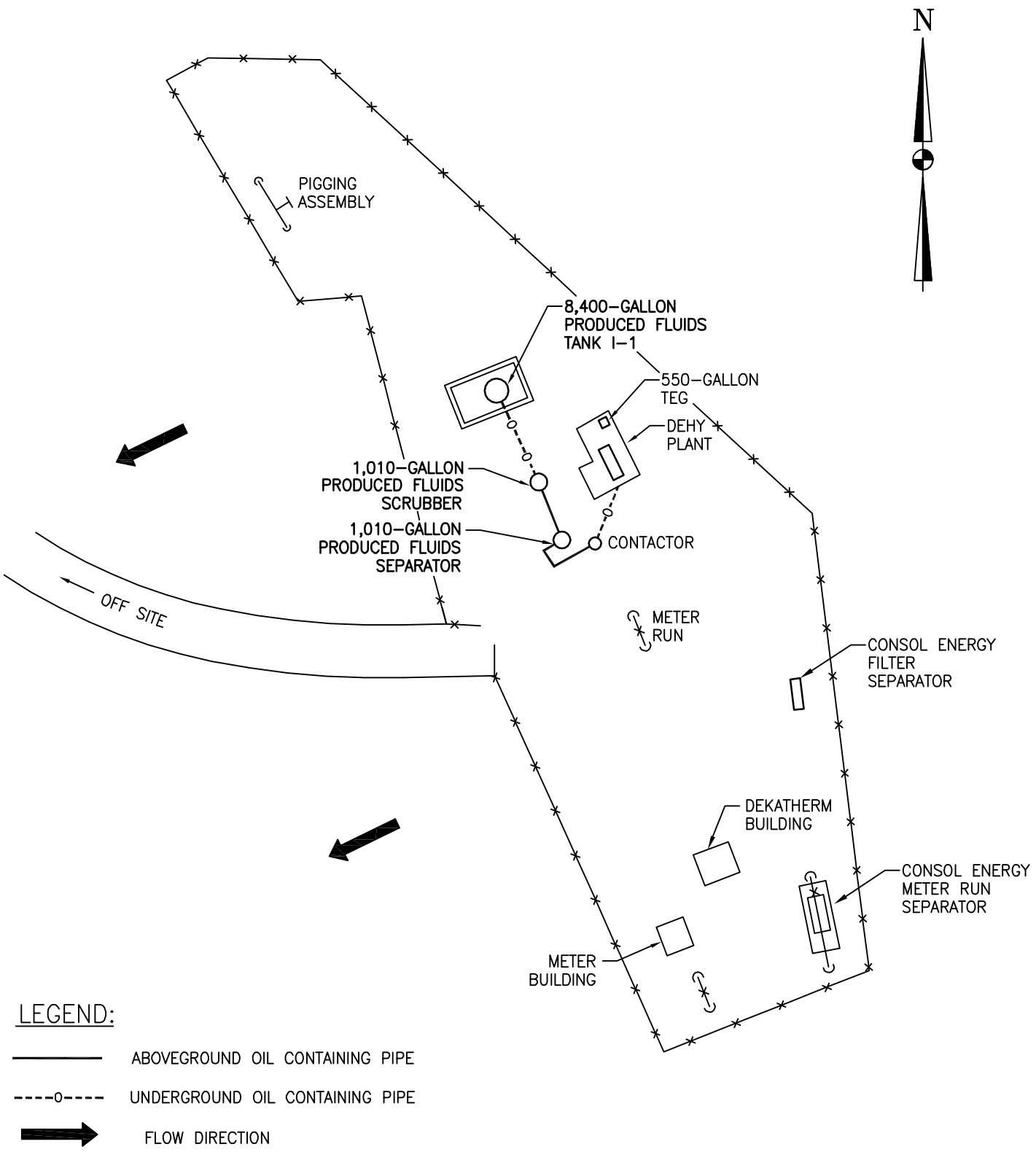
ATTACHMENT D
PROCESS FLOW DIAGRAM

Enclosed Flare



Process Flow Diagram
Dominion Transmission, Inc.
Cassity Mountain Compressor Station – Randolph County, WV

ATTACHMENT E
PLOT PLAN



DRAWN BY	DJF
DATE	9/6/12
CHECKED BY	
SET JOB NO.	209105
SET DWG FILE	CASSSITY MTNa01.dwg
DRAWING SCALE	N.T.S.

TECHNOLOGIES
98 Vanadium Road Bridgeville, PA 15017 (412) 221-1100

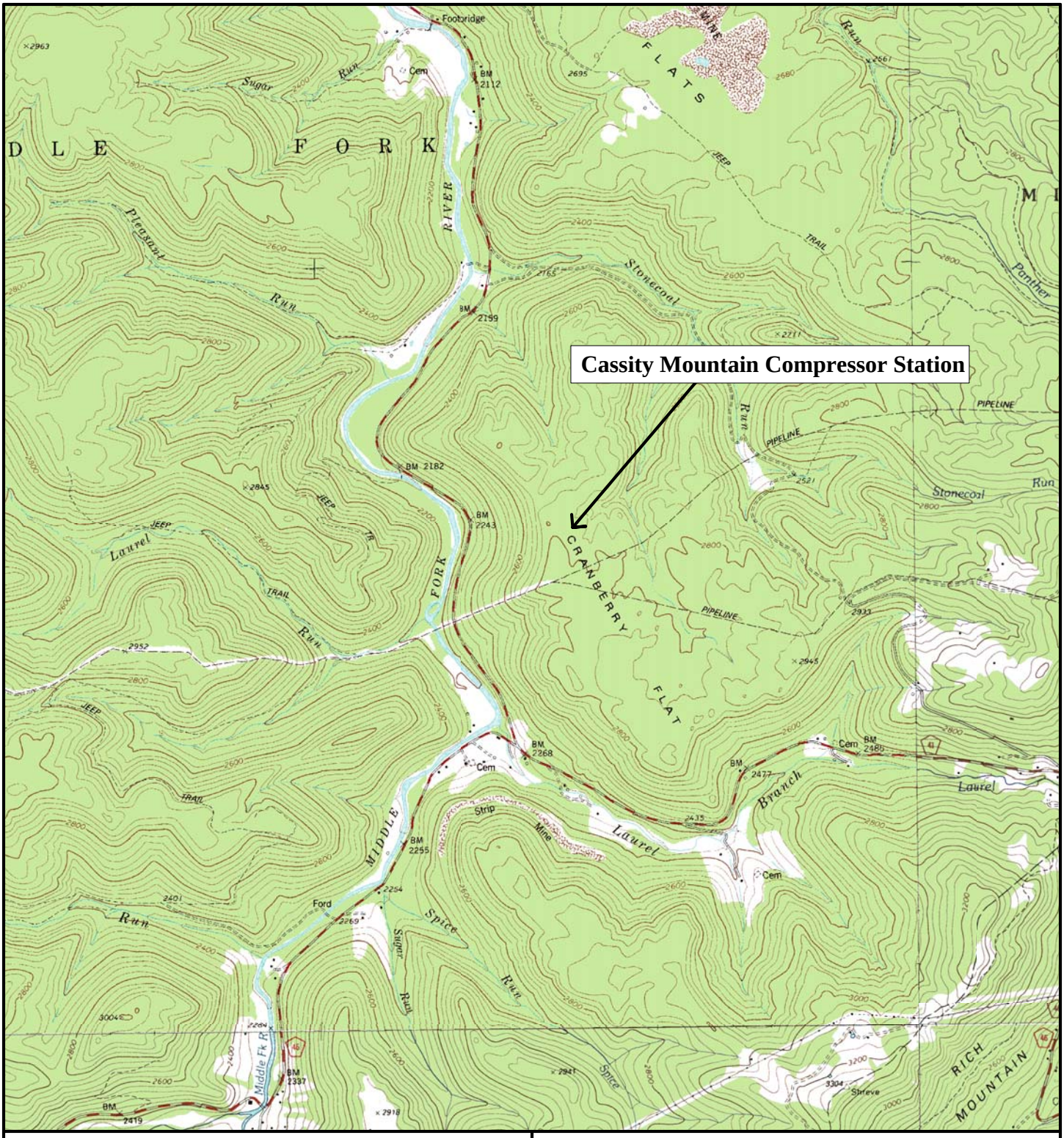
DOMINION

CASSITY MOUNTAIN DEHY
RANDOLPH COUNTY, WEST VIRGINIA
SITE LAYOUT

DRAWING NAME	REV.
FIGURE 2	0

Plot: env045 09/06/2012 14:41 G:\DOMINION\209105\CASSITY MTNa01.dwg

ATTACHMENT F
AREA MAP



approximate quadrangle location

0 0.5 1

N

Based on USGS 1:24,000 topographical map for Cassity (1977), Adolph (1998), Beverly West (1998) and Mill Creek (1998).

Dominion Transmission Inc.
Cassity Mountain Compressor Station
Randolph County, WV

Figure 1-1
Facility Location Map

Cassity Mountain Station
Location: Lat 38.7753 , Long -80.0241
Non-Urban
Created 8/4/2014
● = Cassity Mountain Station

Legend:

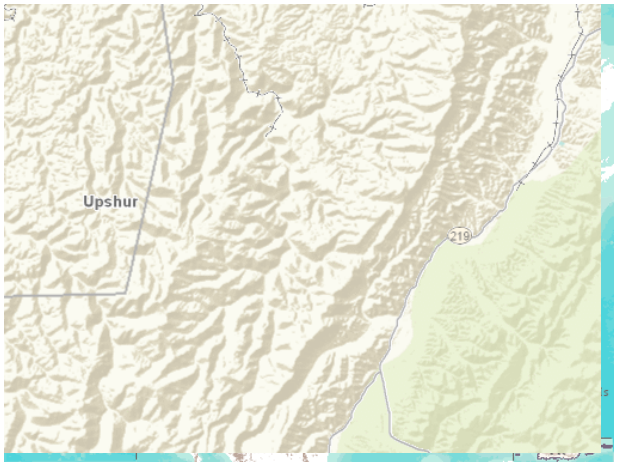
Boundaries

- State
- '00 County
- '00 Urban Area

Features

- Street
- Railroad
- Pipe/Powerline
- Stream/Waterbody

Items in grey text are not visible at this zoom level



ATTACHMENT G
EQUIPMENT DATA SHEETS

General Permit G35-A Registration
Section Applicability Form

General Permit G35-A was developed to allow qualified registrants to seek registration for a variety of sources. These sources include internal combustion engines, boilers, reboilers, line heaters, tanks, emergency generators, dehydration units not subject to MACT standards, dehydration units not subject to MACT standards and being controlled by a flare control device, dehydration units not subject to MACT standards and being controlled by recycling the dehydration unit back to flame zone of reboiler, dehydration units not subject to MACT standards being controlled by a thermal oxidizer, and permit exemptions including the less than 1 ton/year benzene exemption, the 40CFR63 Subpart HH - Annual Average Flow of Gas Exemption (3 mmscf/day), and the 40CFR63 Subpart HHH - Annual Average Flow of Gas Exemption (10 mmscf/day). All registered facilities will be subject to Sections 1.0, 1.1, 2.0, 3.0, and 4.0.

