

INTERNAL PERMITTING DOCUMENT TRACKING MANIFEST

Company Name EGT - Brunswick

Permitting Action Number R13-3252 Total Days 371 DAQ Days 15

Permitting Action:

- | | | |
|---|--|--------------------------------------|
| <input type="radio"/> Permit Determination | <input type="radio"/> Temporary | <input type="radio"/> Modification |
| <input type="radio"/> General Permit | <input type="radio"/> Relocation | <input type="radio"/> PSD (Rule 14) |
| <input type="radio"/> Administrative Update | <input checked="" type="radio"/> Construction
<i>After the Fact</i> | <input type="radio"/> NNSR (Rule 19) |

Documents Attached:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Engineering Evaluation/Memo | <input checked="" type="checkbox"/> Completed Database Sheet |
| <input checked="" type="checkbox"/> Draft Permit | <input type="checkbox"/> Withdrawal |
| <input checked="" type="checkbox"/> Notice | <input type="checkbox"/> Letter |
| <input type="checkbox"/> Denial | <input type="checkbox"/> Other (specify) _____ |
| <input type="checkbox"/> Final Permit/General Permit Registration | _____ |

Date	From	To	Action Requested
5/31	Ed	BW	Please Review
6/6	BW	Ed	See comments - Address Go to Notice

NOTE: Retain a copy of this manifest for your records when transmitting your document(s).



Permit / Application Information Sheet
Division of Environmental Protection
West Virginia Office of Air Quality

Company:	EQUITRANS, L.P.		Facility:	Burnsville #71	
Region:	8	Plant ID:	007-00006	Application #:	13-3252
Engineer:	Andrews, Edward S.		Category:	Gas Comp	
Physical Address:			SIC: [4922] ELECTRIC, GAS AND SANITARY SERVICES - NATURAL GAS TRANSMISSION NAICS: [486210] Pipeline Transportation of Natural Gas		
County:	Braxton				
Other Parties:	VICE PRES - Charletta, Diana 304-348-7661 ENV_COOR - Sowa, Mark A. 412-395-3654				

Information Needed for Database and AIRS
1. Need valid physical West Virginia address with zip

Regulated Pollutants		
CO	Carbon Monoxide	2.890 TPY
PM10	Particulate Matter < 10 um	0.040 TPY
SO2	Sulfur Dioxide	0.520 TPY
VOC	Volatile Organic Compounds (Reactive organic gases)	10.340 TPY
THAP	Total HAP Pollutants	2.410 TPY
	BENZENE-D6	0.200 TPY
NOX	Nitrogen Oxides (including NO, NO2, NO3, N2O3, N2O4, and N2O5)	0.350 TPY

Summary from this Permit 13-3252		
Air Programs	Applicable Regulations	
	06 10	
Fee Program	Fee	Application Type
	\$1,000.00	CONSTRUCTION

Notes from Database
 Permit Note: This action is to incorporate the compliance plan of CO-R30-E-2015-11 into a permit and make the flare enforceable.

Activity Dates	
APPLICATION RECEIVED	05/26/2015
ASSIGNED DATE	06/01/2015
APPLICATION FEE PAID	06/23/2015
APPLICANT PUBLISHED LEGAL AD	08/05/2015
APPLICATION DEEMED COMPLETE	05/16/2016

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Please note, this information sheet is not a substitute for file research and is limited to data entered into the AIRTRAX database.

Company ID: 007-00006
 Company: EQUITRANS, L.P.
 Printed: 05/31/2016
 Engineer: Andrews, Edward S.

Andrews, Edward S

From: Adkins, Sandra K
Sent: Tuesday, June 28, 2016 11:07 AM
To: Allen Heath
Cc: Andrews, Edward S
Subject: Publication of Class I Legal Ad for the WV Division of Air Quality

Please publish the information below as a Class I legal advertisement (one time only) in the Tuesday, July 5, 2016, issue of the *Braxton Citizens' News*. Please let me know that this has been received and will be published as requested. Thank you.

Send the invoice for payment and affidavit of publication to:

Sandra Adkins
WV Department of Environmental Protection
DIVISION OF AIR QUALITY
601- 57th Street
Charleston, WV 25304

ID # 7-6
Reg R13-3252
Company FRT
Facility Burnsville Initials _____

AIR QUALITY PERMIT NOTICE

Entire Document
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Notice of Intent to Approve

On May 26, 2015, Equitrans, LP applied to the WV Department of Environmental Protection, Division of Air Quality (DAQ) for a permit to construct a flare to control emissions from an existing natural gas dehydration unit at the Burnsville Compressor Station located on Kanawha Avenue in Burnsville, Braxton County, WV at latitude 38.862842 degrees and longitude -80.658920 degrees. A preliminary evaluation has determined that all State and Federal air quality requirements will be met by the proposed facility. The DAQ is providing notice to the public of its preliminary determination to issue the permit as Permit R13-3252.

The following potential emissions will be authorized by this permit action: Particulate Matter less than 10 microns, 0.04 tons per year (TPY); Particulate Matter, 0.04 TPY; Sulfur Dioxide, decrease 0.52 TPY; Oxides of Nitrogen, 0.35 TPY; Carbon Monoxide, 2.89 TPY; Volatile Organic Compounds, 10.34 TPY; Total Hazardous Air Pollutants, 2.41 TPY of which 0.18 tons of benzene; and Carbon Dioxide Equivalent, 1,786.16 TPY.

Written comments or requests for a public meeting must be received by the DAQ before 5:00 p.m. on Thursday, August 4, 2016. A public meeting may be held if the Director of the DAQ determines that significant public interest has been expressed, in writing, or when the Director deems it appropriate.

The purpose of the DAQ's permitting process is to make a preliminary determination if the proposed construction will meet all state and federal air quality requirements. The purpose of the public review process is to accept public comments on air quality issues relevant to this determination. Only written comments received at the address noted below within the specified time frame, or comments presented orally at a scheduled public

meeting, will be considered prior to final action on the permit. All such comments will become part of the public record.

Edward Andrews
WV Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
Telephone: 304/926-0499, ext. 1214
FAX: 304/926-0478

Additional information, including copies of the draft permit, application and all other supporting materials relevant to the permit decision may be obtained by contacting the engineer listed above. The draft permit and engineering evaluation can be downloaded at:

www.dep.wv.gov/daq/Pages/NSRPermitsforReview.aspx



west virginia department of environmental protection

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304-2345
Phone: 304 926 0475 • Fax: 304 926 0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION/FACT SHEET

B BACKGROUND INFORMATION

Application No.:	R13-3252
Plant ID No.:	007-00006
Applicant:	Equitrans, LP
Facility Name:	Burnsville Compressor Station
Location:	Burnsville
NAICS Code:	486210
Application Type:	Construction
Received Date:	May 26, 2015
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	\$1,000.00
Date Received:	June 23, 2015
Complete Date:	May 5, 2016
Due Date:	August 3, 2016
Applicant Ad Date:	August 5, 2015
Newspaper:	<i>Braxton Citizens' News</i>
UTM's:	Easting: 529.40 km Northing: 4,301.40 km Zone: 17
Description:	The application is to address the compliance plan in Consent Order CO-R30-E-2015-11, which is for the construction of a replacement flare to control the still vent from an existing gas dehydration unit.

DESCRIPTION OF PROCESS

Equitrans LP (EQT) owns and operates the Burnsville Compressor Station (BCS). As part of operation at the BCS, EQT utilizes a glycol dehydration unit to remove the moisture (water) out of the field gas before it is transmitted to the Copley Run Compressor Station. The purpose of this glycol dehydration unit is to remove water from the inlet natural gas stream. Water is removed from the wet natural gas stream via physical absorption while it flows countercurrent to circulation of triethylene glycol (TEG) in a contactor tower. The dry natural gas then exits the BCS. The rich TEG, which is in a liquid state, is sent to a flash tank (aka oil skimmer) to reduce volatile hydrocarbons. The liquid enters the flash tank which allows some of the entrained hydrocarbons (methane, ethane, propane, etc.) to change to a gaseous state. The

flash tank operates like a three phase separator. The vapors (gaseous hydrocarbons) from the flash tank are utilized as fuel gas for the reboiler of the dehydration unit; and the excess gas is routed to the flare.

From the flash tank, the rich glycol, which is in a liquid state, is sent to the regenerator side of the reboiler. Heat energy for the reboiler heats up the rich glycol to boil out the water. The remaining entrained hydrocarbons are released from the glycol solution. The temperature of the rich glycol is below the boiling point of the glycol so that the undesired water and hydrocarbons are boiled off and vented through the still vent of the regenerator of the reboiler. These hydrocarbon vapors are sent to a flare and is destroyed through incineration. This particular dehydrator uses a stripping gas. This stripping gas improves the water removal efficiency of the regenerator.

On November 24, 2014, EQT replaced the existing flare tip with a John Zink EEF-500 flare pilot. The existing flare did not meet the exit tip velocity criteria under 40 CFR §60.18.

SITE INSPECTION

This facility is an existing major source and is routinely inspected by the DAQ to verify compliance with the facility's Title V Operating Permit. The last inspection was conducted on January 7, 2016 by Mr. Eric Ray, P.E., a Compliance and Enforcement engineer of the Kanawha City Office. Mr. Ray determined that the facility was operating in compliance.

This writer visited the facility on May 17, 2016. Ms. Kim Gissy, Senior Environmental Coordinator for EQT Corporation, accompanied the writer during this visit. The main purpose of this inspection was to obtain site-specific information to verify EQT's claim that BCS is an area source of hazardous air pollutant for a gas production facility under Subpart HH of Part 63. This information included inlet conditions of the field gas gathering lines and turnovers of the waste fluid tank. During this visit, the writer did not notice any indicators of construction activities other than what was agreed upon in Consent Order CO-R30_E-2015-11.

ESTIMATE OF EMISSION BY REVIEWING ENGINEER

The applicant used GRI-GLYCalc to predict properties of the still vent and flash tank off gas streams. The applicant used pollutant specific emissions factors from AP-42 Chapter 1.4 to determine the combustion related emissions from the reboiler and flare. The emissions from the flare are dependent on the operation of the dehydration unit. GYLCalc is limited to predicting the outlet streams from affected process equipment of the dehydration units (i.e. absorber, flash tank, regenerator, etc.) without regards to the energy needed to maintain the process at a steady state.

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The writer modelled the proposed dehydration using ProMax™ Version 4.0 developed by Bryan Engineering and Research (BR&E) to predict the energy streams needed for the reboiler and flare to operate properly.

EQT determined that the inlet conditions to the dehydration unit to be pressure of 125 psig at a temperature 120⁰ F with a wet gas flow rate of 25 million standard cubic feet per day (MMSCFD) as worst case situation. The writer reviewed this submittal and noted that this analysis configured the absorber with 13 stages. The issue with entering 13 stages in GLYCalc is that the model treats them as ideal stages. During the May 17, 2016 site visit, the writer reviewed the actual drawings for the absorber, which contains 13 trays. Based on locations and number of trays within the column, the writer approximated the number of ideal stages in this absorber column to be 3.5. Also, the writer requested the most recent extended gas analysis for this application, which was sampled on October 8, 2015. The following table is a comparison of the GLYCalc™ and ProMax™ at the sample conditions of maximum wet gas throughput.

Table #1 – Comparison of Predicted Uncontrolled Emission				
Source/Location	Pollutant	GLYCalc w/stripping as dry gas (lb/hr)	GLYCalc w/stripping as flash gas (lb/hr)	ProMax w/mixture of dry & flash gas as stripping gas(lb/hr)
Flash Tank	Volatile Organic Compounds (VOCs)	28.61	28.59	2.34
	Total Hazardous Air Pollutants (HAPs)	0.68	0.68	0.18
	Benzene	0.02	0.02	0.01
Still Vent	Volatile Organic Compounds (VOCs)	90.72	118.20	91.47
	Total Hazardous Air Pollutants (HAPs)	26.91	27.54	21.53
	Benzene	2.03	2.05	2.00

The writer compared the two models at the flash tank and still vent to see the difference between the two models. The issue of simply using GLYCalc is how the actual dehydration is configured and the arrangement of the fuel gas system. GLYCalc can be configured with the stripping gas as dry gas on a user inputted flow rate or all of the flash gas as a stripping gas. In ProMax, the user can nearly configure the model to the actual system being simulated. For this case, the actual stripping gas is a mixture of dry and flash gases metered in the regenerator at a flow rate of 1.75 scfh.

Before considering which model or settings to use when establishing emission potentials for the new flare, the flare operating conditions needs to be considered. A flare that meets the criteria of 40 CFR 60.18 is understood to have a destruction efficiency of at least 98% for hydrocarbons and VOCs, which includes BTEX. As part of the compliance plan in Consent Order CO-R30-E-2015-11, EQT conducted a flare assessment to demonstrate that the replacement flare meets the criteria of 40 CFR 60.18 on June 9, 2015. This flare assessment satisfactory demonstrated that the new flare meets the criteria of 40 CFR 60.18 with adding 500 scfh of auxiliary gas to the flare (supplemental fuel). Mr. Eric Ray, P.E. has observed during follow-up inspections a supplemental fuel rate to the flare being maintained at 700 scfh (0.7 MSCFH).

This writer compared the flare emissions from the GLYCalc run with flash gas as the stripping gas and ProMax predicted results, which are presented in the following table.

Table #2 – Comparison of the Flare Emissions using GLYCalc and ProMax		
Pollutant	GLYCalc (lb/hr)	ProMax (lb/hr)
Volatile Organic Compounds (VOCs)	2.36	1.98
Total Hazardous Air Pollutants (HAPs)	0.55	0.44
Benzene	0.04	0.04

Both are predicting emissions fairly close to the other. The ProMax run was limited to a supplemental fuel gas rate of 700 scfh while the GLYCalc run didn't include any supplemental fuel. Boilers in general are assumed to have a combustion efficiency of 95% for hydrocarbons and VOCs. It is this writer's conclusion that the new flare potential to emit of VOC and HAPs should be based on the GLYCalc run using the flash gas as stripping gas at a maximum wet gas flow rate of 34 MMSCFD. ProMax predicted the carbon dioxide equivalent potential from the flare to be 407.80 pound per hour and 1,786 tons per year.

Emissions of oxides of nitrogen and carbon monoxide for the flare were estimated using the predicted heat release rate at maximum wet gas throughput rate through the dehydration unit. The heat release rate was predicted to be 1.2 MMBtu/hr. NO_x and CO emissions were based on factors from TCEQ Publication RG-360A/11 Technical Supplement 4 for non-assisted flares with a low heat release rate (effluent less than 1,000 Btu/scf). SO₂ was based on the predicted hydrogen sulfide using two models. The following table is a summary of potential emissions from the flare.

Table 3 Flare Emissions		
Pollutant	Flare Emissions	
	Hourly Rates (lb/hr)	Annual (tpy)
PM/PM ₁₀ /PM _{2.5}	0.01	0.04
Oxides of Nitrogen (NO _x)	0.08	0.35
Carbon Monoxide (CO)	0.66	2.89
Sulfur Dioxide	<0.01	<0.04
Volatile Organic Compounds (VOCs)	2.36	10.34
Total Hazardous Air Pollutants (HAPs)	0.55	2.41
Benzene	0.04	0.18
Carbon Dioxide Equivalent (CO _{2e})	407.80	1,786.16

The only emission source that has changed as part of the consent order was the new flare. No other changes are being proposed at the BCS. Thus, no other emission source is required to be evaluated under the permitting rule (Rule 13). However, EQT is requesting the benzene exclusion under 40 CFR Subpart HH for the existing dehydration unit. Thus, the following discussions pertain to verifying if the BCS is an area source of hazardous air pollutants (HAPs) as defined in 40 CFR §63.761. This definition includes sources engaged with field gas production activities but excludes compressor stations.

At the BCS, the HAP emissions from the compressors and compressor engines are excluded for the HAP potential under Subpart HH. Sources that must be included are Tank-1, the dehydration unit, and the pig launcher.