General Permit G35-A allows the registrant to choose which sections of the permit that they wish to seek registration under. Therefore, please mark which sections that you are applying for registration under. Please keep in mind, that if this registration is approved, the issued registration will state which sections will apply to your affected facility.

Section 5	Reciprocating Internal Combustion Engines (R.I.C.E.)*	☒
Section 6	Boilers, Reboilers, and Line Heaters	☒
Section 7	Tanks	☐
Section 8	Emergency Generators	☒
Section 9	Dehydration Units Not Subject to MACT Standards	☐
Section 10	Dehydration Units Not Subject to MACT Standards and being controlled by a flare control device	☒
Section 11	Dehydration Units Not Subject to MACT Standards being controlled by recycling the dehydration unit back to the flame zone of the reboiler	☐
Section 12	Dehydration Units Not Subject to MACT Standards and being controlled by a thermal oxidizer	☐
Section 13	Permit Exemption (Less than 1 ton/year of benzene exemption)	☒
Section 14	Permit Exemption (40CFR63 Subpart HH – Annual average flow of gas exemption (3 mmscf/day))	☐
Section 15	Permit Exemption (40CFR63 Subpart HHH – Annual average flow of gas exemption (10 mmscf/day))	☐
Section 16	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (40CFR60 Subpart JJJJ)	☒

*** Affected facilities that are subject to Section 5 may also be subject to Section 16. Therefore, if the applicant is seeking registration under both sections, please select both.**

NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET

Source Identification Number[1]		***GE-1***	
Engine Manufacturer and Model		***Cummins 60 GGHE***	
Manufacturer's Rated bhp/rpm		***97.5 bhp***	
Source Status[2]		***NS***	
Date Installed/Modified/Removed[3]		***2015***	
Engine Manufactured/Reconstruction Date[4]		***2014***	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart JJJJ? (Yes or No)[5]		***Yes***	
Engine, Fuel and Combustion Data	Engine Type[6]	***4SLB***	
	APCD Type[7]	***SCR***	
	Fuel Type[8]	***PQ***	
	H_2S (gr/100 scf)	***Negligible***	
	Operating bhp/rpm	***97.5 bhp***	
	BSFC (Btu/bhp-hr)	***9,272***	
	Fuel throughput (ft^3/hr)	***861***	
	Fuel throughput ($MMft^3$/yr)	***0.43***	
	Operation (hrs/yr)	***500***	
Reference[9]	Potential Emissions[10]	lbs/hr	tons/yr
MD	NO_X	***1.31***	***0.33***
MD	CO	***10.80***	***2.70***
AP/MD	VOC	***0.26***	***0.06***
AP	SO_2	***<0.01***	***<0.01***
AP	PM_{10}	***<0.01***	***<0.01***
AP	Formaldehyde	***0.02***	***<0.01***

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

2. Enter the Source Status using the following codes:

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

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

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

5. Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart JJJJ. If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance according to 40CFR§60.4243a(2)(i) through (iii), as appropriate.

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

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

LB2S	Lean Burn Two Stroke	RB4S	Rich Burn Four Stroke
LB4S	Lean Burn Four Stroke		

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

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

8. Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas

9. Enter the Potential Emissions Data Reference designation using the following codes. Attach all referenced data to this *Compressor/Generator Data Sheet(s)*.

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

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

NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET

General Glycol Dehydration Unit Data		Manufacturer and Model		***Cameron 300/550***	
		Max Dry Gas Flow Rate (mmscf/day)		***55 MMSCFD***	
		Design Heat Input (mmBtu/hr)		***0.930***	
		Design Type (DEG or TEG)		***TEG***	
		Source Status[2]		***ES***	
		Date Installed/Modified/Removed[3]		***6/01/2011***	
		Regenerator Still Vent APCD[4]		***FL***	
		Fuel HV (Btu/scf)		***1,106.5***	
		H_2S Content (gr/100 scf)		***Negligible***	
		Operation (hrs/yr)		***8,760***	
Source ID #[1]	Vent	Reference[5]	Potential Emissions[6]	lbs/hr	tons/yr
RBV-2	Reboiler Vent	MD	NO_X	***0.07***	***0.30***
		MD	CO	***0.06***	***0.26***
		MD	VOC	***0.04***	***0.18***
		AP	SO_2	***<0.01***	***<0.01***
		AP	PM_{10}	***<0.01***	***<0.01***
RSV-2	Glycol Regenerator Still Vent	GRI-GLYCalc™	VOC	***1.11***	***4.87***
		GRI-GLYCalc™	Benzene	***0.03***	***0.15***
		GRI-GLYCalc™	Ethylbenzene	***0.10***	***0.43***
		GRI-GLYCalc™	Toluene	***0.06***	***0.26***
		GRI-GLYCalc™	Xylenes	***0.13***	***0.57***
		GRI-GLYCalc™	n-Hexane	***0.02***	***0.09***

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
WEB PAGE: http:\\www.wvdep.org

Division of Air Quality

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): ***55 MMSCFD***

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. ***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***

The affected facility is: ☐ prior to a NG processing plant ☐ a NG processing plant
☒ 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). ***No***

The affected facility exclusively processes, stores, or transfers black oil. ***No***

Initial producing gas-to-oil ratio (GOR): _____scf/bbl API gravity: _____degrees

Section B: Dehydration Unit (if applicable) [1]

Description: ***Cameron Glycol Dehydration Unit***

Date of Installation: ***11/2011***	Annual Operating Hours: ***8,760***	Burner rating (MMbtu/hr): ***0.930***
Exhaust Stack Height (ft): ***25.5***	Stack Diameter (ft): ***0.83***	Stack Temp. (°F): ***~1,650***

Glycol Type: ☒ TEG ☐ EG ☐ Other:

Glycol Pump Type: ☒ Electric ☐ Gas If gas, what is the volume ratio? _____ACFM/gpm

Condenser installed? ☐ Yes ☒ No Exit Temp. _____ °F Condenser Pressure _____psig

Incinerator/flare installed? ☒ Yes ☐ No Destruction Eff. ***95*** %

Other controls installed? ☐ Yes ☒ No Describe:

Wet Gas[2]: Gas Temp.: ***~80 °F*** Gas Pressure ***~500 psig***
(Upstream of Contact Tower) Saturated Gas? ☒ Yes ☐ No If no, water content _____ lb/MMSCF

Dry Gas: Gas Flowrate(MMSCFD) Actual _____ Design ***55 MMSCFD***
(Downstream of Contact Tower) Water Content ***5 lb/MMSCF***

Lean Glycol: Circulation rate (gpm) Actual[3] _____ Maximum[4] ***3 gal/lb H_2O***
Pump make/model: ***N/A***

Glycol Flash Tank (if applicable): Temp.: ***150 °F*** Pressure ***50 psig*** Vented? Yes ☒ No ☐
If no, describe vapor control: ***N/A***

Stripping Gas (if applicable): Source of gas: ***Dry gas*** Rate ***65*** 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 C_1-C_8, 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)

- ☒ Subject to Subpart HH
- ☐ Subject to Subpart HHH
- ☐ Not Subject because:
  - ☐ < 10/25 TPY
  - ☐ Affected facility exclusively handles black oil
  - ☐ The facility wide actual annual average NG throughput is < 650 thousand scf/day and facility wide actual annual average hydrocarbon liquid is < 250 bpd
  - ☐ No affected source is present

COMPRESSOR STATION EMISSION SUMMARY SHEET FOR CRITERIA POLLUTANTS

Compressor Station						Registration Number (Agency Use) G35-A				
	Potential Emissions (lbs/hr)					Potential Emissions (tons/yr)				
Source ID No.	NO_X	CO	VOC	SO_2	PM_{10}	NO_X	CO	VOC	SO_2	PM_{10}
GE-1	*1.31*	*10.80*	*0.26*	*<0.01*	*<0.01*	*0.33*	*2.70*	*0.06*	*<0.01*	*<0.01*
RBV-2	*0.07*	*0.06*	*0.04*	*<0.01*	*<0.01*	*0.30*	*0.26*	*0.18*	*<0.01*	*<0.01*
RSV-2	*-*	*-*	*1.11*	*-*	*-*	*-*	*-*	*4.87*	*-*	*-*
F-2	*0.67*	*0.56*	*-*	*<0.01*	*0.05*	*2.93*	*2.46*	*-*	*0.01*	*0.24*
Total	*2.05*	*11.42*	*1.41*	*<0.01*	*0.05*	*3.56*	*5.42*	*5.11*	*0.01*	*0.24*

COMPRESSOR STATION EMISSION SUMMARY SHEET FOR HAZARDOUS/TOXIC POLLUTANTS

Compressor Station							Registration Number (Agency Use) G35-A					
	Potential Emissions (lbs/hr)						Potential Emissions (tons/yr)					
Source ID No.	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formalde-hyde	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formalde-hyde
GE-1	*<0.01*	*<0.01-*	*<0.01*	*<0.01*	*<0.01*	*0.05*	*<0.01*	*<0.01*	*<0.01-*	*<0.01*	*<0.01*	*<0.01*
RBV-2	*-*	*-*	*-*	*-*	*<0.01*	*<0.01*	*-*	*-*	*-*	*-*	*<0.01*	*<0.01*
RSV-2	*0.03*	*0.10*	*0.06*	*0.13*	*0.02*	*-*	*0.15*	*0.43*	*0.26*	*0.57*	*0.09*	*-*
Total	*0.03*	*0.10*	*0.06*	*0.13*	*0.02*	*0.05*	*0.15*	*0.43*	*0.26*	*0.57*	*0.09*	*0.01*

ATTACHMENT H
AIR POLLUTION CONTROL DEVICE SHEETS

Flare System Control Device Sheet

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.

General Information

1) Control Device ID#: ***F-2***	2) Installation Date: ***May 2015*** ☒ New
3) Maximum Flare Rated Capacity: ***66 Mscf/d***	4) Maximum Pilot Rated Capacity: ***1,200 scf/d***

5) Emission Unit Information

List the emission units whose emissions are controlled by this flare:
(Emission Point ID#: ***F-2***)

Emission Unit ID#	Emission Source Description	Installation Date
RSV-2	***Glycol Dehydrator – Regeneration Still Vent***	***06/01/2011*** ☐ NEW
		☐ NEW
		☐ NEW
		☐ NEW
		☐ NEW

If this flare controls emissions from more than five emission units, please attach additional pages.