The writer used the October 7, 2015 gas analysis, and ProMax to obtain estimates of HAPs emissions from Tank-1 and the whole dehydration unit, which includes the reboiler and still vent. The area source applicability determination will evaluate the fuel gas stream to the reboiler as uncontrolled and still vent as controlled by the proposed flare. Tank-1 vents to the atmosphere and therefore it is uncontrolled.

The following is presented here to illustrate the emission rate of VOCs and HAPs by source and determine which would have the higher emission rate.

Pollutant	Tank-1	Reboiler	Flare (Controlled by 98%)	Pig Launcher	Total Emissions
VOCs (tpy)	0.36	7.12	10.34	0.90	18.72
Total HAPs (tpy)	0.001	1.28	2.41	0.002	3.693

The estimates in the above table were determined using the maximum wet gas flow rate of 34 MMSCFD and with one pig being launched per year. Because the total HAP potential of the BCS is less than 10 tons per year, speciation of the individual HAP is not necessary for this determination. The reboiler should reduce the VOCs and total HAPs by at least 95%. Therefore, the BCS would be classified as an area-source of HAPs under Subpart HH of Part 63 for having a potential to emit of HAPs of less than 10 tons per year of any single HAP and 25 tons per year of total HAPs from the gas production facility.

REGULATORY APPLICABILITY

The Burnsville Compressor Station is a major source under Title V (45CSR30) and currently possesses a valid Title V Operating Permit. Under this program, new emission units have 12 months after start-up to be incorporated into the facility's operating permit.

The facility is currently classified as a major source for NO_x under Prevention of Significant Deterioration (PSD). The first step in determining major modification applicability is to determine which pollutants that the project is major for, which is illustrated in the following table.

Pollutant	New Potential from the Replacement Flare (tpy)	Significance Threshold (tpy)	Significance Trigger (Yes/No)
PM	0.40	25	No
PM ₁₀	0.40	15	No
PM _{2.5} Direct	0.40	10	No
NO _x (precursor of Ozone and PM _{2.5})	0.35	40	No
SO ₂	0.01	40	No
CO	2.89	100	No
VOCs	10.34	40	No

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Burnsville Compressor Station
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This project does not represent a “significant emission increase” (45CSR§14-2.75) for any NSR pollutant. Thus, no further review is required.

With regards to the National Ambient Air Quality Standards, Braxton County is classified as attainment for all pollutants. Thus, no further review of this application with regards to 45 CSR 19, West Virginia Non-Attainment Permitting Rule is required.

The replacement flare is subject to Rules 6 & 10 (WV State Rules on PM and SO₂). 45 CSR §6-4.1. establishes an allowable PM emission limit from this flare at 0.62 pounds per hour. This allowable is based on mass rate of 230 pounds of effluent per hour being routed to the flare. The effluent to this flare is in a gaseous state and should not cause the PM emissions to increase beyond this allowable, with the predicted potential being at 0.01 pounds of PM per hour. 45 CSR §6-4.3 limits visible emission from incinerators to less than 20% opacity. A visible indicator of proper operation of a flare is no visible emissions (zero opacity). EQT plans on operating this particular flare in such a manner.

45 CSR §10-5.1 established a hydrogen sulfide (H₂S) limit on the combustion of process gas streams to 50 grains of H₂S per 100 cubic feet of carrier gas. EQT’s Burnsville Station receives field gas which may contain hydrogen sulfide. The field gas received by the BCS typically has concentration levels of hydrogen sulfide less of than 1 ppm.

The writer used GLYCalc to develop an inlet concentration of H₂S that demonstrated compliance with the 50 grain standard of effluent going to the flare. The hydrogen sulfide level of the wet gas that was entered into GLYCalc was 100 ppm which predicted the flare would see a hydrogen sulfide loading of 23.4 grains per 100 cubic feet of carrier gas. The predicted hydrogen sulfide loading would have a sulfur dioxide rate of 0.12 pounds per hour.

The writer recommends setting an inlet concentration for gas coming into the dehydration unit at 100 ppm for the purpose of demonstrating compliance with 45 CSR §10-5.1. (50 grain standard) and the corresponding sulfur dioxide emission limit.

The Burnsville Compressor Station is classified as a natural gas production facility. Under the Subpart HH – National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities of Part 63. Based on the predicted HAP emissions in Table 6, the Burnsville Compressor Station will remain as an area source of HAPs. Subpart HH has requirements for area sources of HAPs. EQT has elected to maintain the benzene emissions from the dehydration unit below 1.0 tons per year. Therefore, 40 CFR §63.764(e)(1) excludes the dehydration unit from the emission limitation and the work practice requirements of 40 CFR §63.764(d). Thus, EQT must determine actual average benzene emissions from the dehydration unit in accordance with 40 CFR §63.772(b)(2).

EQT prepared and submitted a complete application, paid the filing fee, and published a Class I Legal ad in Braxton Citizens’ News on August 5, 2015, which is required under Rule 13 for a construction permit. The facility currently holds a valid Title V Operating Permit and included Attachment S of the application for a significant modification of this operating permit.

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TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The new replacement flare will not emit any pollutants that aren't already being emitted by another emission source at the facility. Therefore, no information about the toxicity of the hazardous air pollutants (HAPs) is presented in this evaluation.

AIR QUALITY IMPACT ANALYSIS

The writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed modification does not meet the definition of a major modification of a major source as defined in 45CSR14.

MONITORING OF OPERATIONS

For this flare, the writer recommends monitoring to ensuring proper operation of the flare. The writer conducted several different simulation to see if any particular situation would result in a condition that the flare would not operate in accordance with the heat content and exit velocity criteria of 40 CFR §60.18. The writer observe that at least 900 to 1,000 scfh of fuel gas is required to satisfy the energy requirements to operate the dehydration unit within the model. When the dehydration unit operating

This writer recommends the following parameters to be monitored for the purpose of ensuring proper operation of the control device and compliance with the emission limits.

- Wet gas processing rate on a daily basis;
- Monitoring the pilot light of the flare.
- Amount of supplemental fuel sent to the flare, which can include the fuel for the pilot light on a daily basis.
- Conduct visible emissions observations on a quarterly basis.

A flare design criteria worksheet was included in the application. However, this assessment was based on a flawed GLYCalc run, which assumed 13 ideal stages in the absorber column. As part of the agreed consent order, EQT conducted a flare assessment to demonstrate that the replacement flare meets the criteria of 40 CFR §60.18 for a non-assisted flare.

The following are the criteria for a non-assisted flare and the results of the assessment.

Table 6 – Non-assisted Flare Criteria and Assessment Results		
Parameter	60.18 Criteria	Results of Assessment
Heat Content (Btu/scf)	200 or greater than	532.
Exit Velocity at the tip (feet per second)	60 or less than	58.1
Supplement Fuel (scf/hour)	N/A	500
Visible Emissions	No more than 5 minutes in any 2 hour period	Zero

The writer conducted several simulation runs in ProMax to see what process changes would affect the flare assessment. These simulations yielded heat content of the effluent from 1500 Btu/scf to 376 Btu/scf with exit velocities ranging from 3 feet per second to just over 12 feet per second. The writer believes that the exit velocity from the flare assessment was not calculated based on the dry corrected flow rate. Using the dry corrected flow rate of 64 cubic feet per minute and a cross-section area of the flare tip of 0.09 square feet (ft²), the average exit velocity should have been 11.85 feet per second.

The monitoring of the flare should focus on ensuring good operation of the flare, which would be a function of being in compliance with the VOC and HAP emission limits. Because the supplemental fuel was added to the flare during the assessment, monitoring the amount of fuel added to the flare needs to be part of the monitoring plan. The writer recommends quarterly, one hour observations to verify proper operation of the flare. Another key parameter is verifying that a flame is present. To determine the presence of flame in the flare, the applicant plans on using a thermocouple or flame rod. For compliance purposes, the applicant only needs to record the time period that no flame was present when the dehydration unit was operating.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates the proposed construction of the replacement flare will meet all the requirements of the applicable rules and regulations when operated in accordance with the permit application. Therefore, the writer recommends granting Equitrans, LP a Rule 13 construction permit for their Burnsville Compressor Station located in Burnsville, WV.



Edward S. Andrews, P.E.
Engineer

June 7, 2016
Date

Engineering Evaluation of R13-3252
Equitrans LP
Burnsville Compressor Station
Non-confidential

West Virginia Department of Environmental Protection
Earl Ray Tomblin
Governor

Division of Air Quality

Randy C. Huffman
Cabinet Secretary

Permit to Construct



R13-3252

This permit is issued in accordance with the West Virginia Air Pollution Control Act (West Virginia Code §§22-5-1 et seq.) and 45 C.S.R. 13 – Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits and Procedures for Evaluation. The permittee identified at the above-referenced facility is authorized to construct the stationary sources of air pollutants identified herein in accordance with all terms and conditions of this permit.

Issued to:

**Equitrans Limited Partnership
Burnsville Compressor Station
077-00006**

William F. Durham
Director

Issued: Draft

Facility Location: 243 Kanawha Ave
Burnsville, Braxton County, West Virginia
Mailing Address: P.O. Box 191
Burnsville, WV 26335
Facility Description: Production Gas Compression Station
NAICS Codes: 486210
UTM Coordinates: 529.40 km Easting • 4,301.40 km Northing • Zone 17
Permit Type: Construction
Description of Change: This action is for the replacement flare that controls the still vent of the existing dehydration unit.

Any person whose interest may be affected, including, but not necessarily limited to, the applicant and any person who participated in the public comment process, by a permit issued, modified or denied by the Secretary may appeal such action of the Secretary to the Air Quality Board pursuant to article one [§§22B-1-1 et seq.], Chapter 22B of the Code of West Virginia. West Virginia Code §§22-5-14.

The source is subject to 45CSR30. Changes authorized by this permit must also be incorporated into the facility's Title V operating permit. Commencement of the operations authorized by this permit shall be determined by the appropriate timing limitations associated with Title V permit revisions per 45CSR30.

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1.0. Emission Units

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
DEHY	DEHY	Reboiler for glycol regenerator	1984	1.06 MMBtu/hr	None
TEG	FLARE	TEG Dehydration Unit with flash tank	1984	34 MMscf/day	FLARE
FLARE	FLARE	Elevated Flare – John Zink: EEF –U-4 Model 320-2	2014	1.02 MMBtu/hr	N/A

2.0. General Conditions

2.1. Definitions

- 2.1.1. All references to the “West Virginia Air Pollution Control Act” or the “Air Pollution Control Act” mean those provisions contained in W.Va. Code §§ 22-5-1 to 22-5-18.
- 2.1.2. The “Clean Air Act” means those provisions contained in 42 U.S.C. §§ 7401 to 7671q, and regulations promulgated thereunder.
- 2.1.3. “Secretary” means the Secretary of the Department of Environmental Protection or such other person to whom the Secretary has delegated authority or duties pursuant to W.Va. Code §§ 22-1-6 or 22-1-8 (45CSR§30-2.12.). The Director of the Division of Air Quality is the Secretary’s designated representative for the purposes of this permit.

2.2. Acronyms

CAAA	Clean Air Act Amendments	NO_x	Nitrogen Oxides
CBI	Confidential Business Information	NSPS	New Source Performance Standards
CEM	Continuous Emission Monitor	PM	Particulate Matter
CES	Certified Emission Statement	PM_{2.5}	Particulate Matter less than 2.5 μm in diameter
C.F.R. or CFR	Code of Federal Regulations	PM₁₀	Particulate Matter less than 10μm in diameter
CO	Carbon Monoxide	Ppb	Pounds per Batch
C.S.R. or CSR	Codes of State Rules	Pph	Pounds per Hour
DAQ	Division of Air Quality	Ppm	Parts per Million
DEP	Department of Environmental Protection	Ppm_v or ppm_v	Parts per Million by Volume
dscm	Dry Standard Cubic Meter	PSD	Prevention of Significant Deterioration
FOIA	Freedom of Information Act	Psi	Pounds per Square Inch
HAP	Hazardous Air Pollutant	SIC	Standard Industrial Classification
HON	Hazardous Organic NESHAP	SIP	State Implementation Plan
HP	Horsepower	SO₂	Sulfur Dioxide
lbs/hr	Pounds per Hour	TAP	Toxic Air Pollutant
LDAR	Leak Detection and Repair	TPY	Tons per Year
M	Thousand	TRS	Total Reduced Sulfur
MACT	Maximum Achievable Control Technology	TSP	Total Suspended Particulate
MDHI	Maximum Design Heat Input	USEPA	United States Environmental Protection Agency
MM	Million	UTM	Universal Transverse Mercator
MMBtu/hr or mmbtu/hr	Million British Thermal Units per Hour	VEE	Visual Emissions Evaluation
MMCF/hr or mmcf/hr	Million Cubic Feet per Hour	VOC	Volatile Organic Compounds
NA	Not Applicable	VOL	Volatile Organic Liquids
NAAQS	National Ambient Air Quality Standards		
NESHAPS	National Emissions Standards for Hazardous Air Pollutants		

2.3. Authority

This permit is issued in accordance with West Virginia Air Pollution Control Act W.Va. Code §§ 22-5-1. et seq. and the following Legislative Rules promulgated thereunder:

- 2.3.1. 45CSR13 – *Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits and Procedures for Evaluation;*

2.4. Term and Renewal

- 2.4.1. This permit supersedes and replaces previously issued Permit R13-1801F. This Permit shall remain valid, continuous and in effect unless it is revised, suspended, revoked or otherwise changed under an applicable provision of 45CSR13 or any other applicable legislative rule;

2.5. Duty to Comply

- 2.5.1. The permitted facility shall be constructed and operated in accordance with the plans and specifications filed in Permit Application R13-3252, and any modifications, administrative updates, or amendments thereto. The Secretary may suspend or revoke a permit if the plans and specifications upon which the approval was based are not adhered to;
[45CSR§§13-5.11 and 10.3.]
- 2.5.2. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the West Virginia Code and the Clean Air Act and is grounds for enforcement action by the Secretary or USEPA;
- 2.5.3. Violations of any of the conditions contained in this permit, or incorporated herein by reference, may subject the permittee to civil and/or criminal penalties for each violation and further action or remedies as provided by West Virginia Code 22-5-6 and 22-5-7;
- 2.5.4. Approval of this permit does not relieve the permittee herein of the responsibility to apply for and obtain all other permits, licenses, and/or approvals from other agencies; i.e., local, state, and federal, which may have jurisdiction over the construction and/or operation of the source(s) and/or facility herein permitted.

2.6. Duty to Provide Information

The permittee shall furnish to the Secretary within a reasonable time any information the Secretary may request in writing to determine whether cause exists for administratively updating, modifying, revoking, or terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the Secretary copies of records to be kept by the permittee. For information claimed to be confidential, the permittee shall furnish such records to the Secretary along with a claim of confidentiality in accordance with 45CSR31. If confidential information is to be sent to USEPA, the permittee shall directly provide such information to USEPA along with a claim of confidentiality in accordance with 40 C.F.R. Part 2.

2.7. Duty to Supplement and Correct Information

Upon becoming aware of a failure to submit any relevant facts or a submittal of incorrect information in any permit application, the permittee shall promptly submit to the Secretary such supplemental facts or corrected information.

2.8. Administrative Update

The permittee may request an administrative update to this permit as defined in and according to the procedures specified in 45CSR13.
[45CSR§13-4.]

2.9. Permit Modification

The permittee may request a minor modification to this permit as defined in and according to the procedures specified in 45CSR13.
[45CSR§13-5.4.]