6) Stack Information ☐ **N/A**

Flare Height	Tip Diameter	Stack Discharge	Assist Type	Exit Velocity of Gas	Heat Content of Waste Gas + Any Auxiliary Fuel
25.5 ft	***1.46*** ft	☐ Horizontal ☒ Vertical ☐ Vertical with Rain cap	☐ Steam ☐ Air ☐ Pressure ☒ Non	***<45.5*** ft/s	***~591*** Btu /scf

7) Flare Fuel Information

Type/Grade of Fuel Combusted	Maximum Fuel Capacity (include units)	Heat Content (include units)	Fuel Contents	Requested Operating Limitation (include units)
Waste Gas	***~66 Mscf/d***	***~591 Btu/scf***	% Sulfur: ***negligible*** % Ash: ***negligible***	***N/A***
Fuel Gas (Natural Gas)	***~10 Mscf/d***	***~1,000 Btu/scf***	% Sulfur: ***negligible*** % Ash: ***negligible***	***None***

8) Pilot Fuel Information

Type/Grade of Fuel Combusted	Maximum Fuel Capacity (include units)	Heat Content (include units)	Fuel Contents	Requested Operating Limitation (include units)
Natural Gas	***~1,200 scf/d***	***~1,000 Btu/scf***	% Sulfur: ***Negligible*** % Ash: ***negligible***	***None***

If either the Flare or Pilot will combust more than one type of fuel, attach additional information.

Flare System Control Device Sheet (continued)

9) Control Information

Pollutant(s) Controlled	% Control Efficiency	Pollutant(s) Controlled	% Control Efficiency
VOC	***95%***		
HAP	***95%***		

If additional pollutants are being controlled, attach additional information.

10) Emission Calculations Attached? ☒ **YES** ☐ **NO**

Please attach a copy of all emission calculations.

11) Additional Information Attached? ☒ **YES** ☐ **NO**

Please attach a copy of flare manufacturer's data sheet.

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

Flares meeting the requirements of G35-A Section 10 and registered under General Permit G35-A are considered federally enforceable.

QUESTOR TECHNOLOGY INC.

Dominion – Cassity Mountain Station

Q100 Thermal Oxidizer Emission Estimates

Design Load – GRI-GLYCalc Simulation Data received August 2013

Waste stream	**Regenerator Overheads Stream**
Flowrate	**66 mscf/d**
Major Components	**89.3% H_2O, 0.55% C_1, 0.31% C_2**

Flue gas emission estimates based on waste to fuel gas ratio of 1:0.2

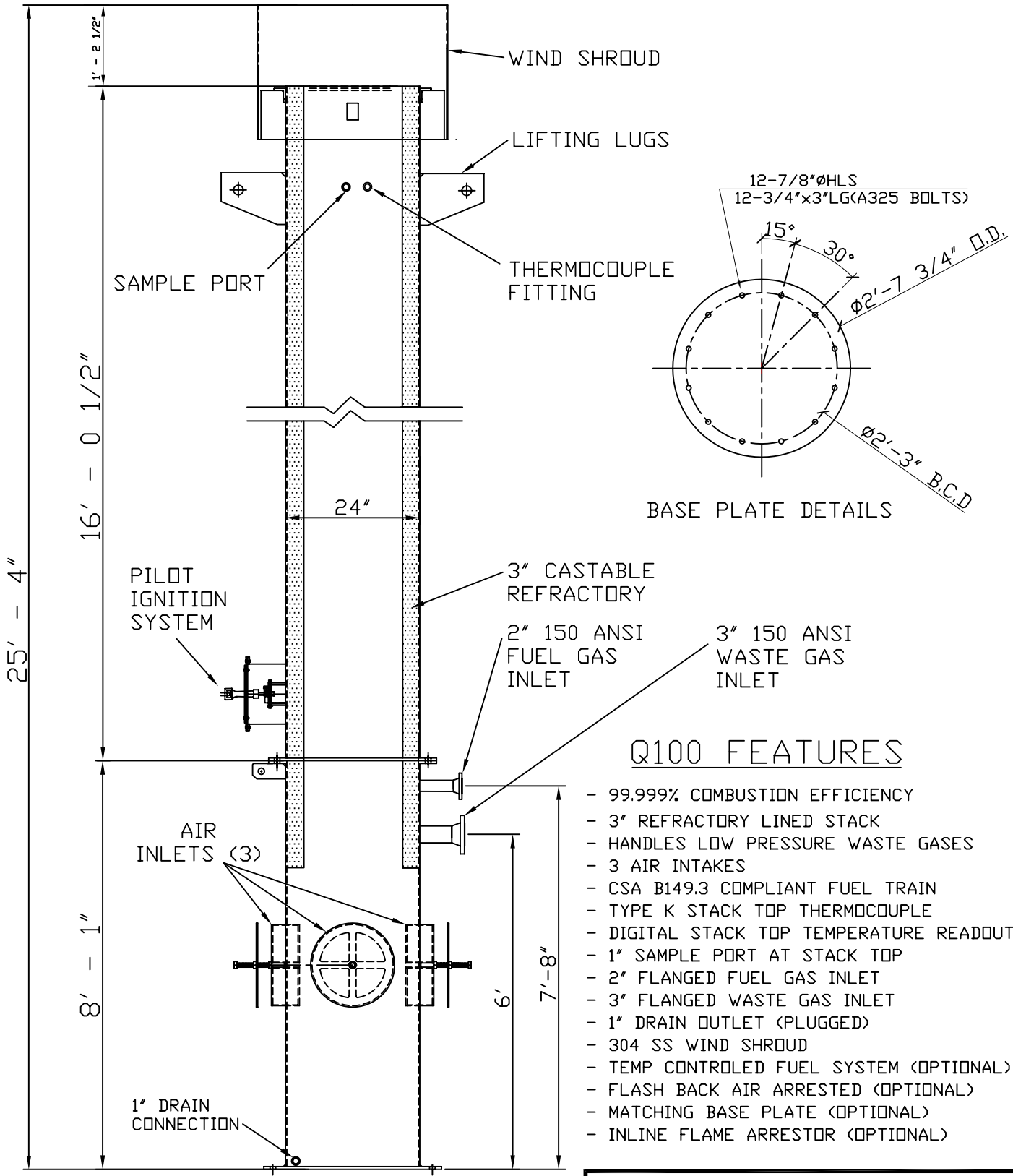
Nitrogen Oxides	
NOx (ppm)	less than 60 ppm
NOx (tons/yr)	0.86 tons/yr
Sulphur Dioxide	
SO_2 (ppm)	0 ppm
SO_2 (tons/yr)	0 tons/yr
Carbon Monoxides	
CO (ppm)	less than 100 ppm
CO (tons/yr)	0.72 tons/yr
Total Hydrocarbons	
HCT (ppm)	less than 20 ppm
HCT (tons/yr)	0.035 tons/yr
Nonmethane Hydrocarbons	
NMHC (ppm)	less than 20 ppm
NMHC (tons/yr)	0.008 tons/yr

Fuel

Fuel type	Natural gas (1050 Btu/scf NHV)
Typical fuel consumption	10 - 20 mscf/d

Exhaust characteristics

Exhaust diameter	17.2 inches
Exhaust height	30 Ft from skid base
Exhaust temperature	1112 - 1600°F
Exhaust velocity	16 - 25 ft/sec
Questor model number	Q100 Thermal Oxidizer
Questor combustion Efficiency	>99.99%



ELEVATION

NOT TO SCALE

APPROXIMATE WEIGHT = 6,000 LBS

BASE PLATE DETAILS

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 CONTROLED FUEL SYSTEM (OPTIONAL)
- FLASH BACK AIR ARRESTED (OPTIONAL)
- MATCHING BASE PLATE (OPTIONAL)
- INLINE FLAME ARRESTOR (OPTIONAL)

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 ^{o}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 BWRF
Bolting	A335

Refractory Specification

Type:	4LI
Thickness:	3 inches
Manufacturer:	Rescocast
Maximum working temperature:	2600 ^{o}F 1427 ^{o}C

Gas Supply Connections

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

Questor Technology Inc., Suite 510, 100 - 4th Avenue SW, Calgary, Alberta, Canada, T2P 3N2 Phone: (403) 571 - 1530 Fax: (403) 571 - 1539 http://www.questortech.com/

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 m^3/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 Technology Inc., Suite 510, 100 - 4th Avenue SW, Calgary, Alberta, Canada, T2P 3N2 Phone: (403) 571 - 1530 Fax: (403) 571 - 1539 http://www.questortech.com/

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

Questor Technology Inc., Suite 510, 100 - 4th Avenue SW, Calgary, Alberta, Canada, T2P 3N2 Phone: (403) 571 - 1530 Fax: (403) 571 - 1539 http://www.questortech.com/

ATTACHMENT I
EMISSIONS CALCULATIONS

Table 3-1
Dominion Transmission, Inc. - Cassity Mountain Station
Project Related Potential Emissions Summary

Regulated Pollutant	Emission Points			
	RSV-2 (Controlled by F-2)		F-2 (New)	
	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
Criteria Pollutants				
PM[(a)]	-	-	0.05	0.24
VOC[(b)]	1.11	4.87	-	-
NO_X[(c)]	-	-	0.67	2.93
CO[(c)]	-	-	0.56	2.46
SO_2[(c)]	-	-	2.33E-03	0.01
Greenhouse Gas Pollutants[(d)]				
CO_2[(e)]	-	-	626.99	2753.75
CH_4[(f)]	-	-	1.78	7.82
N_2O[(g)]	-	-	7.37E-03	3.24E-02
CO_2e[(h)]	-	-	673.72	2,958.99
Hazardous Air Pollutants				
Total HAP[(b)]	0.35	1.54	-	-

[(a)] Potential emissions of PM include PTE from the combustion of natural gas from the pilot flame and the supplemental natural gas stream, calculated based on the AP-42, Chapter 1.4, Table 1.4-2 emission factor for PM (Total). The supplemental natural gas stream flowrate includes the flow of natural gas used as both fuel gas (20 Mscf/day) and stripping gas (93.6 Mscf/day). PM emissions also include PTE from enclosed flare's combustion of emissions from the dehydration still vent and waste fuel gas, calculated based on the AP-42, Chapter 13.5, Table 13.5-1 emission factor for soot, assuming a lightly smoking flare (40 µg/L). According to the May 2011 Emission Estimation Protocol for Petroleum Refineries, approved by the U.S. EPA on March 28, 2011, 40 µg/L is equivalent to 0.027 lb/MMBtu. PM is conservatively assumed to be equivalent to all filterable PM including PM_{10} and $PM_{2.5}$, and condensable fractions.

[(b)] Potential emissions of VOC and HAP include PTE from the pilot flame's natural gas combustion (i.e., pilot, fuel gas, and stripping gas streams) were calculated using AP-42 Chapter 1.4, Table 1.4-2. Emissions factors for VOC and TOC, and PTE from enclosed flare's combustion of emissions from the dehydration still vent's waste gas were calculated using GRI-GLYCalc Version 4.0 and an updated wet gas analysis . The VOC and HAP emissions from the dehydration still vent represent the sum of controlled regenerator emissions and flash tank off gas emissions generated using GRI-GLYCalc 4.0 with the incorporation of a 20% safety factor. To be consistent with the previous G35-A General Permit application that was submitted to West Virginia Department of Environmental Protection (WVDEP) on March 18, 2011, the Station's PTE is shown from the still vent which is controlled by the flare.