2.10 Major Permit Modification

The permittee may request a major modification as defined in and according to the procedures specified in 45CSR14 or 45CSR19, as appropriate.
[45CSR§13-5.1]

2.11. Inspection and Entry

The permittee shall allow any authorized representative of the Secretary, upon the presentation of credentials and other documents as may be required by law, to perform the following:

- a. At all reasonable times (including all times in which the facility is in operation) enter upon the permittee's premises where a source is located or emissions related activity is conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times (including all times in which the facility is in operation) any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and
- d. Sample or monitor at reasonable times substances or parameters to determine compliance with the permit or applicable requirements or ascertain the amounts and types of air pollutants discharged.

2.12. Emergency

- 2.12.1. An "emergency" means any situation arising from sudden and reasonable unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by

improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

- 2.12.2. Effect of any emergency. An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if the conditions of Section 2.12.3 are met.
- 2.12.3. The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:
- a. An emergency occurred and that the permittee can identify the cause(s) of the emergency;
 - b. The permitted facility was at the time being properly operated;
 - c. During the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements in the permit; and
 - d. The permittee submitted notice of the emergency to the Secretary within one (1) working day of the time when emission limitations were exceeded due to the emergency and made a request for variance, and as applicable rules provide. This notice must contain a detailed description of the emergency, any steps taken to mitigate emissions, and corrective actions taken.
- 2.12.4. In any enforcement proceeding, the permittee seeking to establish the occurrence of an emergency has the burden of proof.
- 2.12.5 The provisions of this section are in addition to any emergency or upset provision contained in any applicable requirement.

2.13. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it should have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. However, nothing in this paragraph shall be construed as precluding consideration of a need to halt or reduce activity as a mitigating factor in determining penalties for noncompliance if the health, safety, or environmental impacts of halting or reducing operations would be more serious than the impacts of continued operations.

2.14. Suspension of Activities

In the event the permittee should deem it necessary to suspend, for a period in excess of sixty (60) consecutive calendar days, the operations authorized by this permit, the permittee shall notify the Secretary, in writing, within two (2) calendar weeks of the passing of the sixtieth (60) day of the suspension period.

2.15. Property Rights

This permit does not convey any property rights of any sort or any exclusive privilege.

2.16. Severability

The provisions of this permit are severable and should any provision(s) be declared by a court of competent jurisdiction to be invalid or unenforceable, all other provisions shall remain in full force and effect.

2.17. Transferability

This permit is transferable in accordance with the requirements outlined in Section 10.1 of 45CSR13. [45CSR§13-10.1.]

2.18. Notification Requirements

The permittee shall notify the Secretary, in writing, no later than thirty (30) calendar days after the actual startup of the operations authorized under this permit.

2.19. Credible Evidence

Nothing in this permit shall alter or affect the ability of any person to establish compliance with, or a violation of, any applicable requirement through the use of credible evidence to the extent authorized by law. Nothing in this permit shall be construed to waive any defense otherwise available to the permittee including, but not limited to, any challenge to the credible evidence rule in the context of any future proceeding.

3.0. Facility-Wide Requirements

3.1. Limitations and Standards

- 3.1.1. **Open burning.** The open burning of refuse by any person, firm, corporation, association or public agency is prohibited except as noted in 45CSR§6-3.1.
[45CSR§6-3.1.]
- 3.1.2. **Open burning exemptions.** The exemptions listed in 45CSR§6-3.1 are subject to the following stipulation: Upon notification by the Secretary, no person shall cause, suffer, allow or permit any form of open burning during existing or predicted periods of atmospheric stagnation. Notification shall be made by such means as the Secretary may deem necessary and feasible.
[45CSR§6-3.2.]
- 3.1.3. **Asbestos.** The permittee is responsible for thoroughly inspecting the facility, or part of the facility, prior to commencement of demolition or renovation for the presence of asbestos and complying with 40 C.F.R. § 61.145, 40 C.F.R. § 61.148, and 40 C.F.R. § 61.150. The permittee, owner, or operator must notify the Secretary at least ten (10) working days prior to the commencement of any asbestos removal on the forms prescribed by the Secretary if the permittee is subject to the notification requirements of 40 C.F.R. § 61.145(b)(3)(i). The USEPA, the Division of Waste Management, and the Bureau for Public Health - Environmental Health require a copy of this notice to be sent to them.
[40CFR§61.145(b) and 45CSR§34]
- 3.1.4. **Odor.** No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.
[45CSR§4-3.1] *[State Enforceable Only]*
- 3.1.5. **Permanent shutdown.** A source which has not operated at least 500 hours in one 12-month period within the previous five (5) year time period may be considered permanently shutdown, unless such source can provide to the Secretary, with reasonable specificity, information to the contrary. All permits may be modified or revoked and/or reapplication or application for new permits may be required for any source determined to be permanently shutdown.
[45CSR§13-10.5.]
- 3.1.6. **Standby plan for reducing emissions.** When requested by the Secretary, the permittee shall prepare standby plans for reducing the emissions of air pollutants in accordance with the objectives set forth in Tables I, II, and III of 45CSR11.
[45CSR§11-5.2.]

3.2. Monitoring Requirements

[Reserved]

3.3. Testing Requirements

- 3.3.1. **Stack testing.** As per provisions set forth in this permit or as otherwise required by the Secretary, in accordance with the West Virginia Code, underlying regulations, permits and orders, the permittee shall conduct test(s) to determine compliance with the emission limitations set forth in this permit and/or established or set forth in underlying documents. The Secretary, or his duly authorized representative, may at his option witness or conduct such test(s). Should the Secretary

exercise his option to conduct such test(s), the operator shall provide all necessary sampling connections and sampling ports to be located in such manner as the Secretary may require, power for test equipment and the required safety equipment, such as scaffolding, railings and ladders, to comply with generally accepted good safety practices. Such tests shall be conducted in accordance with the methods and procedures set forth in this permit or as otherwise approved or specified by the Secretary in accordance with the following:

- a. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with 40 C.F.R. Parts 60, 61, and 63 in accordance with the Secretary's delegated authority and any established equivalency determination methods which are applicable. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be revised in accordance with 45CSR§13-4. or 45CSR§13-5.4 as applicable.
- b. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with applicable requirements which do not involve federal delegation. In specifying or approving such alternative testing to the test methods, the Secretary, to the extent possible, shall utilize the same equivalency criteria as would be used in approving such changes under Section 3.3.1.a. of this permit. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be revised in accordance with 45CSR§13-4. or 45CSR§13-5.4 as applicable.
- c. All periodic tests to determine mass emission limits from or air pollutant concentrations in discharge stacks and such other tests as specified in this permit shall be conducted in accordance with an approved test protocol. Unless previously approved, such protocols shall be submitted to the Secretary in writing at least thirty (30) days prior to any testing and shall contain the information set forth by the Secretary. In addition, the permittee shall notify the Secretary at least fifteen (15) days prior to any testing so the Secretary may have the opportunity to observe such tests. This notification shall include the actual date and time during which the test will be conducted and, if appropriate, verification that the tests will fully conform to a referenced protocol previously approved by the Secretary.
- d. The permittee shall submit a report of the results of the stack test within sixty (60) days of completion of the test. The test report shall provide the information necessary to document the objectives of the test and to determine whether proper procedures were used to accomplish these objectives. The report shall include the following: the certification described in paragraph 3.5.1.; a statement of compliance status, also signed by a responsible official; and, a summary of conditions which form the basis for the compliance status evaluation. The summary of conditions shall include the following:
 1. The permit or rule evaluated, with the citation number and language;
 2. The result of the test for each permit or rule condition; and,
 3. A statement of compliance or noncompliance with each permit or rule condition.

[WV Code § 22-5-4(a)(14-15) and 45CSR13]

3.4. Recordkeeping Requirements

- 3.4.1. **Retention of records.** The permittee shall maintain records of all information (including monitoring data, support information, reports, and notifications) required by this permit recorded in a form suitable and readily available for expeditious inspection and review. Support information

includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation. The files shall be maintained for at least five (5) years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent two (2) years of data shall be maintained on site. The remaining three (3) years of data may be maintained off site, but must remain accessible within a reasonable time. Where appropriate, the permittee may maintain records electronically (on a computer, on computer floppy disks, CDs, DVDs, or magnetic tape disks), on microfilm, or on microfiche.

- 3.4.2. **Odors.** For the purposes of 45CSR4, the permittee shall maintain a record of all odor complaints received, any investigation performed in response to such a complaint, and any responsive action(s) taken.

[45CSR§4. State Enforceable Only.]

3.5. Reporting Requirements

- 3.5.1. **Responsible official.** Any application form, report, or compliance certification required by this permit to be submitted to the DAQ and/or USEPA shall contain a certification by the responsible official that states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.
- 3.5.2. **Confidential information.** A permittee may request confidential treatment for the submission of reporting required by this permit pursuant to the limitations and procedures of W.Va. Code § 22-5-10 and 45CSR31.
- 3.5.3. **Correspondence.** All notices, requests, demands, submissions and other communications required or permitted to be made to the Secretary of DEP and/or USEPA shall be made in writing and shall be deemed to have been duly given when delivered by hand, or mailed first class with postage prepaid to the address(es) set forth below or to such other person or address as the Secretary of the Department of Environmental Protection may designate:

If to the DAQ:
Director
WVDEP
Division of Air Quality
601 57th Street
Charleston, WV 25304-2345

If to the US EPA:
Associate Director
Office of Air Enforcement and Compliance Assistance
(3AP20)
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

3.5.4. Operating Fee

- 3.5.4.1. In accordance with 45CSR30 – Operating Permit Program, the permittee shall submit a certified emissions statement and pay fees on an annual basis in accordance with the submittal requirements of the Division of Air Quality. A receipt for the appropriate fee shall be maintained on the premises for which the receipt has been issued, and shall be made immediately available for inspection by the Secretary or his/her duly authorized representative.
- 3.5.5. **Emission inventory.** At such time(s) as the Secretary may designate, the permittee herein shall prepare and submit an emission inventory for the previous year, addressing the emissions from the facility and/or process(es) authorized herein, in accordance with the emission inventory submittal

requirements of the Division of Air Quality. After the initial submittal, the Secretary may, based upon the type and quantity of the pollutants emitted, establish a frequency other than on an annual basis.

4.0. Source-Specific Requirements

4.1. Limitations and Standards

- 4.1.1. The limitations set forth in this condition are hereby established to ensure that the permittee operates and maintains the glycol dehydration unit (TEG) with associated control device (FLARE) that limit hazardous air pollutant emissions to below the major source threshold value of HAPs as defined in 40 CFR §63.761 (Subpart HH - National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities) as follows:
- a. The maximum amount of wet natural gas processed through the dehydration unit shall not exceed 34 MMscf per day annual average.
 - b. The effluent generated by the flash tank of the dehydration unit shall be routed through a closed vent system to the fuel gas system or control device (FLARE) at all times while the dehydration unit is in operation.
 - c. The effluent generated by the still vent shall be routed through a closed vent system to the control device (FLARE) at all times while the dehydration unit is in operation.
 - d. The control device (FLARE) shall be operated and maintained in accordance with Condition 4.1.2.
 - e. The re-boiler shall be operated and maintained in accordance with Condition 4.1.3.
 - f. The closed vent system as required in this condition shall meet the following:
 - i. The system shall be constructed of hard piping.
 - ii. The system shall be constructed and maintained free of leaks. A leaking component is defined as a measured instrument reading greater than 500 ppm above background or by visual inspection.
 - iii. Detected leaks shall be repaired as soon as practicable with the first attempt at repair within 5 calendar days after detecting the leak. Repair shall be completed no later than 15 calendar days after the leak is detected.
[45 CSR §13-5.11.]
- 4.1.2. The permittee shall operate and maintain the control device (FLARE) for the dehydration unit in accordance with the following emission limitations and operating parameters.
- a. Emissions of VOC from FLARE shall not exceed 2.36 pounds per hour. Annual VOC emissions from the FLARE shall not exceed 10.34 tons per year.
 - b. Total hazardous air pollutants (HAPs), which include BTEX, from the flare shall not exceed 0.55 pounds per hour. Annual HAP emissions from the FLARE shall not exceed 2.41 tons per year.
 - c. Actual average benzene emissions from the flare shall not be equal to or exceed 1.0 tons per year.
[40 CFR 63.764(e)(1)(ii)]
 - d. Compliance determination with the emission limits in items a, b, and c of this condition shall be made by using GYCALC™ 3.0 or higher.

- e. Particulate matter emissions from the flare shall not exceed 0.01 pounds per hour. Compliance with this limit is satisfied by complying with requirements of Condition 4.1.2.f.
[45 CSR §6-4.3.]
 - f. The effluent routed to FLARE shall not contain hydrogen sulfide greater than 50 grains per 100 cubic feet of gas. Compliance with this limit is satisfied by limiting the hydrogen sulfide (H₂S) loading of the incoming natural gas to the facility to no greater than 100 ppmv.
[45 CSR §10-5.1.]
 - g. The permittee shall operate and maintain FLARE in a manner that minimizes VOC and volatile HAP emissions. Such operation of the control device shall constitute the following:
 - i. FLARE shall not exhibit any visible emissions, except for periods not to exceed a total of 5 minutes during two consecutive hours.
[45 CSR §6-4.3.]
 - ii. The pilot flame for FLARE shall be lit at all times when the dehydration unit is operating. The fuel source for the pilot light shall be either natural gas, flash tank off gas, or a combination of the two fuels.
 - iii. The flare shall not be operated with an exit velocity at the tip greater than 60 feet per second.
 - iv. The net heating value of the effluent routed to the flare shall not be less than 200 Btu per standard cubic feet. Compliance with this requirement is satisfied by introducing fuel gas to the still vent effluent at a rate of no less than 500 scfh or the rate measured during the recent flare performance demonstration.
- 4.1.3. The permittee shall operate and maintain the reboiler (DEHY) for the dehydration unit in accordance with the following emission limitations and operating parameters.
- a. Visible emissions from the emission point DEHY shall not exceed 10% opacity on a 6-minute block average. Compliance with this requirement is satisfied by complying with the fuel type restriction in Condition 4.1.3.b.
[45 CSR §2-3.1]
 - b. The reboiler shall only be fueled with fuel gas, which can be either flash gas from the TEG Flash Tank, natural gas, or any mixture of these two fuels.
- 4.1.4. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

4.2. Monitoring Requirements

- 4.2.1. The permittee shall monitor and record the following parameters for the purpose of demonstrating compliance with Conditions 4.1.1., 4.1.2., and 4.1.3.:
- a. The throughput of wet natural gas processed through the dehydration unit on a monthly basis, days the dehydration unit operated, and annual average natural gas flowrate.
[40 CFR §63.774(d)(1)]

- b. Determine actual annual average natural gas throughput (in terms of natural gas flowrate to the glycol dehydration unit per day) by converting the annual natural gas flowrate to a daily average by dividing the annual flowrate by the number of days per year the glycol dehydration unit processed natural gas.
[40 CFR §63.772(b)(1)(i)]
 - c. Identify any periods there was no flame present for the pilot of the flare when the dehydration unit was in operation.
 - d. Monitor daily and record the amount of fuel gas (supplemental fuel) introduced to the flare monthly. If such readings includes the fuel gas for the flare pilot light, then compliance with limitation of Condition 4.1.2.g.iv. is satisfied if the reading is at or exceeds the flow rate stipulated in Condition 4.1.2.g.iv. by 50 scfh.
 - e. Determination of the actual average benzene emissions from the dehydration unit shall be made using the model GRIGLYCalc™, Version 3.0 or higher, and the procedures presented in the associated GRI-GLYCalc™ Technical Reference Manual. Inputs to the model shall be representative of actual operating conditions of the glycol dehydration unit and may be determined using the procedures documented in the Gas Research Institute (GRI) report entitled “Atmospheric Rich/Lean Method for Determining Glycol Dehydrator Emissions” (GRI-95/0368.1).
[40 CFR §63.772(b)(2)(i) & 63.774(d)(1)(ii)]
 - f. Records of such monitoring shall be maintained in accordance with Condition 3.4.1.
- 4.2.2. For the purpose of demonstrating compliance with Condition 4.1.2.e., the permittee shall conduct gas sampling at a point that is representative of the incoming natural gas to the facility and analyzing the sample to determine the hydrogen sulfide content of the sample. At a minimum, such sampling and analysis shall be conducted once per calendar year. Records of such monitoring shall be maintained in accordance with Condition 3.4.1. of this permit.
[45 CSR §10-8.3.a.]
- 4.2.3. For the purpose of demonstrating proper operation of the flare, the permittee shall conduct a visible emission observation using Section 11 of Method 22 for one hour once every calendar quarter in which the dehydration unit operates with the first observation being conducted within 90 days after issuance of this permit and subsequent observations conducted once every calendar quarter thereafter. If during the first 30 minutes of the observation there were no visible emissions observed, the permittee may stop the observation.
- If at the end of the observation and visible emission were observed for more than 2.5 minutes, then the permittee shall follow manufacturer’s repair instructions, if available or best combustion engineering practice as outline in the unit inspection and maintenance plan. To return the flare to compliant operation, the permittee shall repeat the visible emission observation. Records of such monitoring and repair activities shall be maintained in accordance with Condition 3.4.1.
- 4.2.4. For the purposes of demonstrating compliance with the requirements of the closed vent system in Condition 4.1.1., the permittee shall conduct the following:
- a. Conduct an initial visual, olfactory, and auditory inspection for defects that could result in air emissions within 180 days after issuance of this permit. Defects include, but are not limited to, visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices.

- b. After the initial, subsequent annual visual, olfactory, and auditory inspections shall be conducted for defect that could result in air emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices.
 - c. Detected leaks shall be repaired in accordance timing stated in Condition 4.1.1f.iii.
 - d. Records of such inspections shall be maintained in accordance with 3.4.1.
 - e. The use of the procedures listed as Alternative Methods to Method 21 (i.e. soapy water) to determine a leak or a leak has been repaired is acceptable.
- 4.2.5. The permittee shall monitor the dehydration unit for equipment leaks in accordance with the following requirements:
- a. Conduct an initial visual, olfactory, and auditory inspection for defects that could result in air emissions within 180 days after issuance of this permit.
 - b. After the completion of the initial inspection, subsequent inspections shall be conducted in accordance with the following:
 - i. Visual inspection of the glycol circulating pumps for visual indicators of leaking seals once per month.
 - ii. Visual inspection of the pressure relief device on a monthly basis.
 - iii. Conduct a visual, olfactory, and auditory inspection for defects that could result in air emissions within 12 months of the previous inspection of the dehydration unit.
 - c. Detected leaks shall be repaired in accordance timing stated in Condition 4.1.4.
 - d. Records of such inspections and any repaired made shall be maintained in accordance with Condition 3.4.1.
 - e. The use of the procedures listed as Alternative Methods to Method 21 (i.e. soapy water) to determine a leak or a leak has been repaired is acceptable.

4.3. Testing Requirements

- 4.3.1. If the permittee elects to reestablish the minimum amount of fuel gas (supplemental fuel) as listed in Condition 4.1.2.g.iv., the permittee shall conduct a flare compliance assessment to demonstrate compliance with the flare requirements of Condition 4.1.2. This compliance assessment testing shall be conducted in accordance with Test Method 18 for organics and Test Method 2, 2A, 2C, or 2D in appendix A to 40 CFR Part 60, as appropriate, and in accordance with Condition 3.3.1. of this permit. Also, Test Method 18 may require the permittee to conduct Test Method 4 in conjunction with Test Method 18. During such testing, the dehydration unit shall be operating that would yield the lowest heat content from the still vent. Records of such assessment shall be maintained in accordance with Condition 3.4.1.

4.4. Recordkeeping Requirements

- 4.4.1. **Record of Monitoring.** The permittee shall keep records of monitoring information that include the following:
 - a. The date, place as defined in this permit, and time of sampling or measurements;

- b. The date(s) analyses were performed;
 - c. The company or entity that performed the analyses;
 - d. The analytical techniques or methods used;
 - e. The results of the analyses; and
 - f. The operating conditions existing at the time of sampling or measurement.
- 4.4.2. **Record of Maintenance of Air Pollution Control Equipment.** For all pollution control equipment listed in Section 1.0, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.
- 4.4.3. **Record of Malfunctions of Air Pollution Control Equipment.** For all air pollution control equipment listed in Section 1.0, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:
- a. The equipment involved.
 - b. Steps taken to minimize emissions during the event.
 - c. The duration of the event.
 - d. The estimated increase in emissions during the event.
- For each such case associated with an equipment malfunction, the additional information shall also be recorded:
- e. The cause of the malfunction.
 - f. Steps taken to correct the malfunction.
 - g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.
- 4.4.4. The permittee shall maintain records of the analysis that is used to indicate compliance is in accordance with items a. b. and f.iii. of Conditions 4.1.2. Such records shall include the source of data used in the analysis and be maintained in accordance with Condition 3.4.1.
[40 CFR 63.774(d)(2)(ii)]

4.5. Reporting Requirements

- 4.5.1. The permittee shall report to the Director any leaks of the closed vent system that were not repaired in accordance with Condition 4.1.1. Such report shall be included with the facility's semiannual or annual compliance report as required in 45 CSR 30.

CERTIFICATION OF DATA ACCURACY

I, the undersigned, hereby certify that, based on information and belief formed after reasonable inquiry, all information contained in the attached _____, representing the period beginning _____ and ending _____, and any supporting documents appended hereto, is true, accurate, and complete.

Signature¹ _____
(please use blue ink) Responsible Official or Authorized Representative Date

Name & Title _____
(please print or type) Name Title

Telephone No. _____ Fax No. _____

- ¹ This form shall be signed by a "Responsible Official." "Responsible Official" means one of the following:
- a. For a corporation: The president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit and either:
 - (i) the facilities employ more than 250 persons or have a gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), or
 - (ii) the delegation of authority to such representative is approved in advance by the Director;
 - b. For a partnership or sole proprietorship: a general partner or the proprietor, respectively;
 - c. For a municipality, State, Federal, or other public entity: either a principal executive officer or ranking elected official. For the purposes of this part, a principal executive officer of a Federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., a Regional Administrator of U.S. EPA); or
 - d. The designated representative delegated with such authority and approved in advance by the Director.

Andrews, Edward S

From: Sowa, Mark A. <MSowa@eqt.com>
Sent: Tuesday, June 28, 2016 7:49 AM
To: Andrews, Edward S
Subject: RE: 077-00006_PERM_13-3252_predraft.docx
Attachments: 007-00006_EVAL_R13-3252_draft (mas 20160630).doc; 077-00006_PERM_13-3252_predraft (mas 20160630).docx

Ed,

Attached is a marked up copy of the predraft permit and evaluation document with EQT's suggested changes. Please call or email if you wish to discuss.

Thanks,

Mark A. Sowa
EQT Corp
625 Liberty Ave
Pittsburgh, PA 15222
Phone: (412) 395-3654
Cell: (412) 290-1687
E-Mail: MSowa@eqt.com

ID # 76
Reg R13-3252
Company EQT
Facility Burnsville Initials MS



From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Monday, June 06, 2016 11:30 AM
To: Sowa, Mark A.
Cc: Gissy, Kimberly A.; Ray, Richard Eric
Subject: 077-00006_PERM_13-3252_predraft.docx

Mark: I have attached a predraft permit for the flare at the Burnsville C.S. The GLYCalc analysis in the application was based on a absorber with 13 ideal stages. The user can either enter the moisture content of the dry gas or the number of equilibrium (ideal) stages in the absorber column. I reproduced the GLYCalc run with inputs from the October 7, 2015 gas analysis (see attached PDF). In this run, I set the stripper to use flash gas in this run as well to account for the actual stripper using a mixture of flash and fuel gas.

For NOx and CO emission from the flare, I used emission factors from TNRCC on Flares and Vapor Oxidizers (See Page 20).

If you have any questions/suggestions about the draft, please contact me.
My supervisor has had my findings for about a week now.

Thanks,
Ed

Entire Document
NON-CONFIDENTIAL

Edward S. Andrews, P.E.
Engineer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
304.926.0499 ext. 1214

West Virginia Department of Environmental Protection
Earl Ray Tomblin
Governor

Division of Air Quality

Randy C. Huffman
Cabinet Secretary

Permit to Construct



R13-3252

This permit is issued in accordance with the West Virginia Air Pollution Control Act (West Virginia Code §§22-5-1 et seq.) and 45 C.S.R. 13 – Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits and Procedures for Evaluation. The permittee identified at the above-referenced facility is authorized to construct the stationary sources of air pollutants identified herein in accordance with all terms and conditions of this permit.

Issued to:

**Equitrans Limited Partnership
Burnsville Compressor Station
077-00006**

William F. Durham
Director

Issued: Draft

Facility Location: Kanawha Ave
Burnsville, Braxton County, West Virginia

Mailing Address: P.O. Box 191
Burnsville, WV 26335

Facility Description: Production Gas Compression Station

NAICS Codes: 486210

UTM Coordinates: 529.40 km Easting • 4,301.40 km Northing • Zone 17

Permit Type: Construction

Description of Change: This action is for the replacement flare that controls the still vent of the existing dehydration unit.

Any person whose interest may be affected, including, but not necessarily limited to, the applicant and any person who participated in the public comment process, by a permit issued, modified or denied by the Secretary may appeal such action of the Secretary to the Air Quality Board pursuant to article one [§§22B-1-1 et seq.], Chapter 22B of the Code of West Virginia. West Virginia Code §§22-5-14.

The source is subject to 45CSR30. Changes authorized by this permit must also be incorporated into the facility's Title V operating permit. Commencement of the operations authorized by this permit shall be determined by the appropriate timing limitations associated with Title V permit revisions per 45CSR30.

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1.0. Emission Units

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
DEHY	DEHY	Reboiler for glycol regenerator	1984	MMBtu/hr	None
TEG	FLARE	TEG Dehydration Unit with flash tank	1984	34 MMscf/day	FLARE
FLARE	FLARE	Elevated Flare – John Zink: EEF –U-4	2014	1.02 MMBtu/hr	N/A

2.0. General Conditions

2.1. Definitions

- 2.1.1. All references to the “West Virginia Air Pollution Control Act” or the “Air Pollution Control Act” mean those provisions contained in W.Va. Code §§ 22-5-1 to 22-5-18.
- 2.1.2. The “Clean Air Act” means those provisions contained in 42 U.S.C. §§ 7401 to 7671q, and regulations promulgated thereunder.
- 2.1.3. “Secretary” means the Secretary of the Department of Environmental Protection or such other person to whom the Secretary has delegated authority or duties pursuant to W.Va. Code §§ 22-1-6 or 22-1-8 (45CSR§30-2.12.). The Director of the Division of Air Quality is the Secretary’s designated representative for the purposes of this permit.

2.2. Acronyms

CAAA	Clean Air Act Amendments	NO_x	Nitrogen Oxides
CBI	Confidential Business Information	NSPS	New Source Performance Standards
CEM	Continuous Emission Monitor	PM	Particulate Matter
CES	Certified Emission Statement	PM_{2.5}	Particulate Matter less than 2.5 μm in diameter
C.F.R. or CFR	Code of Federal Regulations	PM₁₀	Particulate Matter less than 10μm in diameter
CO	Carbon Monoxide	Ppb	Pounds per Batch
C.S.R. or CSR	Codes of State Rules	Pph	Pounds per Hour
DAQ	Division of Air Quality	Ppm	Parts per Million
DEP	Department of Environmental Protection	Ppmv or ppmv	Parts per Million by Volume
dscm	Dry Standard Cubic Meter	PSD	Prevention of Significant Deterioration
FOIA	Freedom of Information Act	Psi	Pounds per Square Inch
HAP	Hazardous Air Pollutant	SIC	Standard Industrial Classification
HON	Hazardous Organic NESHAP	SIP	State Implementation Plan
HP	Horsepower	SO₂	Sulfur Dioxide
lbs/hr	Pounds per Hour	TAP	Toxic Air Pollutant
LDAR	Leak Detection and Repair	TPY	Tons per Year
M	Thousand	TRS	Total Reduced Sulfur
MACT	Maximum Achievable Control Technology	TSP	Total Suspended Particulate
MDHI	Maximum Design Heat Input	USEPA	United States Environmental Protection Agency
MM	Million	UTM	Universal Transverse Mercator
MMBtu/hr or mmbtu/hr	Million British Thermal Units per Hour	VEE	Visual Emissions Evaluation
MMCF/hr or mmcf/hr	Million Cubic Feet per Hour	VOC	Volatile Organic Compounds
NA	Not Applicable	VOL	Volatile Organic Liquids
NAAQS	National Ambient Air Quality Standards		
NESHAPS	National Emissions Standards for Hazardous Air Pollutants		

2.3. Authority

This permit is issued in accordance with West Virginia Air Pollution Control Act W.Va. Code §§ 22-5-1. et seq. and the following Legislative Rules promulgated thereunder:

- 2.3.1. 45CSR13 – *Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits and Procedures for Evaluation;*

2.4. Term and Renewal

- 2.4.1. This permit supersedes and replaces previously issued Permit R13-1801F. This Permit shall remain valid, continuous and in effect unless it is revised, suspended, revoked or otherwise changed under an applicable provision of 45CSR13 or any other applicable legislative rule;

2.5. Duty to Comply

- 2.5.1. The permitted facility shall be constructed and operated in accordance with the plans and specifications filed in Permit Application R13-3252, and any modifications, administrative updates, or amendments thereto. The Secretary may suspend or revoke a permit if the plans and specifications upon which the approval was based are not adhered to;
[45CSR§§13-5.11 and 10.3.]
- 2.5.2. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the West Virginia Code and the Clean Air Act and is grounds for enforcement action by the Secretary or USEPA;
- 2.5.3. Violations of any of the conditions contained in this permit, or incorporated herein by reference, may subject the permittee to civil and/or criminal penalties for each violation and further action or remedies as provided by West Virginia Code 22-5-6 and 22-5-7;
- 2.5.4. Approval of this permit does not relieve the permittee herein of the responsibility to apply for and obtain all other permits, licenses, and/or approvals from other agencies; i.e., local, state, and federal, which may have jurisdiction over the construction and/or operation of the source(s) and/or facility herein permitted.

2.6. Duty to Provide Information

The permittee shall furnish to the Secretary within a reasonable time any information the Secretary may request in writing to determine whether cause exists for administratively updating, modifying, revoking, or terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the Secretary copies of records to be kept by the permittee. For information claimed to be confidential, the permittee shall furnish such records to the Secretary along with a claim of confidentiality in accordance with 45CSR31. If confidential information is to be sent to USEPA, the permittee shall directly provide such information to USEPA along with a claim of confidentiality in accordance with 40 C.F.R. Part 2.

2.7. Duty to Supplement and Correct Information

Upon becoming aware of a failure to submit any relevant facts or a submittal of incorrect information in any permit application, the permittee shall promptly submit to the Secretary such supplemental facts or corrected information.

2.8. Administrative Update

The permittee may request an administrative update to this permit as defined in and according to the procedures specified in 45CSR13.
[45CSR§13-4.]

2.9. Permit Modification

The permittee may request a minor modification to this permit as defined in and according to the procedures specified in 45CSR13.
[45CSR§13-5.4.]

2.10 Major Permit Modification

The permittee may request a major modification as defined in and according to the procedures specified in 45CSR14 or 45CSR19, as appropriate.
[45CSR§13-5.1]

2.11. Inspection and Entry

The permittee shall allow any authorized representative of the Secretary, upon the presentation of credentials and other documents as may be required by law, to perform the following:

- a. At all reasonable times (including all times in which the facility is in operation) enter upon the permittee's premises where a source is located or emissions related activity is conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times (including all times in which the facility is in operation) any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and
- d. Sample or monitor at reasonable times substances or parameters to determine compliance with the permit or applicable requirements or ascertain the amounts and types of air pollutants discharged.