[(c)] Potential emissions of NO_X, CO, and SO_2 include PTE from the combustion of waste gas and fuel gas, with a maximum flowrate = 66 Mscf/day (46 scf/min) and a waste to fuel gas ratio of 1:0.2, based on vendor guarantees. NO_X, CO, and SO_2 emissions also include PTE from the combustion of natural gas used as stripping gas, with a flowrate = 93.6 Mscf/day (65 scf/min), calculated based on the AP-42, Chapter 1.4, Table 1.4-2 emission factors for natural gas combustion.

[(d)] Potential emissions of greenhouse gases are calculated from the combustion of natural gas from the pilot flame, the supplemental natural gas stream, and the waste gas in the enclosed flare. The supplemental natural gas stream flowrate includes the flow of natural gas used as both fuel gas (20 Mscf/day) and stripping gas (93.6 Mscf/day). Emissions from the supplemental natural gas fuel and the pilot flame natural gas were calculated using a fuel flowrate of 10,000 scf/day and a pilot flame flowrate of 1,200 scf/day (34 m^3/d) to the enclosed flare. Greenhouse gas pollutant emission factors for the combustion of natural gas were obtained from 40 CFR Part 98, Subpart C. The emissions from the combustion of waste gas use the methodologies outlined below:

[(e)] CO_2 is calculated assuming emissions from both natural gas and waste gas streams. in metric tons/year, calculated according to 40 CFR 98 Equation Y-1a, where:

$$CO_2 = 0.98 \times 0.001 \times \left(\sum_{p=1}^{n} \left[\frac{44}{12} \times (Flare)_p \times \frac{(MW)_p}{MVC} \times (CC)_p \right] \right)$$

Flare p = volume flare gas combusted = ~46 acfm.
MW = molecular weight flare gas = 21 kg/kg-mol.
MVC = molar conversion factor of 849.5 scf/kg-mol at 68°F.
CC = carbon concentration of flare gas = 7.87%.
0.98 = combustion efficiency of flare (used 0.95 for 95% efficiency)

[(f)] CH_4 is in metric tons/year, calculated according to 40 CFR 98 Equation Y-4, where:

$$CH_4 = \left(CO_2 \times \frac{EmF_{CH4}}{EmF} \right) + CO_2 \times \frac{0.02}{0.98} \times \frac{16}{44} \times f_{CH4}$$

EmF_{CH4} = Default CH_4 emission factor for "Fuel Gas" from Table C-2 .
EmF = default CO_2 emission factor for flare gas of 60 kg/CO_2/MMBtu.
CO_2 = emission rate of CO_2 from flared gas in metric tons/year.
f_{CH4} = default weight fraction of carbon in flare gas of 0.4.
0.98 = combustion efficiency of flare (used 0.95 for 95% efficiency)

[(g)] N_2O is in metric tons/year, calculated according to 40 CFR 98 Equation Y-5, where:

$$N_2O = \left(CO_2 \times \frac{EmF_{N2O}}{EmF} \right) \quad (Eq.\ Y\text{-}5)$$

CO_2 = emission rate of CO_2 from flared gas in metric tons/year.
EmF_{N2O} = Default N_2O emission factor for "Fuel Gas" from Table C-2 .
EmF = default CO_2 emission factor for flare gas of 60 kg/CO_2/MMBtu.

[(h)] CO_2e is carbon dioxide equivalent in metric tons/year, calculated according to 40 CFR 98 Equation A-1, where:

$$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i$$

GHG_i = mass emissions of each greenhouse gas listed in Table A-1, metric tons/year.
GWP_i = global warming potential for each greenhouse gas from Table A-1.
n = number of greenhouse gases emitted.

Table A-1: Global Warming Potentials	
Pollutant	*GWP (100 year)*
CO_2	1
CH_4	25
N_2O	298

Table 3-2
Proposed Emergency Generator Potential Emissions
Dominion Transmission, Inc. - Cassity Mountain Station

Pollutant	Emission Factor		Reference	Potential Emissions	
	Value	Unit		(lb/hr)	(tons/yr)
Criteria Pollutants					
PM	7.71E-05	lb/MMBtu	(b)	6.64E-05	1.66E-05
VOC[(c)]	1.20	g/HP-hr	(a)	0.26	0.06
NO_X	6.10	g/HP-hr	(a)	1.31	0.33
CO	50.30	g/HP-hr	(a)	10.80	2.70
SO_2	5.88E-04	lb/MMBtu	(b)	5.06E-04	1.27E-04
Green House Gas Pollutants					
CO_2	53.06	kg/MMBtu	(d)	100.72	25.18
CH_4	1.00E-03	kg/MMBtu	(d)	1.90E-03	4.75E-04
N_2O	1.00E-04	kg/MMBtu	(d)	1.90E-04	4.75E-05
CO_2e				100.82	25.21
Hazardous Air Pollutants					
Formaldehyde	0.05	lb/MMBtu	(b)	0.05	0.01
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	(b)	3.44E-05	8.61E-06
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	(b)	2.74E-05	6.84E-06
1,1-Dichloroethane	2.36E-05	lb/MMBtu	(b)	2.03E-05	5.08E-06
1,2-Dichloroethane	2.36E-05	lb/MMBtu	(b)	2.03E-05	5.08E-06
1,2-Dichloropropane	2.69E-05	lb/MMBtu	(b)	2.32E-05	5.79E-06
1,3-Butadiene	2.67E-04	lb/MMBtu	(b)	2.30E-04	5.75E-05
1,3-Dichloropropene	2.64E-05	lb/MMBtu	(b)	2.27E-05	5.68E-06
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	(b)	2.15E-04	5.38E-05
Acrolein	5.14E-03	lb/MMBtu	(b)	4.43E-03	1.11E-03
Acetaldehyde	8.36E-03	lb/MMBtu	(b)	7.20E-03	1.80E-03
Benzene	4.40E-04	lb/MMBtu	(b)	3.79E-04	9.47E-05
Biphenyl	2.12E-04	lb/MMBtu	(b)	1.83E-04	4.56E-05
Carbon Tetrachloride	3.67E-05	lb/MMBtu	(b)	3.16E-05	7.90E-06
Chlorobenzene	3.04E-05	lb/MMBtu	(b)	2.62E-05	6.54E-06
Chloroform	2.85E-05	lb/MMBtu	(b)	2.45E-05	6.13E-06
Ethylbenzene	3.97E-05	lb/MMBtu	(b)	3.42E-05	8.55E-06
Ethylene Dibromide	4.43E-05	lb/MMBtu	(b)	3.81E-05	9.54E-06
Methanol	2.50E-03	lb/MMBtu	(b)	2.15E-03	5.38E-04
Methylene Chloride	2.00E-05	lb/MMBtu	(b)	1.72E-05	4.31E-06
n-Hexane	1.11E-03	lb/MMBtu	(b)	9.56E-04	2.39E-04

Table 3-2
Proposed Emergency Generator Potential Emissions
Dominion Transmission, Inc. - Cassity Mountain Station

Pollutant	Emission Factor		Reference	Potential Emissions	
	Value	Unit		(lb/hr)	(tons/yr)
Naphthalene	7.44E-05	lb/MMBtu	(b)	6.41E-05	1.60E-05
Phenol	2.40E-05	lb/MMBtu	(b)	2.07E-05	5.17E-06
Styrene	2.36E-05	lb/MMBtu	(b)	2.03E-05	5.08E-06
Toluene	4.08E-04	lb/MMBtu	(b)	3.51E-04	8.78E-05
Vinyl Chloride	1.49E-05	lb/MMBtu	(b)	1.28E-05	3.21E-06
Xylene	1.84E-04	lb/MMBtu	(b)	1.58E-04	3.96E-05
2-Methylnaphthalene	3.32E-05	lb/MMBtu	(b)	3.78E-04	1.66E-03
Acenaphthene	1.25E-06	lb/MMBtu	(b)	1.42E-05	6.24E-05
Acenaphthlene	5.53E-06	lb/MMBtu	(b)	6.30E-05	2.76E-04
Benzo(b)fluoranthene	1.66E-07	lb/MMBtu	(b)	1.89E-06	8.28E-06
Benzo(e)pyrene	4.15E-07	lb/MMBtu	(b)	4.73E-06	2.07E-05
Benzo(ghi)perylene	4.14E-07	lb/MMBtu	(b)	4.71E-06	2.07E-05
Chrysene	6.93E-07	lb/MMBtu	(b)	7.89E-06	3.46E-05
Fluoranthene	1.11E-06	lb/MMBtu	(b)	1.26E-05	5.54E-05
Fluorene	5.67E-06	lb/MMBtu	(b)	6.46E-05	2.83E-04
Phenanthrene	1.04E-05	lb/MMBtu	(b)	1.18E-04	5.19E-04
Pyrene	1.36E-06	lb/MMBtu	(b)	1.55E-05	6.78E-05
Total HAP				**0.06**	**0.02**

[(a)] Emission factors are obtained from engine manufacturer's technical data sheet.

[(b)] Emission factors are from AP-42, Section 3.2, Table 3.2-2 Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines (7/00).

[(c)] Emission factor includes non-methane hydrocarbons, VOC, precursor organic compounds, and reactive organic compounds constituents.

[(d)] Emission factors are from 40 CFR Part 98 Subpart C. Carbon dioxide equivalent (CO_2e) is calculated according to 40 CFR 98 Equation A-1.

Table 3-3
Dominion Transmission, Inc. - Cassity Mountain Station
Project Related Changes in Potential Emissions Summary

Regulated Pollutant	Existing Potential Emissions (tons/yr)[a]			Project Related Potential Emissions (tons/yr)[b]				Change in Potential Emissions (tons/yr)[c]				Summary of Changes in Potential Emissions[d]
	RBV-2	RSV-2	FL-1	RBV-2	RSV-2	GE-1	FL-2	RBV-2	RSV-2	GE-1	FL-2	
Criteria Pollutants												
PM	<0.01	-	-	<0.01	-	1.66E-05	0.24	0.00	-	1.66E-05	0.24	**0.24**
VOC	0.18	19.64	-	0.18	4.87	0.06	-	0.00	-14.77	0.06	-	**-14.71**
NO_X	0.30	-	0.79	0.30	-	0.33	2.93	0.00	-	0.33	2.14	**2.47**
CO	0.26	-	2.30	0.26	-	2.70	2.46	0.00	-	2.70	0.16	**2.86**
SO_2	<0.01	-	-	<0.01	-	0.00	0.01	0.00	-	1.27E-04	0.01	**0.01**
Greenhouse Gas Pollutants												
CO_2e	442.40	-	8,554.53	442.40	-	25.21	2,958.99	0.00	-	25.21	-5,595.54	**-5,570.34**
Hazardous Air Pollutants												
Total HAP	<0.01	4.38	-	<0.01	1.54	0.02	-	0.00	-2.84	0.02	-	**-2.82**

[a] As reported in Attachment I of the General Permit application submitted to the West Virginia Department of Environmental Protection (WVDEP) on March 18, 2011.

[b] As calculated in Table 3-1 of this General Permit application.

[c] Change in Potential Emissions = ([Project Related Potential Emissions] - [Existing Potential Emissions]).

[d] Summary of Changes in Potential Emissions represents the increase or decrease in potential emissions from the Station as a result of the proposed project. The decrease in the Station's VOC and HAP emissions is attributed to an updated wet gas analysis.

Table 3-4
Dominion Transmission, Inc. - Cassity Mountain Station
Facility-Wide Potential Emission Summary

Regulated Pollutant	Potential Emissions (tons/yr)					Title V Thresholds	Title V Facility?
	Existing Glycol Dehydrator (RSV-2)	Existing Reboiler (RBV-2)	Proposed Flare (FL-2)	Proposed Emergency Generator (GE-1)	Total		
Criteria Pollutants							
PM	-	<0.01	0.24	1.66E-05	0.24	100	No
VOC	4.87	0.18	-	0.06	5.05	100	No
NO_X	-	0.30	2.93	0.33	3.23	100	No
CO	-	0.26	2.46	2.70	2.72	100	No
SO_2	-	<0.01	0.01	1.27E-04	0.01	100	No
Greenhouse Gas Pollutants							
CO_2e	-	442.40	2,958.99	25.21	3,401.39	100,000	No
Hazardous Air Pollutants							
Total HAP	1.54	6.90E-03	-	0.02	1.55	25	No

ATTACHMENT J
CLASS I LEGAL ADVERTISEMENT

AIR QUALITY PERMIT NOTICE

Notice of Application

Notice is given that Dominion Transmission, Inc. has applied to the West Virginia Department of Environmental Protection (WVDEP), Division of Air Quality, for a modification to the General Permit, for the Cassity Mountain Station located in Randolph Country, West Virginia. The latitude and longitude coordinates are 38.7753° north latitude, -80.0241° east longitude.

The applicant estimates the project's increased potential to discharge the following Criteria Air Pollutants will be approximately 0.24 tpy particulate matter (PM), -14.71 tpy volatile organic compounds (VOC), 2.47 tpy nitrogen oxides (NO_X), 2.86 tpy carbon monoxide (CO), and 0.01 tpy sulfur dioxide (SO_2). Additionally, the project's increased potential to discharge the following will approximately be -5,570.34 tpy greenhouse gases (GHG) and -2.82 tpy hazardous air pollutants (HAP). Startup of operation is planned to commence in May 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 1227, during normal business hours.
Dated this the **(Day)** day of **(Month)**, **(Year)**.

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

ATTACHMENT L
GENERAL PERMIT REGISTRATION APPLICATION FEE

ATTACHMENT P
OTHER SUPPORTING DOCUMENTATION
(EMERGENCY GENERATOR VENDOR INFORMATION)

Generator set data sheet

EPA Emissions

Model: GGHE
KW rating: 60 natural gas standby
60 propane standby
Frequency: 60
Fuel type: Natural gas/propane

Exhaust emission data sheet:	**EDS-322**
Exhaust emission compliance sheet:	
Sound performance data sheet:	**MSP-178**
Cooling performance data sheet:	
Prototype test summary data sheet:	**PTS-144**
Standard set-mounted radiator cooling outline:	**0500-3447**

Fuel consumption

	Natural gas								Propane							
	Standby kW (kVA)				Prime kW (kVA)				Standby kW (kVA)				Prime kW (kVA)			
Ratings	60 (75)								60 (75)							
Load	**1/4**	**1/2**	**3/4**	**Full**	**1/4**	**1/2**	**3/4**	**Full**	**1/4**	**1/2**	**3/4**	**Full**	**1/4**	**1/2**	**3/4**	**Full**
scfh	375.6	533.8	692.0	861.0					145.5	208.1	270.6	345.0				
m^3/hr	10.6	15.1	19.6	24.4					4.1	5.9	7.7	9.8				

Engine

	Natural gas		Propane	
	Standby rating	**Prime rating**	**Standby rating**	**Prime rating**
Engine model	WSG-1068			
Configuration	Cast iron, V 10 cylinder			
Aspiration	Naturally aspirated			
Gross engine power output, kWm (bhp)	72.7 (97.5)		72.9 (97.7)	
BMEP at rated load, kPa (psi)	723.9 (105.0)		723.9 (105.0)	
Bore, mm (in)	90.2 (3.55)			
Stroke, mm (in)	105.9 (4.17)			
Rated speed, rpm	1800			
Piston speed, m/s (ft/min)	6.4 (1250.0)			
Compression ratio	9.0:1			
Lube oil capacity, L (qt)	6.1 (6.5)			
Overspeed limit, rpm	2250 ± 50			
Regenerative power, kW	16.00			

Fuel flow

Minimum operating pressure, kPa (in H2O)	1.7 (7.0)	1.7 (7.0)
Maximum operating pressure, kPa (in H2O)	3.4 (13.6)	3.4 (13.6)

Air

	Natural gas		Propane	
	Standby rating	**Prime rating**	**Standby rating**	**Prime rating**
Combustion air, m^3/min (scfm)	4.0 (141.6)		4.0 (141.6)	
Maximum air cleaner restriction, kPa (in H_2O)	1.2 (5.0)			
Alternator cooling air, m^3/min (scfm)	37.0 (1308.0)			

Exhaust

Exhaust flow at rated load, m^3/min (cfm)	12.5 (441.0)		12.0 (424.0)	
Exhaust temperature, °C (°F)	565.0 (1049.0)		570 (1058)	
Maximum back pressure, kPa (in H_2O)	5.0 (20.0)			

Standard set-mounted radiator cooling

Ambient design, °C (°F)	40 (104)			
Fan load, kW (HP)	7.1 (9.5)			
Coolant capacity (with radiator), L (US gal)	32.2 (8.5)			
Coolant system air flow, m^3/min (scfm)	169.8 (6000.0)			
Total heat rejection, MJ/min (Btu/min)	4.3 (4050.0)		3.8 (3600.0)	
Maximum cooling air flow static restriction, kPa (in H_2O)	0.124 (0.5)			

Weights[2]

Unit dry weight kgs (lbs)	892 (1966)
Unit wet weight kgs (lbs)	929 (2048)

Notes:
[1] For non-standard remote installations contact your local Cummins Power Generation representative.
[2] Weights represent a set with standard features. See outline drawing for weights of other configurations.

Alternator data

Natural gas three phase table[1]		105 °C	105 °C	105 °C	105 °C	125 °C	125 °C	125 °C	125 °C	150 °C	150 °C	150 °C
Feature code		B418	B415	B268	B304	B417	B414	B267	B303	B416	B413	B419
Alternator data sheet number		204	204	207	204	204	204	205	203	204	204	203
Voltage ranges		110/190 thru 120/208 220/380 thru 240/416	120/208 thru 139/240 240/416 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	347/600	110/190 thru 120/208 220/380 thru 240/416	120/208 thru 139/240 240/416 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	347/600	110/190 thru 120/208 220/380 thru 240/416	120/208 thru 139/240 240/416 thru 277/480	347/600
Surge kW		71	71	72	71.7	71	71	71.6	70.4	71	71	70.4
Motor starting kVA (at 90% sustained voltage)	Shunt	231	231	360	231	231	231	260	188	231	231	188
	PMG	272	272	423	272	272	272	306	221	272	272	221

Full load current amps at standby rating	110/190 228	115/200 217	120/208 208	127/220 197	139/240 181	220/380 114	230/400 108	240/416 104	255/440 99	277/480 90	347/600 72

Propane three phase table[1]		105 °C	105 °C	105 °C	105 °C	125 °C	125 °C	125 °C	125 °C	150 °C	150 °C	150 °C
Feature code		B418	B415	B268	B304	B417	B414	B267	B303	B416	B413	B419
Alternator data sheet number		204	204	207	204	204	204	205	203	204	204	203
Voltage ranges		110/190 thru 120/208 220/380 thru 240/416	120/208 thru 139/240 240/416 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	347/600	110/190 thru 120/208 220/380 thru 240/416	120/208 thru 139/240 240/416 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	347/600	110/190 thru 120/208 220/380 thru 240/416	120/208 thru 139/240 240/416 thru 277/480	347/600
Surge kW		78.5	78.5	79.5	79.1	78.5	78.5	79.1	77.8	78.5	78.5	77.8
Motor starting kVA (at 90% sustained voltage)	Shunt	231	231	360	231	231	231	260	188	231	231	188
	PMG	272	272	423	272	272	272	306	221	272	272	221

Full load current amps at standby rating	110/190 228	115/200 217	120/208 208	127/220 197	139/240 181	220/380 114	230/400 108	240/416 104	255/440 99	277/480 90	347/600 72

Natural gas single phase table		105 °C	105 °C	105 °C	105 °C	125 °C	125 °C	125 °C	125 °C			
Feature code		B418	B415	B274	B268	B417	B414	B273	B267			
Alternator data sheet number		204	204	205	207	204	204	204	205			
Voltage ranges		120/240[2]	120/240[2]	120/240[3]	120/240[3]	120/240[2]	120/240[2]	120/240[3]	120/240[3]			
Surge kW		69.6	69.6	71.1	70.6	69.6	69.6	70.3	69.2			
Motor starting kVA (at 90% sustained voltage)	Shunt	130	130	155	215	130	130	130	155			
	PMG	153	153	183	250	153	153	153	183			

Full load current amps at standby rating	115/230[2] 174	115/230[3] 261	120/240[2] 167	120/240[3] 250

Propane single phase table		105 °C	105 °C	105 °C	105 °C	125 °C	125 °C	125 °C	125 °C			
Feature code		B418	B415	B274	B268	B417	B414	B273	B267			
Alternator data sheet number		204	204	205	207	204	204	204	205			
Voltage ranges		120/240[2]	120/240[2]	120/240[3]	120/240[3]	120/240[2]	120/240[2]	120/240[3]	120/240[3]			
Surge kW		76.9	76.9	78.5	77.9	76.9	76.9	77.7	76.4			
Motor starting kVA (at 90% sustained voltage)	Shunt	130	130	155	215	130	130	130	155			
	PMG	153	153	183	250	153	153	153	183			

Full load current amps at standby rating	115/230[2] 174	115/230[3] 261	120/240[2] 167	120/240[3] 250

Notes:

[1.] Single phase power can be taken from a three phase generator set at up to 2/3 set rated 3-phase kW at 1.0 power factor. Also see Note 3 below.

[2.] The broad range alternators can supply single phase output up to 2/3 set rated 3-phase kW at 1.0 power factor.

[3.] The extended stack (full single phase output) and 4 lead alternators can supply single phase output up to full set rated 3-phase kW at 1.0 power factor.