2.12. Emergency

- 2.12.1. An "emergency" means any situation arising from sudden and reasonable unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by

improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

- 2.12.2. Effect of any emergency. An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if the conditions of Section 2.12.3 are met.
- 2.12.3. The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - a. An emergency occurred and that the permittee can identify the cause(s) of the emergency;
 - b. The permitted facility was at the time being properly operated;
 - c. During the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements in the permit; and
 - d. The permittee submitted notice of the emergency to the Secretary within one (1) working day of the time when emission limitations were exceeded due to the emergency and made a request for variance, and as applicable rules provide. This notice must contain a detailed description of the emergency, any steps taken to mitigate emissions, and corrective actions taken.
- 2.12.4. In any enforcement proceeding, the permittee seeking to establish the occurrence of an emergency has the burden of proof.
- 2.12.5 The provisions of this section are in addition to any emergency or upset provision contained in any applicable requirement.

2.13. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it should have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. However, nothing in this paragraph shall be construed as precluding consideration of a need to halt or reduce activity as a mitigating factor in determining penalties for noncompliance if the health, safety, or environmental impacts of halting or reducing operations would be more serious than the impacts of continued operations.

2.14. Suspension of Activities

In the event the permittee should deem it necessary to suspend, for a period in excess of sixty (60) consecutive calendar days, the operations authorized by this permit, the permittee shall notify the Secretary, in writing, within two (2) calendar weeks of the passing of the sixtieth (60) day of the suspension period.

2.15. Property Rights

This permit does not convey any property rights of any sort or any exclusive privilege.

2.16. Severability

The provisions of this permit are severable and should any provision(s) be declared by a court of competent jurisdiction to be invalid or unenforceable, all other provisions shall remain in full force and effect.

2.17. Transferability

This permit is transferable in accordance with the requirements outlined in Section 10.1 of 45CSR13. [45CSR§13-10.1.]

2.18. Notification Requirements

The permittee shall notify the Secretary, in writing, no later than thirty (30) calendar days after the actual startup of the operations authorized under this permit.

2.19. Credible Evidence

Nothing in this permit shall alter or affect the ability of any person to establish compliance with, or a violation of, any applicable requirement through the use of credible evidence to the extent authorized by law. Nothing in this permit shall be construed to waive any defense otherwise available to the permittee including, but not limited to, any challenge to the credible evidence rule in the context of any future proceeding.

3.0. Facility-Wide Requirements

3.1. Limitations and Standards

- 3.1.1. **Open burning.** The open burning of refuse by any person, firm, corporation, association or public agency is prohibited except as noted in 45CSR§6-3.1.
[45CSR§6-3.1.]
- 3.1.2. **Open burning exemptions.** The exemptions listed in 45CSR§6-3.1 are subject to the following stipulation: Upon notification by the Secretary, no person shall cause, suffer, allow or permit any form of open burning during existing or predicted periods of atmospheric stagnation. Notification shall be made by such means as the Secretary may deem necessary and feasible.
[45CSR§6-3.2.]
- 3.1.3. **Asbestos.** The permittee is responsible for thoroughly inspecting the facility, or part of the facility, prior to commencement of demolition or renovation for the presence of asbestos and complying with 40 C.F.R. § 61.145, 40 C.F.R. § 61.148, and 40 C.F.R. § 61.150. The permittee, owner, or operator must notify the Secretary at least ten (10) working days prior to the commencement of any asbestos removal on the forms prescribed by the Secretary if the permittee is subject to the notification requirements of 40 C.F.R. § 61.145(b)(3)(i). The USEPA, the Division of Waste Management, and the Bureau for Public Health - Environmental Health require a copy of this notice to be sent to them.
[40CFR§61.145(b) and 45CSR§34]
- 3.1.4. **Odor.** No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.
[45CSR§4-3.1] *[State Enforceable Only]*
- 3.1.5. **Permanent shutdown.** A source which has not operated at least 500 hours in one 12-month period within the previous five (5) year time period may be considered permanently shutdown, unless such source can provide to the Secretary, with reasonable specificity, information to the contrary. All permits may be modified or revoked and/or reapplication or application for new permits may be required for any source determined to be permanently shutdown.
[45CSR§13-10.5.]
- 3.1.6. **Standby plan for reducing emissions.** When requested by the Secretary, the permittee shall prepare standby plans for reducing the emissions of air pollutants in accordance with the objectives set forth in Tables I, II, and III of 45CSR11.
[45CSR§11-5.2.]

3.2. Monitoring Requirements

[Reserved]

3.3. Testing Requirements

- 3.3.1. **Stack testing.** As per provisions set forth in this permit or as otherwise required by the Secretary, in accordance with the West Virginia Code, underlying regulations, permits and orders, the permittee shall conduct test(s) to determine compliance with the emission limitations set forth in this permit and/or established or set forth in underlying documents. The Secretary, or his duly authorized representative, may at his option witness or conduct such test(s). Should the Secretary exercise his option to conduct such test(s), the operator shall provide all necessary sampling

connections and sampling ports to be located in such manner as the Secretary may require, power for test equipment and the required safety equipment, such as scaffolding, railings and ladders, to comply with generally accepted good safety practices. Such tests shall be conducted in accordance with the methods and procedures set forth in this permit or as otherwise approved or specified by the Secretary in accordance with the following:

- a. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with 40 C.F.R. Parts 60, 61, and 63 in accordance with the Secretary's delegated authority and any established equivalency determination methods which are applicable. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be revised in accordance with 45CSR§13-4. or 45CSR§13-5.4 as applicable.
- b. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with applicable requirements which do not involve federal delegation. In specifying or approving such alternative testing to the test methods, the Secretary, to the extent possible, shall utilize the same equivalency criteria as would be used in approving such changes under Section 3.3.1.a. of this permit. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be revised in accordance with 45CSR§13-4. or 45CSR§13-5.4 as applicable.
- c. All periodic tests to determine mass emission limits from or air pollutant concentrations in discharge stacks and such other tests as specified in this permit shall be conducted in accordance with an approved test protocol. Unless previously approved, such protocols shall be submitted to the Secretary in writing at least thirty (30) days prior to any testing and shall contain the information set forth by the Secretary. In addition, the permittee shall notify the Secretary at least fifteen (15) days prior to any testing so the Secretary may have the opportunity to observe such tests. This notification shall include the actual date and time during which the test will be conducted and, if appropriate, verification that the tests will fully conform to a referenced protocol previously approved by the Secretary.
- d. The permittee shall submit a report of the results of the stack test within sixty (60) days of completion of the test. The test report shall provide the information necessary to document the objectives of the test and to determine whether proper procedures were used to accomplish these objectives. The report shall include the following: the certification described in paragraph 3.5.1.; a statement of compliance status, also signed by a responsible official; and, a summary of conditions which form the basis for the compliance status evaluation. The summary of conditions shall include the following:
 1. The permit or rule evaluated, with the citation number and language;
 2. The result of the test for each permit or rule condition; and,
 3. A statement of compliance or noncompliance with each permit or rule condition.

[WV Code § 22-5-4(a)(14-15) and 45CSR13]

3.4. Recordkeeping Requirements

- 3.4.1. **Retention of records.** The permittee shall maintain records of all information (including monitoring data, support information, reports, and notifications) required by this permit recorded in a form suitable and readily available for expeditious inspection and review. Support information includes all calibration and maintenance records and all original strip-chart recordings for

continuous monitoring instrumentation. The files shall be maintained for at least five (5) years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent two (2) years of data shall be maintained on site. The remaining three (3) years of data may be maintained off site, but must remain accessible within a reasonable time. Where appropriate, the permittee may maintain records electronically (on a computer, on computer floppy disks, CDs, DVDs, or magnetic tape disks), on microfilm, or on microfiche.

- 3.4.2. **Odors.** For the purposes of 45CSR4, the permittee shall maintain a record of all odor complaints received, any investigation performed in response to such a complaint, and any responsive action(s) taken.
[45CSR§4. *State Enforceable Only.*]

3.5. Reporting Requirements

- 3.5.1. **Responsible official.** Any application form, report, or compliance certification required by this permit to be submitted to the DAQ and/or USEPA shall contain a certification by the responsible official that states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.
- 3.5.2. **Confidential information.** A permittee may request confidential treatment for the submission of reporting required by this permit pursuant to the limitations and procedures of W.Va. Code § 22-5-10 and 45CSR31.
- 3.5.3. **Correspondence.** All notices, requests, demands, submissions and other communications required or permitted to be made to the Secretary of DEP and/or USEPA shall be made in writing and shall be deemed to have been duly given when delivered by hand, or mailed first class with postage prepaid to the address(es) set forth below or to such other person or address as the Secretary of the Department of Environmental Protection may designate:

If to the DAQ:
Director
WVDEP
Division of Air Quality
601 57th Street
Charleston, WV 25304-2345

If to the US EPA:
Associate Director
Office of Air Enforcement and Compliance Assistance
(3AP20)
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

3.5.4. Operating Fee

- 3.5.4.1. In accordance with 45CSR30 – Operating Permit Program, the permittee shall submit a certified emissions statement and pay fees on an annual basis in accordance with the submittal requirements of the Division of Air Quality. A receipt for the appropriate fee shall be maintained on the premises for which the receipt has been issued, and shall be made immediately available for inspection by the Secretary or his/her duly authorized representative.
- 3.5.5. **Emission inventory.** At such time(s) as the Secretary may designate, the permittee herein shall prepare and submit an emission inventory for the previous year, addressing the emissions from the facility and/or process(es) authorized herein, in accordance with the emission inventory submittal requirements of the Division of Air Quality. After the initial submittal, the Secretary may, based

upon the type and quantity of the pollutants emitted, establish a frequency other than on an annual basis.

4.0. Source-Specific Requirements

4.1. Limitations and Standards

- 4.1.1. The limitations set forth in this condition are hereby established to ensure that the permittee operates and maintains the glycol dehydration unit (affected source, TEG) with associated control device (FLARE) that limit hazardous air pollutant emissions to below the major source threshold value of HAPs as defined in 40 CFR §63.761 (Subpart HH - National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities) as follows:
- a. The maximum amount of wet natural gas processed through the dehydration unit shall not exceed 34 MMscf per day.
 - b. The effluent generated by the flash tank of the dehydration unit shall be routed through a closed vent system to the fuel gas system at all times while the dehydration unit is in operation.
 - c. The effluent generated by the still vent shall be routed through a closed vent system to the control device (FLARE) at all times while the dehydration unit is in operation.
 - d. The control device (FLARE) shall be operated and maintained in accordance with Condition 4.1.2.
 - e. The re-boiler shall be operated and maintained in accordance with Condition 4.1.3.
 - f. The closed vent system as required in this condition shall meet the following:
 - i. The system shall be constructed of hard piping.
 - ii. The system shall be constructed and maintained free of leaks. A leaking component is defined as a measured instrument reading greater than 500 ppm above background or by visual inspection.
 - iii. Detected leaks shall be repaired as soon as practicable with the first attempt at repair within 5 calendar days after detecting the leak. Repair shall be completed no later than 15 calendar days after the leak is detected.
[45 CSR §13-5.11.]
- 4.1.2. The permittee shall operate and maintain the control device (FLARE) for the dehydration unit in accordance with the following emission limitations and operating parameters.
- a. Emissions of VOC from FLARE shall not exceed 2.36 pounds per hour. Annual VOC emissions from the FLARE shall not exceed 10.34 tons per year.
 - b. Total hazardous air pollutants (HAPs), which include BTEX, from the flare shall not exceed 0.55 pounds per hour. Annual HAP emissions from the FLARE shall not exceed 2.41 tons per year.
 - c. Actual average benzene emissions from the flare shall not exceed 0.18 tons per year.
[40 CFR 63.764(e)(1)(ii)]
 - d. Compliance determination with the emission limits in items a, b, and c of this condition shall be made by using GYCALC™ 3.0 or higher.

- e. Particulate matter emissions from the flare shall not exceed 0.01 pounds per hour. Compliance with this limit is satisfied by complying with requirements of Condition 4.1.2.f.
[45 CSR §6-4.3.]
 - f. The effluent routed to FLARE shall not contain hydrogen sulfide greater than 50 grains per 100 cubic feet of gas. Compliance with this limit is satisfied by limiting the hydrogen sulfide (H₂S) loading of the incoming natural gas to the facility to no greater than 100 ppmv.
[45 CSR §10-5.1.]
 - g. The permittee shall operate and maintain FLARE in a manner that minimize^s VOC and volatile HAP emissions. Such operation of the control device shall constitute the following:
 - i. FLARE shall not exhibit any visible emissions, expect for periods not to exceed a total of 5 minutes during two consecutive hours.
[45 CSR §6-4.3.]
 - ii. The pilot flame for FLARE shall be lit at all times when the dehydration unit is operating. The fuel source for the pilot light shall be either natural gas, flash tank off gas, or a combination of the two fuels.
 - iii. The flare shall not be operated with an exit velocity at the tip greater than 60 feet per second.
 - iv. The net heating value of the effluent routed to the flare shall not be less than 200 Btu per standard cubic feet. Compliance with this requirement is satisfied by introducing fuel gas to the still vent effluent at a rate of no less than 500 scfh or the rate measured during the recent flare performance demonstration.
- 4.1.3. The permittee shall operate and maintain the reboiler (DEHY) for the dehydration unit in accordance with the following emission limitations and operating parameters.
- a. Visible emissions from the emission point DEHY shall not exceed 10% opacity on a 6-minute block average. Compliance with this requirement is satisfied by complying with the fuel type restriction in Condition 4.1.3.b.
[45 CSR §2-3.1]
 - b. The reboiler shall only be fueled with fuel gas, which can be either flash gas from the TEG Flash Tank, natural gas, or any mixture of these two fuels.
- 4.1.4. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

4.2. Monitoring Requirements

- 4.2.1. The permittee shall monitor and record the following parameters for the purpose of demonstrating compliance with Conditions 4.1.1., 4.1.2., and 4.1.3.:
 - a. The throughput of wet natural gas processed through the dehydration unit on a daily basis, days the dehydration unit operated, and annual natural gas flowrate.
[40 CFR §63.774(d)(1)]

- b. Determine actual annual average natural gas throughput (in terms of natural gas flowrate to the glycol dehydration unit per day) by converting the annual natural gas flowrate to a daily average by dividing the annual flowrate by the number of days per year the glycol dehydration unit processed natural gas.
[40 CFR §63.772(b)(1)(i)]
 - c. Identify any periods there was no flame present for the pilot of the flare when the dehydration unit was in operation.
 - d. Monitor and record the amount of fuel gas (supplemental fuel) introduced to the flare each operation day. If such readings includes the fuel gas for the flare pilot light, then compliance with limitation of Condition 4.1.2.g.iv. is satisfied if the reading is at or exceeds the flow rate stipulated in Condition 4.1.2.g.iv. by 50 scfh.
 - e. Determination of the actual average benzene emissions from the dehydration unit shall be made using the model GRIGLYCalc™, Version 3.0 or higher, and the procedures presented in the associated GRI-GLYCalc™ Technical Reference Manual. Inputs to the model shall be representative of actual operating conditions of the glycol dehydration unit and may be determined using the procedures documented in the Gas Research Institute (GRI) report entitled “Atmospheric Rich/Lean Method for Determining Glycol Dehydrator Emissions” (GRI-95/0368.1).
[40 CFR §63.772(b)(2)(i) & 63.774(d)(1)(ii)]
 - f. Records of such monitoring shall be maintained in accordance with Condition 3.4.1.
- 4.2.2. For the purpose of demonstrating compliance with Condition 4.1.2.e., the permittee shall conduct gas sampling at a point that is representative of the incoming natural gas to the facility and analyzing the sample to determine the hydrogen sulfide content of the sample. At a minimum, such sampling and analysis shall be conducted once per calendar year. Records of such monitoring shall be maintained in accordance with Condition 3.4.1. of this permit.
[45 CSR §10-8.3.a.]
- 4.2.3. For the purpose of demonstrating proper operation of the flare, the permittee shall conduct a visible emission observation using Section 11 of Method 22 for one hour once every calendar quarter in which the dehydration unit operates. If during the first 30 minutes of the observation there were no visible emissions observed, the permittee may stop the observation.
- If at the end of the observation and visible emission were observed for more than 2.5 minutes, then the permittee shall follow manufacturer’s repair instructions, if available or best combustion engineering practice as outline in the unit inspection and maintenance plan. To return the flare to compliant operation, the permittee shall repeat the visible emission observation. Records of such monitoring and repair activities shall be maintained in accordance with Condition 3.4.1.
- 4.2.4. For the purposes of demonstrating compliance with the requirements of the closed vent system in Condition 4.1.1., the permittee shall conduct the following:
- a. Conduct an initial visual, olfactory, and auditory inspection for defects that could result in air emissions within 180 days of start-up. Defects include, but are not limited to, visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices.
 - b. After the initial, subsequent annual visual, olfactory, and auditory inspections shall be conducted for defect that could result in air emissions. Defects include, but are not limited to,

visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices.