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Derating factors

Natural gas

Standby/prime	Rated power available up to 915 m (3000 ft) at ambient temperatures up to 40 °C (104 °F). Above 915 m (3000 ft) derate at 4% per 305 m (1000 ft), and 2% per 11 °C (1% per 10 °F) above 40 °C (104 °F).

Propane

Standby/prime	Rated power available up to 1220 m (4000 ft) at ambient temperatures up to 40 °C (104 °F). Above 1220 m (4000 ft) derate at 4% per 305 m (1000 ft), and 2% per 11 °C (1% per 10 °F) above 40 °C (104 °F).

Ratings definitions

Emergency standby power (ESP):	**Limited-time running power (LTP)**:	**Prime power (PRP)**:	**Base load (continuous) power (COP)**:
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.

Formulas for calculating full load currents:

Three phase output

$$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$$

Single phase output

$$\frac{\text{kW} \times \text{SinglePhaseFactor} \times 1000}{\text{Voltage}}$$

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

North America
1400 73rd Avenue N.E.
Minneapolis, MN 55432
USA

Phone 763 574 5000
Fax 763 574 5298

Our energy working for you.™

D-3382e (2/14)

Power Generation

cumminspower.com

Exhaust Emission Data Sheet
60GGHE
60 Hz Spark Ignited Generator Set
EPA Emissions

Engine Information:

Model:	WSG-1068	Bore:	3.55 in. (90.2 mm)
Type:	4 Cycle, V-10 Cylinder Spark-Ignited	Stroke:	4.17 in. (105.9 mm)
Aspiration:	Naturally aspirated	Displacement:	412.5 cu. in. (6.8 liters)
Compression Ratio:	9:1		
Emission Control Device:	Electronics Air/Fuel Ratio Control and Closed-loop Breather System		

	Natural Gas	Propane
PERFORMANCE DATA	**Standby**	**Standby**
Genset Rating (kW) @1800 RPM (60 Hz)	60	60
BHP @ 1800 RPM (60 Hz)	97.7	97.7
Fuel Consumption (SCFH)	861	345
Air to Fuel Ratio	16.2	14.5
Exhaust Gas Flow (CFM)	470	445
Exhaust Gas Temperature (°F)	1211	1207
EXHAUST EMISSION DATA		
HC (Total Unburned Hydrocarbons)*	850	1680
NOx (Oxides of Nitrogen as NO_2)	1680	1557
CO (Carbon Monoxide)	20121	31097
		Values are ppmvd
HC (Total Unburned Hydrocarbons)*	1.2	1.0
NOx (Oxides of Nitrogen as NO_2)	6.1	5.4
CO (Carbon Monoxide)	50.3	74.6
		Values are Grams per HP-Hour

*HC includes all NMHC, VOC, POC, and ROC constituents (Non-Methane HC, Volatile Organic Compounds, Precursor Organic Compounds, and Reactive Organic Compounds)

TEST CONDITIONS

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (±2%). Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	
Natural Gas:	Dry gas as received from Supplier (1000 BTU/SCF).
Propane:	Meets the requirements for Commercial Grade Propane under the ASTM D1835 Standard Specification for Liquefied Gases
Fuel Temperature	60 ± 9 °F at Flow Transmitter
Fuel Pressure	14.73PSIA ± 0.5 PSIA at Flow Transmitter
Intake Air Temperature:	77 ± 9 °F at inlet
Barometric Pressure:	29.92 in. Hg ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H_2O/lb dry air

The NOx, HC, and CO emission data tabulated here were from a single engine under the test conditions shown above. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limit, or with improper maintenance, may results in elevated emission levels.

EPA Exhaust Emission Compliance Statement GGHE Natural gas standby

60 Hz Spark Ignited Generator Set

Compliance Information:

The engine used in this generator set complies with U.S. EPA emission regulations under the provisions of 40 CFR Part 60, Stationary Emergency Spark-Ignited emissions limits when tested per ISO 8178 D2.

Engine Manufacturer:	Cummins Inc
EPA Certificate Number:	DCEXB06.8GDC-003
Effective Date:	10/17/2012
Date Issued:	10/17/2012
EPA Engine Family:	DCEXB06.8GDC

Engine Information:

Model:	WSG-1068	Bore:	3.55 in. (90.2 mm)
Engine Nameplate HP:	97.5		
Type:	4 Cycle, V-10 Cylinder Spark-Ignited	Stroke:	4.17 in. (105.9 mm)
Aspiration:	Naturally aspirated	Displacement:	412.5 cu. in. (6.8 liters)
Compression Ratio:	9.0:1		

Emission Control Device: Electronics Air/Fuel Ratio Control and Closed-loop Breather System

U.S. Environmental Protection Agency Stationary Emergency SI Emission Limits

COMPONENT	(All values are Grams per HP-Hour)
HC + NOx (Total Unburned Hydrocarbons and Oxides of Nitrogen)	10
CO (Carbon Monoxide)	387

Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

APPENDIX B
GRI-GLYCALC EMISSION SUMMARY AND WET GAS ANALYSIS

Certificate of Analysis

Number: 1030-14020696-003A

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

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

Feb. 26, 2014

Station Name: Cassity MT
Method: GPA 2286
Cylinder No: 2345
Analyzed: 02/24/2014 13:46:24 by JD

Sampled By:
Sample Of: Gas Spot
Sample Date: 02/11/2014 09:35
Sample Conditions: 500 psig, @ 36 °F

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia		
Nitrogen	0.440	0.740		GPM TOTAL C2+	0.716
Carbon Dioxide	0.375	0.990		GPM TOTAL C3+	0.117
Methane	96.577	92.984		GPM TOTAL iC5+	0.030
Ethane	2.239	4.040	0.599		
Propane	0.227	0.601	0.063		
Iso-butane	0.031	0.108	0.010		
n-Butane	0.043	0.150	0.014		
Iso-pentane	0.019	0.082	0.007		
n-Pentane	0.013	0.056	0.005		
Hexanes Plus	0.036	0.249	0.018		
	100.000	100.000	0.716		

Physical Properties	Total	C6+
Relative Density Real Gas	0.5763	3.9645
Calculated Molecular Weight	16.66	114.82
Compressibility Factor	0.9979	
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.696 psia & 60°F		
Real Gas Dry BTU	1029	6240
Water Sat. Gas Base BTU	1011	6131

Comments: H2O Mol% : 1.744 ; Wt% : 1.883
2.5 Gallons per minute glycol flow tag info
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: 1030-14020696-003A

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Method: GPA 2286
Cylinder No: 2345
Analyzed: 02/24/2014 13:46:24 by JD

Sampled By:
Sample Of: Gas Spot
Sample Date: 02/11/2014 09:35
Sample Conditions: 500 psig, @ 36 °F

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia
Nitrogen	0.440	0.740	
Carbon Dioxide	0.375	0.990	
Hydrogen Sulfide	NIL	NIL	
Methane	96.577	92.984	
Ethane	2.239	4.040	0.599
Propane	0.227	0.601	0.063
Iso-Butane	0.031	0.108	0.010
n-Butane	0.043	0.150	0.014
Iso-Pentane	0.019	0.082	0.007
n-Pentane	0.013	0.056	0.005
Hexanes	0.017	0.070	0.006
Heptanes Plus	0.019	0.179	0.012
	100.000	100.000	0.716

GPM TOTAL C2+	0.716
GPM TOTAL C3+	0.117
GPM TOTAL iC5+	0.030

Physical Properties	Total	C7+
Relative Density Real Gas	0.5763	4.5256
Calculated Molecular Weight	16.66	131.07
Compressibility Factor	0.9979	
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.696 psia & 60°F		
Real Gas Dry BTU	1029	7090
Water Sat. Gas Base BTU	1011	6966

Comments: H2O Mol% : 1.744 ; Wt% : 1.884
2.5 Gallons per minute glycol flow tag info
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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Feb. 26, 2014

Station Name: Cassity MT
Method: GPA 2286
Cylinder No: 2345
Analyzed: 02/24/2014 13:46:24 by JD

Sampled By:
Sample Of: Gas Spot
Sample Date: 02/11/2014 09:35
Sample Conditions: 500 psig, @ 36 °F

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia
Nitrogen	0.440	0.740	
Methane	96.577	92.984	
Carbon Dioxide	0.375	0.990	
Hydrogen Sulfide	NIL	NIL	
Ethane	2.239	4.040	0.599
Propane	0.227	0.601	0.063
Iso-Butane	0.031	0.108	0.010
n-Butane	0.043	0.150	0.014
Iso-Pentane	0.019	0.082	0.007
n-Pentane	0.013	0.056	0.005
i-Hexanes	0.012	0.048	0.004
n-Hexane	0.005	0.022	0.002
Benzene	NIL	NIL	NIL
Cyclohexane	NIL	NIL	NIL
i-Heptanes	0.006	0.038	0.003
n-Heptane	0.002	0.013	0.001
Toluene	NIL	NIL	NIL
i-Octanes	0.003	0.028	0.002
n-Octane	0.001	0.008	NIL
Ethylbenzene	NIL	NIL	NIL
Xylenes	NIL	NIL	NIL
i-Nonanes	NIL	NIL	NIL
n-Nonane	NIL	NIL	NIL
i-Decanes	NIL	NIL	NIL
n-Decane	NIL	NIL	NIL
Undecanes	NIL	NIL	NIL
Dodecanes	0.003	0.033	0.002
Tridecanes	0.003	0.040	0.003
Tetradecanes Plus	0.001	0.019	0.001
	100.000	100.000	0.716

GPM TOTAL C2+ 0.716

Physical Properties	Total	C14+
Calculated Molecular Weight	16.663	198.413
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.696 psia & 60°F		
Real Gas Dry BTU	1028.9	10728.8
Water Sat. Gas Base BTU	1011	10541.6
Relative Density Real Gas	0.5763	6.8500
Compressibility Factor	0.9979	

Comments: 2.5 Gallons per minute glycol flow tag info
H2S 0 ppm

Certificate of Analysis

Number: 1030-14020696-003A

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

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

Feb. 26, 2014

Station Name:	Cassity MT	Sampled By:	
Method:	GPA 2286	Sample Of:	Gas Spot
Cylinder No:	2345	Sample Date:	02/11/2014 09:35
Analyzed:	02/24/2014 13:46:24 by JD	Sample Conditions:	500 psig, @ 36 °F

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Cassity Mountain PTE
File Name: M:\Dominion\RFP 02-2014 WV Flare Permitting Projects\GLYCalc\Cassity Mountain\Final Runs\Cassity Mountain PTE (Sample 2)031215.ddf
Date: March 13, 2015

DESCRIPTION:

Description: PTE for Dominion Cassity Mountain Station (Gas Sample 2) completed 3-13-15

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 80.00 deg. F
Pressure: 500.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.3750
Nitrogen	0.4400
Methane	96.5770
Ethane	2.2390
Propane	0.2270
Isobutane	0.0310
n-Butane	0.0430
Isopentane	0.0190
n-Pentane	0.0130
n-Hexane	0.0050
Other Hexanes	0.0120
Heptanes	0.0080
2,2,4-Trimethylpentane	0.0010
Benzene	0.0010
Toluene	0.0010
Ethylbenzene	0.0010
Xylenes	0.0010
C8+ Heavies	0.0110

DRY GAS:

Flow Rate: 55.0 MMSCF/day
Water Content: 5.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Recirculation Ratio: 3.0 gal/lb H2O

PUMP:

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

Flash Control:	Vented to atmosphere
Temperature:	150.0 deg. F
Pressure:	50.0 psig

STRIPPING GAS:

Source of Gas:	Dry Gas
Gas Flow Rate:	65.000 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 - EMISSIONS SUMMARY

Case Name: Cassity Mountain PTE
File Name: M:\Dominion\RFP 02-2014 WV Flare Permitting Projects\GLYCalc\Cassity Mountain\Final Runs\Cassity Mountain PTE (Sample 2)031215.ddf
Date: March 13, 2015

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	7.9916	191.798	35.0031
Ethane	0.3588	8.612	1.5717
Propane	0.0577	1.385	0.2527
Isobutane	0.0113	0.272	0.0496
n-Butane	0.0172	0.412	0.0752
Isopentane	0.0098	0.235	0.0428
n-Pentane	0.0075	0.179	0.0327
n-Hexane	0.0048	0.115	0.0210
Other Hexanes	0.0096	0.231	0.0422
Heptanes	0.0152	0.364	0.0665
2,2,4-Trimethylpentane	0.0012	0.029	0.0053
Benzene	0.0237	0.568	0.1036
Toluene	0.0440	1.057	0.1929
Ethylbenzene	0.0756	1.815	0.3313
Xylenes	0.1032	2.476	0.4519
C8+ Heavies	0.1282	3.078	0.5616
Total Emissions	8.8593	212.624	38.8039
Total Hydrocarbon Emissions	8.8593	212.624	38.8039
Total VOC Emissions	0.5090	12.215	2.2292
Total HAP Emissions	0.2525	6.060	1.1059
Total BTEX Emissions	0.2465	5.916	1.0796

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	159.8313	3835.951	700.0610
Ethane	7.1766	172.239	31.4335
Propane	1.1540	27.696	5.0545
Isobutane	0.2267	5.440	0.9928
n-Butane	0.3432	8.238	1.5034
Isopentane	0.1957	4.696	0.8570
n-Pentane	0.1493	3.582	0.6537
n-Hexane	0.0959	2.301	0.4200
Other Hexanes	0.1926	4.622	0.8435
Heptanes	0.3035	7.283	1.3292
2,2,4-Trimethylpentane	0.0240	0.576	0.1051
Benzene	0.4731	11.354	2.0720
Toluene	0.8807	21.136	3.8573
Ethylbenzene	1.5127	36.304	6.6256
Xylenes	2.0633	49.519	9.0373
C8+ Heavies	2.5646	61.550	11.2329
Total Emissions	177.1869	4252.487	776.0788
Total Hydrocarbon Emissions	177.1869	4252.487	776.0788
Total VOC Emissions	10.1791	244.297	44.5843

Total HAP Emissions	5.0496	121.191	22.1173
Total BTEX Emissions	4.9297	118.313	21.5922

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	4.6968	112.724	20.5721
Ethane	0.6096	14.630	2.6700
Propane	0.1339	3.214	0.5866
Isobutane	0.0311	0.747	0.1364
n-Butane	0.0506	1.215	0.2218
Isopentane	0.0292	0.701	0.1280
n-Pentane	0.0230	0.551	0.1005
n-Hexane	0.0132	0.318	0.0579
Other Hexanes	0.0286	0.687	0.1253
Heptanes	0.0298	0.715	0.1304
2,2,4-Trimethylpentane	0.0032	0.077	0.0140
Benzene	0.0046	0.110	0.0202
Toluene	0.0059	0.141	0.0258
Ethylbenzene	0.0062	0.149	0.0273
Xylenes	0.0059	0.141	0.0258
C8+ Heavies	0.0495	1.189	0.2169
Total Emissions	5.7213	137.310	25.0591
Total Hydrocarbon Emissions	5.7213	137.310	25.0591
Total VOC Emissions	0.4148	9.956	1.8170
Total HAP Emissions	0.0390	0.937	0.1710
Total BTEX Emissions	0.0226	0.543	0.0991

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Cassity Mountain PTE
File Name: M:\Dominion\RFP 02-2014 WV Flare Permitting Projects\GLYCalc\Cassity Mountain\Final Runs\Cassity Mountain PTE (Sample 2)031215.ddf
Date: March 13, 2015

DESCRIPTION:

Description: PTE for Dominion Cassity Mountain Station
(Gas Sample 2) completed 3-13-15

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	7.9916	191.798	35.0031
Ethane	0.3588	8.612	1.5717
Propane	0.0577	1.385	0.2527
Isobutane	0.0113	0.272	0.0496
n-Butane	0.0172	0.412	0.0752
Isopentane	0.0098	0.235	0.0428
n-Pentane	0.0075	0.179	0.0327
n-Hexane	0.0048	0.115	0.0210
Other Hexanes	0.0096	0.231	0.0422
Heptanes	0.0152	0.364	0.0665
2,2,4-Trimethylpentane	0.0012	0.029	0.0053
Benzene	0.0237	0.568	0.1036
Toluene	0.0440	1.057	0.1929
Ethylbenzene	0.0756	1.815	0.3313
Xylenes	0.1032	2.476	0.4519
C8+ Heavies	0.1282	3.078	0.5616
Total Emissions	8.8593	212.624	38.8039
Total Hydrocarbon Emissions	8.8593	212.624	38.8039
Total VOC Emissions	0.5090	12.215	2.2292
Total HAP Emissions	0.2525	6.060	1.1059
Total BTEX Emissions	0.2465	5.916	1.0796

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	159.8313	3835.951	700.0610
Ethane	7.1766	172.239	31.4335
Propane	1.1540	27.696	5.0545
Isobutane	0.2267	5.440	0.9928
n-Butane	0.3432	8.238	1.5034
Isopentane	0.1957	4.696	0.8570
n-Pentane	0.1493	3.582	0.6537
n-Hexane	0.0959	2.301	0.4200
Other Hexanes	0.1926	4.622	0.8435
Heptanes	0.3035	7.283	1.3292

2,2,4-Trimethylpentane	0.0240	0.576	0.1051
Benzene	0.4731	11.354	2.0720
Toluene	0.8807	21.136	3.8573
Ethylbenzene	1.5127	36.304	6.6256
Xylenes	2.0633	49.519	9.0373
C8+ Heavies	2.5646	61.550	11.2329
Total Emissions	177.1869	4252.487	776.0788
Total Hydrocarbon Emissions	177.1869	4252.487	776.0788
Total VOC Emissions	10.1791	244.297	44.5843
Total HAP Emissions	5.0496	121.191	22.1173
Total BTEX Emissions	4.9297	118.313	21.5922

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	4.6968	112.724	20.5721
Ethane	0.6096	14.630	2.6700
Propane	0.1339	3.214	0.5866
Isobutane	0.0311	0.747	0.1364
n-Butane	0.0506	1.215	0.2218
Isopentane	0.0292	0.701	0.1280
n-Pentane	0.0230	0.551	0.1005
n-Hexane	0.0132	0.318	0.0579
Other Hexanes	0.0286	0.687	0.1253
Heptanes	0.0298	0.715	0.1304
2,2,4-Trimethylpentane	0.0032	0.077	0.0140
Benzene	0.0046	0.110	0.0202
Toluene	0.0059	0.141	0.0258
Ethylbenzene	0.0062	0.149	0.0273
Xylenes	0.0059	0.141	0.0258
C8+ Heavies	0.0495	1.189	0.2169
Total Emissions	5.7213	137.310	25.0591
Total Hydrocarbon Emissions	5.7213	137.310	25.0591
Total VOC Emissions	0.4148	9.956	1.8170
Total HAP Emissions	0.0390	0.937	0.1710
Total BTEX Emissions	0.0226	0.543	0.0991

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 68.00 deg. F
Excess Oxygen: 5.00 %
Combustion Efficiency: 95.00 %
Supplemental Fuel Requirement: 8.52e-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%
Other Hexanes	5.00%	95.00%
Heptanes	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

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

Calculated Absorber Stages:	1.25	
Calculated Dry Gas Dew Point:	3.85	lbs. H2O/MMSCF
Temperature:	80.0	deg. F
Pressure:	500.0	psig
Dry Gas Flow Rate:	55.0000	MMSCF/day
Glycol Losses with Dry Gas:	0.1144	lb/hr
Wet Gas Water Content:	Saturated	
Calculated Wet Gas Water Content:	54.20	lbs. H2O/MMSCF
Specified Lean Glycol Recirc. Ratio:	3.00	gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	7.10%	92.90%
Carbon Dioxide	99.90%	0.10%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.98%	0.02%
Propane	99.96%	0.04%
Isobutane	99.93%	0.07%
n-Butane	99.91%	0.09%
Isopentane	99.90%	0.10%
n-Pentane	99.87%	0.13%
n-Hexane	99.75%	0.25%
Other Hexanes	99.82%	0.18%
Heptanes	99.48%	0.52%
2,2,4-Trimethylpentane	99.78%	0.22%
Benzene	90.03%	9.97%
Toluene	84.21%	15.79%
Ethylbenzene	76.44%	23.56%
Xylenes	67.84%	32.16%
C8+ Heavies	97.86%	2.14%

FLASH TANK

Flash Control:	Vented to atmosphere	
Flash Temperature:	150.0	deg. F

Flash Pressure: 50.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.97%	0.03%
Carbon Dioxide	58.08%	41.92%
Nitrogen	11.29%	88.71%
Methane	11.80%	88.20%
Ethane	29.77%	70.23%
Propane	48.39%	51.61%
Isobutane	57.19%	42.81%
n-Butane	63.10%	36.90%
Isopentane	65.44%	34.56%
n-Pentane	69.92%	30.08%
n-Hexane	79.73%	20.27%
Other Hexanes	75.39%	24.61%
Heptanes	88.21%	11.79%
2,2,4-Trimethylpentane	79.69%	20.31%
Benzene	99.07%	0.93%
Toluene	99.38%	0.62%
Ethylbenzene	99.63%	0.37%
Xylenes	99.75%	0.25%
C8+ Heavies	98.20%	1.80%

REGENERATOR

Regenerator Stripping Gas:
Dry Product Gas

Stripping Gas Flow Rate: 65.0000 scfm

Component	Remaining in Glycol	Distilled Overhead
Water	29.19%	70.81%
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	0.76%	99.24%
n-Pentane	0.72%	99.28%
n-Hexane	0.63%	99.37%
Other Hexanes	1.33%	98.67%
Heptanes	0.57%	99.43%
2,2,4-Trimethylpentane	1.88%	98.12%
Benzene	5.05%	94.95%
Toluene	7.95%	92.05%
Ethylbenzene	10.45%	89.55%
Xylenes	12.95%	87.05%
C8+ Heavies	12.25%	87.75%