- c. Detected leaks shall be repaired in accordance timing stated in Condition 4.1.1f.iii.
- d. Records of such inspections shall be maintained in accordance with 3.4.1.
- e. The use of the procedures listed as Alternative Methods to Method 21 (i.e. soapy water) to determine a leak or a leak has been repaired is acceptable.

4.2.5. The permittee shall monitor the dehydration unit for equipment leaks in accordance with the following requirements:

- a. Conduct an initial visual, olfactory, and auditory inspection for defects that could result in air emissions within 180 days of start-up of the dehydration unit.
- b. After the completion of the initial inspection, subsequent inspections shall be conducted in accordance with the following:
 - i. Visual inspection of the glycol circulating pumps for visual indicators of leaking seals once per month.
 - ii. Visual determination of the visual indicator of the pressure relief device to determine if a release has occurred on a daily basis.
 - iii. Conduct a visual, olfactory, and auditory inspection for defects that could result in air emissions within 12 months of the previous inspection of the dehydration unit.
- c. Detected leaks shall be repaired in accordance timing stated in Condition 4.1.4.
- d. Records of such inspections and any repaired made shall be maintained in accordance with 3.4.1.
- e. The use of the procedures listed as Alternative Methods to Method 21 (i.e. soapy water) to determine a leak or a leak has been repaired is acceptable.

4.3. Testing Requirements

- 4.3.1. If the permittee elects to reestablish the minimum amount of fuel gas (supplemental fuel) as listed in Condition 4.1.2.g.iv., the permittee shall conduct a flare compliance assessment to demonstrate compliance with the flare requirements of Condition 4.1.2. This compliance assessment testing shall be conducted in accordance with Test Method 18 for organics and Test Method 2, 2A, 2C, or 2D in appendix A to 40 CFR part 60, as appropriate, and in accordance with Condition 3.3.1. of this permit. Also, Test Method 18 may require the permittee to conduct Test Method 4 in conjunction with Test Method 18. During such testing, the dehydration unit shall be operating that would yield the lowest heat content from the still vent. Records of such assessment shall be maintained in accordance with Condition 3.4.1.

4.4. Recordkeeping Requirements

- 4.4.1. **Record of Monitoring.** The permittee shall keep records of monitoring information that include the following:
 - a. The date, place as defined in this permit, and time of sampling or measurements;

- b. The date(s) analyses were performed;
- c. The company or entity that performed the analyses;
- d. The analytical techniques or methods used;
- e. The results of the analyses; and
- f. The operating conditions existing at the time of sampling or measurement.

4.4.2. **Record of Maintenance of Air Pollution Control Equipment.** For all pollution control equipment listed in Section 1.0, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.

4.4.3. **Record of Malfunctions of Air Pollution Control Equipment.** For all air pollution control equipment listed in Section 1.0, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:

- a. The equipment involved.
- b. Steps taken to minimize emissions during the event.
- c. The duration of the event.
- d. The estimated increase in emissions during the event.

For each such case associated with an equipment malfunction, the additional information shall also be recorded:

- e. The cause of the malfunction.
- f. Steps taken to correct the malfunction.
- g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.

4.4.4. The permittee shall maintain records of the analysis that is used to indicate compliance is in accordance with items a. b. and f.iii. of Conditions 4.1.2. Such records shall include the source of data used in the analysis and be maintained in accordance with Condition 3.4.1.

[40 CFR 63.774(d)(2)(ii)]

4.5. Reporting Requirements

4.5.1. The permittee shall report to the Director any leaks of the closed vent system that were not repaired in accordance with Condition 4.1.1. Such report shall be included with the facility's semiannual or annual compliance report as required in 45 CSR 30.

CERTIFICATION OF DATA ACCURACY

I, the undersigned, hereby certify that, based on information and belief formed after reasonable inquiry, all information contained in the attached _____, representing the period beginning _____ and ending _____, and any supporting documents appended hereto, is true, accurate, and complete.

Signature¹ _____
(please use blue ink) Responsible Official or Authorized Representative Date

Name & Title _____
(please print or type) Name Title

Telephone No. _____ Fax No. _____

¹ This form shall be signed by a "Responsible Official." "Responsible Official" means one of the following:

- a. For a corporation: The president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit and either:
 - (i) the facilities employ more than 250 persons or have a gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), or
 - (ii) the delegation of authority to such representative is approved in advance by the Director;
- b. For a partnership or sole proprietorship: a general partner or the proprietor, respectively;
- c. For a municipality, State, Federal, or other public entity: either a principal executive officer or ranking elected official. For the purposes of this part, a principal executive officer of a Federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., a Regional Administrator of U.S. EPA); or
- d. The designated representative delegated with such authority and approved in advance by the Director.



west virginia department of environmental protection

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Earl Ray Tomblin, Governor
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ENGINEERING EVALUATION/FACT SHEET

B ACKGROUND INFORMATION

Application No.:	R13-3252
Plant ID No.:	007-00006
Applicant:	Equitrans, LP
Facility Name:	Burnsville Compressor Station
Location:	Burnsville
NAICS Code:	486210
Application Type:	Construction
Received Date:	May 26, 2015
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	\$1,000.00
Date Received:	June 23, 2015
Complete Date:	May 5, 2016
Due Date:	August 3, 2016
Applicant Ad Date:	August 5, 2015
Newspaper:	<i>Braxton Citizens' News</i>
UTM's:	Easting: 529.40 km Northing: 4,301.40 km Zone: 17
Description:	The application is to address the compliance plan in Consent Order CO-R30-E-2015-11, which is for the construction of a replacement flare to control the still vent from an existing gas dehydration unit.

DESCRIPTION OF PROCESS

Equitrans LP (EQT) owns and operates the Burnsville Compressor Station (BCS). As part of operation at the BCS, EQT utilizes a glycol dehydration unit to remove the moisture (water) out of the field gas before it is transmitted to the Copley Run Compressor Station. The purpose of this glycol dehydration unit is to remove water from the inlet natural gas stream. Water is removed from the wet natural gas stream via physical absorption while it flows countercurrent to circulation of triethylene glycol (TEG) in a contactor tower. The dry natural gas then exits the BCS. The rich TEG, which is in a liquid state, is sent to a flash tank (aka oil skimmer) to reduce volatile hydrocarbons. The liquid enters the flash tank which allows some of the entrained hydrocarbons (methane, ethane, propane, etc.) to change to a gaseous state. The

Promoting a healthy environment.

flash tank operates like a three phase separator. The vapors (gaseous hydrocarbons) from the flash tank are ~~mixed natural gas utilized~~ as fuel gas for the reboiler of the dehydration unit; and the excess gas is routed to the flare ~~as supplement fuel~~.

From the flash tank, the rich glycol, which is in a liquid state, is sent to the regenerator side of the reboiler. Heat energy for the reboiler heats up the rich glycol to boil out the water. The remaining entrained hydrocarbons are released from the glycol solution. The temperature of the rich glycol is below the boiling point of the glycol so that the undesired water and hydrocarbons are boiled off and vented through the still vent of the regenerator of the reboiler. These hydrocarbon vapors are sent to a flare and is destroyed through incineration. This particular dehydrator uses a stripping gas. This stripping gas improves the water removal efficiency of the regenerator.

On November 24, 2014, EQT replaced the existing flare tip with a John Zink EEF-500 flare pilot. The existing flare did not meet the exit tip velocity criteria under 40 CFR §60.18.

SITE INSPECTION

This facility is an existing major source and is routinely inspected by the DAQ to verify compliance with the facility's Title V Operating Permit. The last inspection was conducted on January 7, 2016 by Mr. Eric Ray, P.E., a Compliance and Enforcement engineer of the Kanawha City Office. Mr. Ray determined that the facility was operating in compliance.

This writer visited the facility on May 17, 2016. Ms. Kim Gissy, Senior Environmental Coordinator for EQT Corporation, accompanied the writer during this visit. The main purpose of this inspection was to obtain site-specific information to verify EQT's claim that BCS is an area source of hazardous air pollutant for a gas production facility under Subpart HH of Part 63. This information included inlet conditions of the field gas gathering lines and turnovers of the waste fluid tank. During this visit, the writer did not notice any indicators of construction activities other than what was agreed upon in Consent Order CO-R30_E-2015-11.

ESTIMATE OF EMISSION BY REVIEWING ENGINEER

The applicant used GRI-GLYCalc to predict properties of the still vent and flash tank off gas streams. The applicant used pollutant specific emissions factors from AP-42 Chapter 1.4 to determine the combustion related emissions from the reboiler and flare. The emissions from the flare are dependent on the operation of the dehydration unit. GYLCalc is limited to predicting the outlet streams from affected process equipment of the dehydration units (i.e. absorber, flash tank, regenerator) without regards to the energy needed to maintain the process at a steady state.

The writer modelled the proposed dehydration using ProMax™ Version 4.0 developed by Bryan Engineering and Research (BR&E) to predict the energy streams needed for the reboiler and flare to operate properly.

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EQT determined that the inlet conditions to the dehydration unit to be pressure of 125 psig at a temperature 120⁰ F with a wet gas flow rate of 25 million standard cubic feet per day (MMSCFD) as worst case situation. The writer reviewed this submittal and noted that this analysis configured the absorber with 13 stages. The issue with entering 13 stages in GLYCalc is that the model treats them as ideal stages. During the May 17, 2016 site visit, the writer reviewed the actual drawings for the absorber, which contains 13 trays. Based on locations and number of trays within the column, the writer approximated the number of ideal stages in this absorber column to be 3.5. Also, the writer requested the most recent extended gas analysis for this application, which was sampled on October 8, 2015. The following table is a comparison of the GLYCalc™ and ProMax™ at the sample conditions of maximum wet gas throughput.

Source/Location	Pollutant	GLYCalc w/stripping as dry gas (lb/hr)	GLYCalc w/stripping as flash gas (lb/hr)	ProMax w/mixture of dry & flash gas as stripping gas(lb/hr)
Flash Tank	Volatile Organic Compounds (VOCs)	28.61	28.59	2.34
	Total Hazardous Air Pollutants (HAPs)	0.68	0.68	0.18
	Benzene	0.02	0.02	0.01
Still Vent	Volatile Organic Compounds (VOCs)	90.72	118.20	91.47
	Total Hazardous Air Pollutants (HAPs)	26.91	27.54	21.53
	Benzene	2.03	2.05	2.00

The writer compared the two models at the flash tank and still vent to see the difference between the two models. The issue of simply using GLYCalc is how the actual dehydration is configured and the arrangement of the fuel gas system. GLYCalc can be configured with the stripping gas as dry gas on a user inputted flow rate or all of the flash gas as a stripping gas. In ProMax, the user can nearly configure the model to the actual system being simulated. For this case, the actual stripping gas is a mixture of dry and flash gases metered in the regenerator at a flow rate of 1.75 scfh.

Before considering which model or settings to use when establishing emission potentials for the new flare, the flare operating conditions needs to be considered. A flare that meets the criteria of 40 CFR 60.18 is understood to have a destruction efficiency of at least 98% for hydrocarbons and VOCs, which includes BTEX. As part of the compliance plan in Consent

Order CO-R30-E-2015-11, EQT conducted a flare assessment to demonstrate that the replacement flare meets the criteria of 40 CFR 60.18 on June 9, 2015. This flare assessment satisfactory demonstrated that the new flare meets the criteria of 40 CFR 60.18 with adding 500 scfh of auxiliary gas to the flare (supplemental fuel). Mr. Eric Ray, P.E. has observed during follow-up inspections a supplemental fuel rate to the flare being maintained at 700 scfh (0.7 MSCFH).

This writer compared the flare emissions from the GLYCalc run with flash gas as the stripping gas and ProMax predicted results, which are presented in the following table.

Table #2 – Comparison of the Flare Emissions using GLYCalc and ProMax		
Pollutant	GLYCalc (lb/hr)	ProMax (lb/hr)
Volatile Organic Compounds (VOCs)	2.36	1.98
Total Hazardous Air Pollutants (HAPs)	0.55	0.44
Benzene	0.04	0.04

Both are predicting emissions fairly close to the other. The ProMax run was limited to a supplemental fuel gas rate of 700 scfh while the GLYCalc run didn't include any supplemental fuel. Boilers in general are assumed to have a combustion efficiency of 95% for hydrocarbons and VOCs. It is this writer's conclusion that the new flare potential to emit of VOC and HAPs should be based on the GLYCalc run using the flash gas as stripping gas at a maximum wet gas flow rate of 34 MMSCFD. ProMax predicted the carbon dioxide equivalent potential from the flare to be 407.80 pound per hour and 1,786 tons per year.

Emissions of oxides of nitrogen and carbon monoxide for the flare were estimated using the predicted heat release rate at maximum wet gas throughput rate through the dehydration unit. The heat release rate was predicted to be 1.2 MMBtu/hr. NO_x and CO emissions were based on factors from TCEQ Publication RG-360A/11 Technical Supplement 4 for non-assisted flares with a low heat release rate (effluent less than 1,000 Btu/scf). SO₂ was based on the predicted hydrogen sulfide using two models. The following table is a summary of potential emissions from the flare.

Table 3 Flare Emissions		
Pollutant	Flare Emissions	
	Hourly Rates (lb/hr)	Annual (tpy)
PM/PM ₁₀ /PM _{2.5}	0.01	0.04
Oxides of Nitrogen (NO _x)	0.08	0.35
Carbon Monoxide (CO)	0.66	2.89
Sulfur Dioxide	<0.01	<0.04
Volatile Organic Compounds (VOCs)	2.36	10.34
Total Hazardous Air Pollutants (HAPs)	0.55	2.41
Benzene	0.04	0.18
Carbon Dioxide Equivalent (CO _{2e})	407.80	1,786.16

The only emission source that has changed as part of the consent order was the new flare. No other changes are being proposed at the BCS. Thus, no other emission source is required to be evaluated under the permitting rule (Rule 13). However, EQT is requesting the benzene exclusion under 40 CFR Subpart HH for the existing dehydration unit. Thus, the following discussions pertain to verifying if the BCS is an area source of hazardous air pollutants (HAPs) as defined in 40 CFR §63.761. This definition includes sources engaged with field gas production activities but excludes compressor stations.

At the BCS, the HAP emissions from the compressors and compressor engines are excluded for the HAP potential under Subpart HH. Sources that must be included are Tank-1, the dehydration unit, and the pig launcher.

The writer used the October 7, 2015 gas analysis, and ProMax to obtain estimates of HAPs emissions from Tank-1 and the whole dehydration unit, which includes the reboiler and still vent. The area source applicability determination will evaluate the fuel gas stream to the reboiler as uncontrolled and still vent as controlled by the proposed flare. Tank-1 vents to the atmosphere and therefore it is uncontrolled.

The following is presented here to illustrate the emission rate of VOCs and HAPs by source and determine which would have the higher emission rate.

Pollutant	Tank-1	Reboiler	Flare (Controlled by 98%)	Pig Launcher	Total Emissions
VOCs (tpy)	0.36	7.12	10.34	0.90	18.72
Total HAPs (tpy)	0.001	1.28	2.41	0.002	3.693

The estimates in the above table were determined using the maximum wet gas flow rate of 34 MMSCFD and with one pig being launched per year. Because the total HAP potential of the BCS is less than 10 tons per year, speciation of the individual HAP is not necessary for this determination. The reboiler should reduce the VOCs and total HAPs by at least 95%. Therefore, the BCS would be classified as an area-source of HAPs under Subpart HH of Part 63 for having a potential to emit of HAPs of less than 10 tons per year of any single HAP and 25 tons per year of total HAPs from the gas production facility.

REGULATORY APPLICABILITY

The Burnsville Compressor Station is a major source under Title V (45CSR30) and currently possesses a valid Title V Operating Permit. Under this program, new emission units have 12 months after start-up to be incorporated into the facility's operating permit.

The facility is currently classified as a major source for NO_x under Prevention of Significant Deterioration (PSD). The first step in determining major modification applicability is to determine which pollutants that the project is major for, which is illustrated in the following table.

Pollutant	New Potential from the Replacement Flare (tpy)	Significance Threshold (tpy)	Significance Trigger (Yes/No)
PM	0.40	25	No
PM ₁₀	0.40	15	No
PM _{2.5} Direct	0.40	10	No
NO _x (precursor of Ozone and PM _{2.5})	0.35	40	No
SO ₂	0.01	40	No
CO	2.89	100	No
VOCs	10.34	40	No

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This project does not represent a “significant emission increase” (45CSR§14-2.75) for any NSR pollutant. Thus, no further review is required.

With regards to the National Ambient Air Quality Standards, Braxton County is classified as attainment for all pollutants. Thus, no further review of this application with regards to 45 CSR 19, West Virginia Non-Attainment Permitting Rule is required.

The replacement flare is subject to Rules 6 & 10 (WV State Rules on PM and SO₂). 45 CSR §6-4.1. establishes an allowable PM emission limit from this flare at 0.62 pounds per hour. This allowable is based on mass rate of 230 pounds of effluent per hour being routed to the flare. The effluent to this flare is in a gaseous state and should not cause the PM emissions to increase beyond this allowable, with the predicted potential being at 0.01 pounds of PM per hour. 45 CSR §6-4.3 limits visible emission from incinerators to less than 20% opacity. A visible indicator of proper operation of a flare is no visible emissions (zero opacity). EQT plans on operating this particular flare in such a manner.

45 CSR §10-5.1 established a hydrogen sulfide (H₂S) limit on the combustion of process gas streams to 50 grains of H₂S per 100 cubic feet of carrier gas. EQT’s Burnsville Station receives field gas which may contain hydrogen sulfide. The field gas received by the BCS typically has concentration levels of hydrogen sulfide less of than 1 ppm.

The writer used GLYCalc to develop an inlet concentration of H₂S that demonstrated compliance with the 50 grain standard of effluent going to the flare. The hydrogen sulfide level of the wet gas that was entered into GLYCalc was 100 ppm which a predicted the flare would see a hydrogen sulfide loading of 23.4 grains per 100 cubic feet of carrier gas. The predicted hydrogen sulfide loading would have a sulfur dioxide rate of 0.12 pounds per hour.

The writer recommends setting an inlet concentration for gas coming into the dehydration unit at 100 ppm for the purpose of demonstrating compliance with 45 CSR §10-5.1. (50 grain standard) and the corresponding sulfur dioxide emission limit.

The Burnsville Compressor Station is classified as a natural gas production facility. Under the Subpart HH – National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities of Part 63. Based on the predicted HAP emissions in Table 6, the Burnsville Compressor Station will remain as an area source of HAPs. Subpart HH has requirements for area sources of HAPs. EQT has elected to maintain the benzene emissions from the dehydration unit below 1.0 tons per year. Therefore, 40 CFR §63.764(e)(1) excludes the dehydration unit from the emission limitation and the work practice requirements of 40 CFR §63.764(d). Thus, EQT must determine actual average benzene emissions from the dehydration unit in accordance with 40 CFR §63.772(b)(2).

EQT prepared and submitted a complete application, paid the filing fee, and published a Class I Legal ad in Braxton Citizens’ News on August 5, 2015, which is required under Rule 13 for a construction permit. The facility currently holds a valid Title V Operating Permit and included Attachment S of the application for a significant modification of this operating permit.

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TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The new replacement flare will not emit any pollutants that aren't already being emitted by another emission source at the facility. Therefore, no information about the toxicity of the hazardous air pollutants (HAPs) is presented in this evaluation.

AIR QUALITY IMPACT ANALYSIS

The writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed modification does not meet the definition of a major modification of a major source as defined in 45CSR14.

MONITORING OF OPERATIONS

For this flare, the writer recommends monitoring to ensuring proper operation of the flare. The writer conducted several different simulation to see if any particular situation would result in a condition that the flare would not operate in accordance with the heat content and exit velocity criteria of 40 CFR §60.18. The writer observe that at least 900 to 1,000 scfh of fuel gas is required to satisfy the energy requirements to operate the dehydration unit within the model. When the dehydration unit operating

This writer recommends the following parameters to be monitored for the purpose of ensuring proper operation of the control device and compliance with the emission limits.

- Wet gas processing rate on a daily basis;
- Monitoring the pilot light of the flare.
- Amount of supplemental fuel sent to the flare, which can include the fuel for the pilot light on a daily basis.
- Conduct visible emissions observations on a quarterly basis.

A flare design criteria worksheet was included in the application. However, this assessment was based on a flawed GLYCalc run, which assumed 13 ideal stages in the absorber column. As part of the agreed consent order, EQT conducted a flare assessment to demonstrate that the replacement flare meets the criteria of 40 CFR §60.18 for a non-assisted flare.

The following are the criteria for a non-assisted flare and the results of the assessment.

Parameter	60.18 Criteria	Results of Assessment
Heat Content (Btu/scf)	200 or greater than	532.
Exit Velocity at the tip (feet per second)	60 or less than	58.1

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Supplement Fuel (scf/hour)	N/A	500
Visible Emissions	No more than 5 minutes in any 2 hour period	Zero

The writer conducted several simulation runs in ProMax to see what process changes would affect the flare assessment. These simulations yielded heat content of the effluent from 1500 Btu/scf to 376 Btu/scf with exit velocities ranging from 3 feet per second to just over 12 feet per second. The writer believes that the exit velocity from the flare assessment was not calculated based on the dry corrected flow rate. Using the dry corrected flow rate of 64 cubic feet per minute and a cross-section area of the flare tip of 0.09 square feet (ft²), the average exit velocity should have been 11.85 feet per second.

The monitoring of the flare should focus on ensuring good operation of the flare, which would be a function of being in compliance with the VOC and HAP emission limits. Because the supplemental fuel was added to the flare during the assessment, monitoring the amount of fuel added to the flare needs to be part of the monitoring plan. The writer recommends quarterly, one hour observations to verify proper operation of the flare. Another key parameter is verifying that a flame is present. To determine the presence of flame in the flare, the applicant plans on using a thermocouple or flame rod. For compliance purposes, the applicant only needs to record the time period that no flame was present when the dehydration unit was operating.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates the proposed construction of the replacement flare will meet all the requirements of the applicable rules and regulations when operated in accordance with the permit application. Therefore, the writer recommends granting Equitrans, LP a Rule 13 construction permit for their Burnsville Compressor Station located in Burnsville, WV.

Edward S. Andrews, P.E.
Engineer

June 7, 2016
Date

Engineering Evaluation of R13-3252
Equitrans LP
Burnsville Compressor Station
Non-confidential

Andrews, Edward S

From: Gissy, Kimberly A. <KGissy@eqt.com>
Sent: Tuesday, June 21, 2016 7:25 AM
To: Andrews, Edward S
Subject: Re: Burnsville

ID # 7-6
Reg RB-3252
Company EQT
Facility Burnsville Initials EA

Ok thanks Ed. Enjoy your time off.

Sent from my iPhone

On Jun 21, 2016, at 7:23 AM, Andrews, Edward S <Edward.S.Andrews@wv.gov<mailto:Edward.S.Andrews@wv.gov>> wrote:

Kim: I just need to that you measuring the combined flow of pilot and assist gas to the flare.

Under 60.18, flares that meet this standard are achieving 98 in the eyes of EPA. You cannot measure the emissions using standard methods.

So, a flare meets 60.18 or 63.11(b) has the emissions based on 98% destruction efficiency.

Mark also inquired about the destruction efficiency too.

I am out of the office this week. If you have any other questions , please send them in a email.

Ed

From: Gissy, Kimberly A. <KGissy@eqt.com<mailto:KGissy@eqt.com>>
Sent: Monday, June 20, 2016 3:43:24 PM
To: Andrews, Edward S
Subject: FW: Burnsville

Ed,

I have two questions regarding the Burnsville permit. Do we need to meter the volume of assist gas, exclusively, or can it be combined with the volume to the pilot?

Also, is 98% efficiency for that flare achievable, or should that type of device be at 95%? Thanks

Kim

<imagebb81f8.jpg@55672800.2aed4398>

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v1.e

Entire Document
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Andrews, Edward S

From: Gissy, Kimberly A. <KGissy@eqt.com>
Sent: Wednesday, June 08, 2016 2:03 PM
To: Andrews, Edward S
Subject: RE: 007-00006_EVAL_R13-3252_draft.doc - AKA Burnsville Eval

Were you going to finish your thought? Or delete?

MONITORING OF OPERATIONS

For this flare, the writer recommends monitoring to ensuring proper operation of the flare. The writer conducted several different simulation to see if any particular situation would result in a condition that the flare would not operate in accordance with the heat content and exit velocity criteria of 40 CFR §60.18. The writer observe that at least 900 to 1,000 scfh of fuel gas is required to satisfy the energy requirements to operate the dehydration unit within the model. **When the dehydration unit operating**

This writer recommends the following parameters to be monitored for the purpose of ensuring proper operation of the control device and compliance with the emission limits.

From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Wednesday, June 08, 2016 12:06 PM
To: Gissy, Kimberly A.
Subject: RE: 007-00006_EVAL_R13-3252_draft.doc - AKA Burnsville Eval

Kim: I ran GYLCalc with the inlet H2S set at 100 ppm to see if the effluent going to the Dehy would exceed the 50 grain/100 ft³ of gas standard from 45 CSR 10-5.1. Which yielded a H2S conc of 23.4 grains per 100 ft³ of effluent going to the flare. Thus, I use this to set an inlet H2S conc for the inlet wet gas to the station at 100 ppm that would demonstrate that the flare is not exceed the 50 grain standard. Because the station receives field with very low conc. of H2S, I felt sampling the inlet gas once per year is sufficient for compliance with Rule 10.

I am glad your operations folks are reading the permit.

Please give me a call.

Ed

ID # 7-6
Reg R13-3252
Company EQT
Facility Burnsville Initials EL

From: Gissy, Kimberly A. [mailto:KGissy@eqt.com]
Sent: Wednesday, June 08, 2016 11:50 AM
To: Andrews, Edward S <Edward.S.Andrews@wv.gov>
Cc: Bennett, Rusty <RBennett@eqt.com>
Subject: FW: 007-00006_EVAL_R13-3252_draft.doc - AKA Burnsville Eval

Ed,

Please comment on this...



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From: Bennett, Rusty
Sent: Wednesday, June 08, 2016 9:51 AM
To: Gissy, Kimberly A.
Subject: RE: 007-00006_EVAL_R13-3252_draft.doc - AKA Burnsville Eval

Are they suggesting we set analyzing equipment to check for H2S upstream of the Dehy? We don't have an issue with H2S at Burnsville, especially not 100 PPM, or are they just looking for something in writing saying that we will not operate the Dehy if H2S exceeds 100 ppm?

The writer recommends setting an inlet concentration for gas coming into the dehydration unit at 100 ppm for the purpose of demonstrating compliance with 45 CSR §10-5.1. (50 grain standard) and the corresponding sulfur dioxide emission limit.

From: Gissy, Kimberly A.
Sent: Tuesday, June 07, 2016 3:18 PM
To: Bennett, Rusty
Subject: FW: 007-00006_EVAL_R13-3252_draft.doc - AKA Burnsville Eval

Rusty,

Please review for accuracy. Do you have any comments on the H2S limit? Thanks!

Kim

From: Andrews, Edward S [<mailto:Edward.S.Andrews@wv.gov>]
Sent: Tuesday, June 07, 2016 2:36 PM
To: Sowa, Mark A.
Cc: Gissy, Kimberly A.
Subject: 007-00006_EVAL_R13-3252_draft.doc - AKA Burnsville Eval

This is my evaluation of Burnsville.

Ed

Edward S. Andrews, P.E.
Engineer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
304.926.0499 ext. 1214

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: R13-3252

File Name: C:\Program Files\GRI-GLYCalc4\R13-3252_Burnsville_EQT.ddf

Date: May 27, 2016

*stripping gas
air flash gas*

DESCRIPTION:

Description:

Annual Hours of Operation: 8760.0 hours/yr

ID# 7-6
 Reg R13-3252
 Company EQT
 Facility Burnsville Initials gsl

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	<0.0001	<0.001	<0.0001
Methane	0.0432	1.036	0.1892
Ethane	0.0561	1.347	0.2458
Propane	0.0673	1.615	0.2946
Isobutane	0.0224	0.538	0.0982
n-Butane	0.0617	1.480	0.2701
Isopentane	0.0325	0.779	0.1422
n-Pentane	0.0414	0.995	0.1815
Cyclopentane	0.0001	0.001	0.0002
n-Hexane	0.0581	1.394	0.2545
Cyclohexane	0.0324	0.778	0.1419
Heptanes	0.1516	3.638	0.6639
Methylcyclohexane	0.1079	2.591	0.4728
2,2,4-Trimethylpentane	0.0004	0.010	0.0019
Benzene	0.0410	0.985	0.1798
Toluene	0.0003	0.007	0.0013
Ethylbenzene	0.0006	0.014	0.0026
Xylenes	0.4504	10.810	1.9728
C8+ Heavies	1.2959	31.102	5.6761
Total Emissions	2.4634	59.121	10.7895
Total Hydrocarbon Emissions	2.4633	59.120	10.7895
Total VOC Emissions	2.3640	56.737	10.3545
Total HAP Emissions	0.5509	13.221	2.4129
Total BTEX Emissions	0.4923	11.816	2.1565

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UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0005	0.012	0.0022
Methane	2.1594	51.825	9.4580
Ethane	2.8055	67.333	12.2883
Propane	3.3636	80.725	14.7324
Isobutane	1.1215	26.915	4.9120
n-Butane	3.0835	74.004	13.5058
Isopentane	1.6231	38.955	7.1093
n-Pentane	2.0723	49.735	9.0766
Cyclopentane	0.0027	0.064	0.0118
n-Hexane	2.9049	69.717	12.7233
Cyclohexane	1.6202	38.884	7.0964
Heptanes	7.5786	181.888	33.1945
Methylcyclohexane	5.3971	129.531	23.6393
2,2,4-Trimethylpentane	0.0216	0.519	0.0948
Benzene	2.0524	49.257	8.9895
Toluene	0.0150	0.360	0.0657
Ethylbenzene	0.0294	0.705	0.1286
Xylenes	22.5207	540.497	98.6408
C8+ Heavies	64.7958	1555.100	283.8058
Total Emissions	123.1678	2956.027	539.4750
Total Hydrocarbon Emissions	123.1673	2956.015	539.4728
Total VOC Emissions	118.2024	2836.857	517.7265
Total HAP Emissions	27.5440	661.055	120.6426
Total BTEX Emissions	24.6175	590.819	107.8245