STREAM REPORTS:

WET GAS STREAM

Temperature: 80.00 deg. F
Pressure: 514.70 psia
Flow Rate: 2.29e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.14e-001	1.24e+002
Carbon Dioxide	3.75e-001	9.97e+002
Nitrogen	4.39e-001	7.44e+002
Methane	9.65e+001	9.36e+004
Ethane	2.24e+000	4.07e+003
Propane	2.27e-001	6.05e+002
Isobutane	3.10e-002	1.09e+002
n-Butane	4.29e-002	1.51e+002
Isopentane	1.90e-002	8.28e+001
n-Pentane	1.30e-002	5.66e+001
n-Hexane	4.99e-003	2.60e+001
Other Hexanes	1.20e-002	6.25e+001
Heptanes	7.99e-003	4.84e+001
2,2,4-Trimethylpentane	9.99e-004	6.90e+000
Benzene	9.99e-004	4.72e+000
Toluene	9.99e-004	5.57e+000
Ethylbenzene	9.99e-004	6.41e+000
Xylenes	9.99e-004	6.41e+000
C8+ Heavies	1.10e-002	1.13e+002
Total Components	100.00	1.01e+005

DRY GAS STREAM

Temperature: 80.00 deg. F
Pressure: 514.70 psia
Flow Rate: 2.29e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	8.11e-003	8.83e+000
Carbon Dioxide	3.75e-001	9.96e+002
Nitrogen	4.40e-001	7.44e+002
Methane	9.66e+001	9.36e+004
Ethane	2.24e+000	4.07e+003
Propane	2.27e-001	6.04e+002
Isobutane	3.10e-002	1.09e+002
n-Butane	4.30e-002	1.51e+002
Isopentane	1.90e-002	8.27e+001
n-Pentane	1.30e-002	5.66e+001
n-Hexane	4.99e-003	2.60e+001
Other Hexanes	1.20e-002	6.23e+001
Heptanes	7.96e-003	4.82e+001
2,2,4-Trimethylpentane	9.98e-004	6.88e+000
Benzene	9.00e-004	4.25e+000
Toluene	8.42e-004	4.69e+000
Ethylbenzene	7.64e-004	4.90e+000
Xylenes	6.78e-004	4.35e+000
C8+ Heavies	1.08e-002	1.11e+002
Total Components	100.00	1.01e+005

LEAN GLYCOL STREAM

Temperature: 80.00 deg. F
Flow Rate: 5.64e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	3.12e+003
Water	1.50e+000	4.76e+001
Carbon Dioxide	3.00e-012	9.53e-011
Nitrogen	1.38e-013	4.39e-012
Methane	5.64e-018	1.79e-016
Ethane	1.29e-008	4.10e-007
Propane	3.33e-010	1.06e-008
Isobutane	6.88e-011	2.18e-009
n-Butane	1.07e-010	3.40e-009
Isopentane	1.33e-005	4.23e-004
n-Pentane	1.20e-005	3.82e-004
n-Hexane	1.03e-005	3.26e-004
Other Hexanes	3.66e-005	1.16e-003
Heptanes	3.98e-005	1.26e-003
2,2,4-Trimethylpentane	7.43e-006	2.36e-004
Benzene	7.80e-004	2.48e-002
Toluene	2.38e-003	7.54e-002
Ethylbenzene	5.53e-003	1.76e-001
Xylenes	9.64e-003	3.06e-001
C8+ Heavies	1.04e-002	3.32e-001
Total Components	100.00	3.17e+003

RICH GLYCOL STREAM

Temperature: 80.00 deg. F
Pressure: 514.70 psia
Flow Rate: 5.90e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.46e+001	3.12e+003
Water	4.94e+000	1.63e+002
Carbon Dioxide	2.89e-002	9.53e-001
Nitrogen	1.33e-003	4.40e-002
Methane	1.61e-001	5.33e+000
Ethane	2.63e-002	8.68e-001
Propane	7.86e-003	2.59e-001
Isobutane	2.20e-003	7.27e-002
n-Butane	4.16e-003	1.37e-001
Isopentane	2.56e-003	8.45e-002
n-Pentane	2.31e-003	7.63e-002
n-Hexane	1.98e-003	6.53e-002
Other Hexanes	3.52e-003	1.16e-001
Heptanes	7.64e-003	2.53e-001
2,2,4-Trimethylpentane	4.76e-004	1.57e-002
Benzene	1.50e-002	4.95e-001
Toluene	2.89e-002	9.54e-001
Ethylbenzene	5.10e-002	1.69e+000

Xylenes	7.17e-002	2.37e+000
C8+ Heavies	8.35e-002	2.76e+000
Total Components	100.00	3.30e+003

FLASH TANK OFF GAS STREAM

Temperature: 150.00 deg. F
Pressure: 64.70 psia
Flow Rate: 1.26e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.16e-001	4.29e-002
Carbon Dioxide	2.73e+000	4.00e-001
Nitrogen	4.19e-001	3.90e-002
Methane	8.81e+001	4.70e+000
Ethane	6.10e+000	6.10e-001
Propane	9.14e-001	1.34e-001
Isobutane	1.61e-001	3.11e-002
n-Butane	2.62e-001	5.06e-002
Isopentane	1.22e-001	2.92e-002
n-Pentane	9.57e-002	2.30e-002
n-Hexane	4.62e-002	1.32e-002
Other Hexanes	9.99e-002	2.86e-002
Heptanes	8.94e-002	2.98e-002
2,2,4-Trimethylpentane	8.40e-003	3.19e-003
Benzene	1.77e-002	4.60e-003
Toluene	1.92e-002	5.89e-003
Ethylbenzene	1.76e-002	6.23e-003
Xylenes	1.67e-002	5.90e-003
C8+ Heavies	8.75e-002	4.95e-002
Total Components	100.00	6.20e+000

FLASH TANK GLYCOL STREAM

Temperature: 150.00 deg. F
Flow Rate: 5.88e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.47e+001	3.12e+003
Water	4.95e+000	1.63e+002
Carbon Dioxide	1.68e-002	5.54e-001
Nitrogen	1.51e-004	4.97e-003
Methane	1.91e-002	6.28e-001
Ethane	7.84e-003	2.58e-001
Propane	3.81e-003	1.26e-001
Isobutane	1.26e-003	4.16e-002
n-Butane	2.63e-003	8.66e-002
Isopentane	1.68e-003	5.53e-002
n-Pentane	1.62e-003	5.34e-002
n-Hexane	1.58e-003	5.20e-002
Other Hexanes	2.66e-003	8.76e-002
Heptanes	6.76e-003	2.23e-001
2,2,4-Trimethylpentane	3.80e-004	1.25e-002
Benzene	1.49e-002	4.91e-001

Component	Conc. (vol%)	Loading (lb/hr)
Toluene	2.88e-002	9.48e-001
Ethylbenzene	5.09e-002	1.68e+000
Xylenes	7.16e-002	2.36e+000
C8+ Heavies	8.21e-002	2.71e+000
Total Components	100.00	3.30e+003

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 6.38e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	3.81e+001	1.16e+002
Carbon Dioxide	3.04e-001	2.25e+000
Nitrogen	2.70e-001	1.27e+000
Methane	5.92e+001	1.60e+002
Ethane	1.42e+000	7.18e+000
Propane	1.56e-001	1.15e+000
Isobutane	2.32e-002	2.27e-001
n-Butane	3.51e-002	3.43e-001
Isopentane	1.61e-002	1.96e-001
n-Pentane	1.23e-002	1.49e-001
n-Hexane	6.61e-003	9.59e-002
Other Hexanes	1.33e-002	1.93e-001
Heptanes	1.80e-002	3.03e-001
2,2,4-Trimethylpentane	1.25e-003	2.40e-002
Benzene	3.60e-002	4.73e-001
Toluene	5.68e-002	8.81e-001
Ethylbenzene	8.47e-002	1.51e+000
Xylenes	1.16e-001	2.06e+000
C8+ Heavies	8.95e-002	2.56e+000
Total Components	100.00	2.96e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.96e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	9.66e+001	7.99e+000
Ethane	2.31e+000	3.59e-001
Propane	2.54e-001	5.77e-002
Isobutane	3.78e-002	1.13e-002
n-Butane	5.73e-002	1.72e-002
Isopentane	2.63e-002	9.78e-003
n-Pentane	2.01e-002	7.46e-003
n-Hexane	1.08e-002	4.79e-003
Other Hexanes	2.17e-002	9.63e-003
Heptanes	2.94e-002	1.52e-002
2,2,4-Trimethylpentane	2.04e-003	1.20e-003
Benzene	5.87e-002	2.37e-002
Toluene	9.27e-002	4.40e-002
Ethylbenzene	1.38e-001	7.56e-002

Xylenes	1.88e-001	1.03e-001
C8+ Heavies	1.46e-001	1.28e-001
Total Components	100.00	8.86e+000

APPENDIX C
FLARE DESIGN EVALUATION SHEET

Flare Design Evaluation

Type	Unassisted
Throat Diameter (inches)	17.5

GLYCalc	**Flowrate (scf/h):**	**6380**	***scf/h***
	INPUT	*Compound Net*	*Mixture Net*
	mole	*Heating Value*	*Heating Value*
Compound	*percent*	*(Btu/scf)*	*(Btu/scf)*
Water	38.100	0	0.0
Carbon Dioxide	0.304	0	0.0
Nitrogen	0.270	0	0.0
Methane	59.200	913	540.5
Ethane	1.420	1641	23.3
Propane	0.156	2385	3.7
Isobutane	0.023	3105	0.7
n-Butane	0.035	3113	1.1
Isopentane	0.016	3716	0.6
n-Pentane	0.012	3709	0.5
n-Hexane	0.007	4412	0.3
Other Hexanes	0.013	4870	0.6
Heptane	0.018	4925	0.9
2, 2, 4 - Trimethylpentane	0.001	3698	0.0
Benzene	0.036	3601	1.3
Toluene	0.057	4284	2.4
Ethylbenzene	0.085	4977	4.2
Xylene	0.116	4980	5.8
Octane (C8+)	0.090	5804	5.2
Hydrogen Sulfide	0.000	596	0.0
TOTALS:	100		591.2

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	*scfh*
Composite net heating value	591.2	*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)	591	22.1
Vmax = 10^[(LHV+28.2)/31.7] for Vmax in m/sec and LHV in MJ/scm	m/sec	ft/sec
(1 m = 3.28 ft)	40.2	131.8
Vmax limit based on 40 CFR 60.18(b)(4)(iii)	40.2	131.8

Actual flare exit velocity:

Total volumetric flow *(vent gas + assist gas in scfh/3600 sec/hr)* =	1.77	*scf/sec*
Total volumetric flow at 180F & atmospheric pressure =	2.29	*cf/sec*
Flare exit cross-sectional area based on throat diameter =	1.67	*ft2*
Velocity = volumetric flow / cross-sectional area =	1.4	*ft/sec*