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	<0.0001	0.001	0.0002
Methane	1.6541	39.699	7.2450
Ethane	1.5139	36.334	6.6310
Propane	1.3122	31.492	5.7473
Isobutane	0.3755	9.012	1.6446
n-Butane	0.9045	21.708	3.9617
Isopentane	0.4722	11.333	2.0683
n-Pentane	0.5351	12.841	2.3435
Cyclopentane	0.0002	0.005	0.0010
n-Hexane	0.5469	13.126	2.3955
Cyclohexane	0.0904	2.170	0.3960
Heptanes	0.9148	21.956	4.0069
Methylcyclohexane	0.2716	6.519	1.1897

2,2,4-Trimethylpentane	0.0043	0.103	0.0188
Benzene	0.0243	0.583	0.1064
Toluene	0.0001	0.003	0.0006
Ethylbenzene	0.0002	0.004	0.0008
Xylenes	0.1050	2.520	0.4599
C8+ Heavies	23.0343	552.823	100.8901

Total Emissions	31.7596	762.231	139.1072

Total Hydrocarbon Emissions	31.7596	762.230	139.1070
Total VOC Emissions	28.5916	686.197	125.2310
Total HAP Emissions	0.6808	16.339	2.9819
Total BTEX Emissions	0.1296	3.110	0.5677

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 68.00 deg. F
 Excess Oxygen: 120.00 %
 Combustion Efficiency: 98.00 %
 Supplemental Fuel Requirement: 1.02e+000 MM BTU/hr

Component	Emitted	Destroyed
-----	-----	-----
Hydrogen Sulfide	2.00%	98.00%
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	2.00%	98.00%
Isobutane	2.00%	98.00%
n-Butane	2.00%	98.00%
Isopentane	2.00%	98.00%
n-Pentane	2.00%	98.00%
Cyclopentane	2.00%	98.00%
n-Hexane	2.00%	98.00%
Cyclohexane	2.00%	98.00%
Heptanes	2.00%	98.00%
Methylcyclohexane	2.00%	98.00%
2,2,4-Trimethylpentane	2.00%	98.00%
Benzene	2.00%	98.00%
Toluene	2.00%	98.00%
Ethylbenzene	2.00%	98.00%
Xylenes	2.00%	98.00%
C8+ Heavies	2.00%	98.00%

ABSORBER

Specified Absorber Stages: 3.50
 Calculated Dry Gas Dew Point: 3.44 lbs. H2O/MMSCF
 Temperature: 57.0 deg. F
 Pressure: 82.0 psig
 Dry Gas Flow Rate: 34.0000 MMSCF/day
 Glycol Losses with Dry Gas: 0.0219 lb/hr
 Wet Gas Water Content: Subsaturated
 Specified Wet Gas Water Content: 71.00 lbs. H2O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 7.57 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	4.84%	95.16%
Carbon Dioxide	99.91%	0.09%
Hydrogen Sulfide	99.21%	0.79%
Nitrogen	100.00%	0.00%
Methane	100.00%	0.00%
Ethane	99.98%	0.02%
Propane	99.95%	0.05%
Isobutane	99.90%	0.10%
n-Butane	99.86%	0.14%
Isopentane	99.82%	0.18%
n-Pentane	99.75%	0.25%
Cyclopentane	98.98%	1.02%
n-Hexane	99.45%	0.55%
Cyclohexane	97.67%	2.33%
Heptanes	98.59%	1.41%
Methylcyclohexane	96.52%	3.48%
2,2,4-Trimethylpentane	99.37%	0.63%
Benzene	76.65%	23.35%
Toluene	56.61%	43.39%
Ethylbenzene	26.29%	73.71%
Xylenes	14.33%	85.67%
C8+ Heavies	93.67%	6.33%

FLASH TANK

Flash Control: Used as stripping gas
 Flash Temperature: 200.0 deg. F
 Flash Pressure: 49.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.96%	0.04%
Carbon Dioxide	68.32%	31.68%
Hydrogen Sulfide	91.26%	8.74%
Nitrogen	23.09%	76.91%
Methane	23.40%	76.60%
Ethane	46.04%	53.96%
Propane	60.99%	39.01%
Isobutane	66.52%	33.48%
n-Butane	70.67%	29.33%
Isopentane	71.05%	28.95%
n-Pentane	74.31%	25.69%
Cyclopentane	91.93%	8.07%
n-Hexane	81.27%	18.73%
Cyclohexane	94.60%	5.40%
Heptanes	87.99%	12.01%
Methylcyclohexane	95.17%	4.83%
2,2,4-Trimethylpentane	80.50%	19.50%
Benzene	98.88%	1.12%
Toluene	99.15%	0.85%
Ethylbenzene	99.44%	0.56%
Xylenes	99.59%	0.41%
C8+ Heavies	68.72%	31.28%

 REGENERATOR

Regenerator Stripping Gas:
 Flash Tank Off Gas
 Stripping Gas Flow Rate: 2.4158 scfm

Component	Remaining in Glycol	Distilled Overhead
Water	51.55%	48.45%
Carbon Dioxide	0.00%	100.00%
Hydrogen Sulfide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.70%	99.30%
n-Pentane	0.67%	99.33%

Cyclopentane	0.54%	99.46%
n-Hexane	0.62%	99.38%
Cyclohexane	3.38%	96.62%
Heptanes	0.57%	99.43%
Methylcyclohexane	4.20%	95.80%
2,2,4-Trimethylpentane	1.86%	98.14%
Benzene	5.06%	94.94%
Toluene	7.97%	92.03%
Ethylbenzene	10.46%	89.54%
Xylenes	12.95%	87.05%
C8+ Heavies	17.46%	82.54%

STREAM REPORTS:

WET GAS STREAM

Temperature: 57.00 deg. F
 Pressure: 96.70 psia
 Flow Rate: 1.42e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.50e-001	1.01e+002
Carbon Dioxide	1.15e-001	1.89e+002
Hydrogen Sulfide	5.01e-005	6.39e-002
Nitrogen	7.27e-001	7.62e+002
Methane	8.03e+001	4.82e+004
Ethane	1.20e+001	1.36e+004
Propane	3.93e+000	6.49e+003
Isobutane	5.41e-001	1.18e+003
n-Butane	1.04e+000	2.26e+003
Isopentane	3.32e-001	8.97e+002
n-Pentane	3.12e-001	8.42e+002
Cyclopentane	1.00e-004	2.63e-001
n-Hexane	1.64e-001	5.28e+002
Cyclohexane	2.21e-002	6.95e+001
Heptanes	1.43e-001	5.37e+002
Methylcyclohexane	4.22e-002	1.55e+002
2,2,4-Trimethylpentane	8.02e-004	3.43e+000
Benzene	3.01e-003	8.79e+000
Toluene	1.00e-005	3.46e-002
Ethylbenzene	1.00e-005	3.98e-002

Xylenes 6.62e-003 2.63e+001
 C8+ Heavies 1.61e-001 1.02e+003

 Total Components 100.00 7.68e+004

DRY GAS STREAM

 Temperature: 57.00 deg. F
 Pressure: 96.70 psia
 Flow Rate: 1.42e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.25e-003	4.87e+000
Carbon Dioxide	1.15e-001	1.89e+002
Hydrogen Sulfide	4.98e-005	6.34e-002
Nitrogen	7.29e-001	7.62e+002
Methane	8.04e+001	4.82e+004
Ethane	1.21e+001	1.35e+004
Propane	3.94e+000	6.48e+003
Isobutane	5.41e-001	1.17e+003
n-Butane	1.04e+000	2.26e+003
Isopentane	3.32e-001	8.95e+002
n-Pentane	3.12e-001	8.40e+002
Cyclopentane	9.94e-005	2.60e-001
n-Hexane	1.63e-001	5.25e+002
Cyclohexane	2.16e-002	6.78e+001
Heptanes	1.41e-001	5.29e+002
Methylcyclohexane	4.08e-002	1.50e+002
2,2,4-Trimethylpentane	7.99e-004	3.41e+000
Benzene	2.31e-003	6.74e+000
Toluene	5.69e-006	1.96e-002
Ethylbenzene	2.64e-006	1.05e-002
Xylenes	9.50e-004	3.77e+000
C8+ Heavies	1.51e-001	9.58e+002
-----	-----	-----
Total Components	100.00	7.65e+004

LEAN GLYCOL STREAM

 Temperature: 57.00 deg. F
 Flow Rate: 1.21e+001 gpm

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

TEG	9.83e+001	6.68e+003
Water	1.50e+000	1.02e+002
Carbon Dioxide	2.51e-013	1.70e-011
Hydrogen Sulfide	7.43e-016	5.05e-014
Nitrogen	4.91e-014	3.34e-012
Methane	1.07e-018	7.26e-017
Ethane	1.95e-008	1.32e-006
Propane	2.01e-009	1.37e-007
Isobutane	4.95e-010	3.36e-008
n-Butane	1.13e-009	7.65e-008
Isopentane	1.20e-004	8.16e-003
n-Pentane	1.53e-004	1.04e-002
Cyclopentane	1.99e-007	1.35e-005
n-Hexane	2.15e-004	1.46e-002
Cyclohexane	7.88e-004	5.36e-002
Heptanes	5.60e-004	3.81e-002
Methylcyclohexane	3.31e-003	2.25e-001
2,2,4-Trimethylpentane	4.85e-006	3.30e-004
Benzene	1.59e-003	1.08e-001
Toluene	1.89e-005	1.29e-003
Ethylbenzene	5.01e-005	3.41e-003
Xylenes	4.91e-002	3.34e+000
C8+ Heavies	1.30e-001	8.84e+000

Total Components	100.00	6.80e+003

RICH GLYCOL STREAM

Temperature: 57.00 deg. F
 Pressure: 96.70 psia
 Flow Rate: 1.25e+001 gpm
 NOTE: Stream has more than one phase.

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

TEG	9.52e+001	6.68e+003
Water	2.82e+000	1.98e+002
Carbon Dioxide	2.43e-003	1.70e-001
Hydrogen Sulfide	7.20e-006	5.05e-004
Nitrogen	4.75e-004	3.34e-002
Methane	3.08e-002	2.16e+000
Ethane	4.00e-002	2.81e+000
Propane	4.79e-002	3.36e+000
Isobutane	1.60e-002	1.12e+000
n-Butane	4.39e-002	3.08e+000
Isopentane	2.32e-002	1.63e+000

n-Pentane	2.97e-002	2.08e+000
Cyclopentane	3.85e-005	2.70e-003
n-Hexane	4.16e-002	2.92e+000
Cyclohexane	2.38e-002	1.67e+000
Heptanes	1.09e-001	7.62e+000
Methylcyclohexane	8.01e-002	5.62e+000
2,2,4-Trimethylpentane	3.13e-004	2.20e-002
Benzene	3.08e-002	2.16e+000
Toluene	2.32e-004	1.63e-002
Ethylbenzene	4.67e-004	3.28e-002
Xylenes	3.68e-001	2.59e+001
C8+ Heavies	1.05e+000	7.36e+001

Total Components	100.00	7.02e+003

FLASH TANK OFF GAS STREAM

Temperature: 200.00 deg. F
 Pressure: 63.70 psia
 Flow Rate: 1.45e+002 scfh

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

Water	1.25e+000	8.58e-002
Carbon Dioxide	3.21e-001	5.40e-002
Hydrogen Sulfide	3.39e-004	4.42e-005
Nitrogen	2.40e-001	2.57e-002
Methane	2.70e+001	1.65e+000
Ethane	1.32e+001	1.51e+000
Propane	7.79e+000	1.31e+000
Isobutane	1.69e+000	3.75e-001
n-Butane	4.07e+000	9.05e-001
Isopentane	1.71e+000	4.72e-001
n-Pentane	1.94e+000	5.35e-001
Cyclopentane	8.14e-004	2.18e-004
n-Hexane	1.66e+000	5.47e-001
Cyclohexane	2.81e-001	9.04e-002
Heptanes	2.39e+000	9.15e-001
Methylcyclohexane	7.24e-001	2.72e-001
2,2,4-Trimethylpentane	9.82e-003	4.28e-003
Benzene	8.14e-002	2.43e-002
Toluene	3.92e-004	1.38e-004
Ethylbenzene	4.55e-004	1.85e-004
Xylenes	2.59e-001	1.05e-001
C8+ Heavies	3.54e+001	2.30e+001

Total Components 100.00 3.19e+001

FLASH TANK GLYCOL STREAM

 Temperature: 200.00 deg. F
 Flow Rate: 1.25e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.57e+001	6.68e+003
Water	2.83e+000	1.98e+002
Carbon Dioxide	1.67e-003	1.16e-001
Hydrogen Sulfide	6.60e-006	4.61e-004
Nitrogen	1.10e-004	7.70e-003
Methane	7.23e-003	5.05e-001
Ethane	1.85e-002	1.29e+000
Propane	2.94e-002	2.05e+000
Isobutane	1.07e-002	7.46e-001
n-Butane	3.12e-002	2.18e+000
Isopentane	1.66e-002	1.16e+000
n-Pentane	2.22e-002	1.55e+000
Cyclopentane	3.55e-005	2.48e-003
n-Hexane	3.40e-002	2.37e+000
Cyclohexane	2.27e-002	1.58e+000
Heptanes	9.59e-002	6.70e+000
Methylcyclohexane	7.66e-002	5.35e+000
2,2,4-Trimethylpentane	2.53e-004	1.77e-002
Benzene	3.06e-002	2.14e+000
Toluene	2.31e-004	1.61e-002
Ethylbenzene	4.66e-004	3.26e-002
Xylenes	3.69e-001	2.58e+001
C8+ Heavies	7.24e-001	5.06e+001
Total Components	100.00	6.99e+003

REGENERATOR OVERHEADS STREAM

 Temperature: 212.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 2.49e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	8.12e+001	9.59e+001
Carbon Dioxide	5.90e-002	1.70e-001

Hydrogen Sulfide	2.26e-004	5.05e-004
Nitrogen	1.82e-002	3.34e-002
Methane	2.05e+000	2.16e+000
Ethane	1.42e+000	2.81e+000
Propane	1.16e+000	3.36e+000
Isobutane	2.94e-001	1.12e+000
n-Butane	8.09e-001	3.08e+000
Isopentane	3.43e-001	1.62e+000
n-Pentane	4.38e-001	2.07e+000
Cyclopentane	5.84e-004	2.69e-003
n-Hexane	5.14e-001	2.90e+000
Cyclohexane	2.93e-001	1.62e+000
Heptanes	1.15e+000	7.58e+000
Methylcyclohexane	8.38e-001	5.40e+000
2,2,4-Trimethylpentane	2.89e-003	2.16e-002
Benzene	4.01e-001	2.05e+000
Toluene	2.48e-003	1.50e-002
Ethylbenzene	4.21e-003	2.94e-002
Xylenes	3.23e+000	2.25e+001
C8+ Heavies	5.80e+000	6.48e+001

Total Components	100.00	2.19e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 9.34e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Hydrogen Sulfide	1.20e-003	1.01e-005
Methane	1.09e+001	4.32e-002
Ethane	7.58e+000	5.61e-002
Propane	6.20e+000	6.73e-002
Isobutane	1.57e+000	2.24e-002
n-Butane	4.31e+000	6.17e-002
Isopentane	1.83e+000	3.25e-002
n-Pentane	2.33e+000	4.14e-002
Cyclopentane	3.11e-003	5.37e-005
n-Hexane	2.74e+000	5.81e-002
Cyclohexane	1.56e+000	3.24e-002
Heptanes	6.14e+000	1.52e-001
Methylcyclohexane	4.47e+000	1.08e-001
2,2,4-Trimethylpentane	1.54e-002	4.33e-004
Benzene	2.13e+000	4.10e-002

Toluene	1.32e-002	3.00e-004
Ethylbenzene	2.25e-002	5.87e-004
Xylenes	1.72e+001	4.50e-001
C8+ Heavies	3.09e+001	1.30e+000

Total Components	100.00	2.46e+000