



west virginia department of environmental protection

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

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

ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-3095
Plant ID No.: 017-00058
Applicant: EQT Gathering
Facility Name: Pandora Station
Location: Doddridge County
NAICS Code: 211111
Application Type: Construction
Received Date: June 21, 2013
Engineer Assigned: Steven R. Pursley, PE
Fee Amount: \$4,500.00
Date Received: June 26, 2013
Complete Date: July 19, 2013
Due Date: October 17, 2013
Applicant Ad Date: June 6, 2013
Newspaper: *The Herald Record*
UTM's: Easting: 525.32 km Northing: 4,357.16 km Zone: 17
Description: Construction of a natural gas gathering facility

DESCRIPTION OF PROCESS

Natural gas enters the station via a distribution pipeline system and is first compressed, using one of four natural gas fired compressors rated at 4,735 hp (2 units) and 2,370 hp (2 units). The compressed natural gas stream is then processed through one of two triethylene glycol (TEG) dehydration units (each rated at 120 mmscfd) with associated reboilers and controlled with enclosed vapor combustors (each rated at 12 mmbtu/hr). The dehydration unit introduces TEG to the gas stream in a contact tower to absorb water vapor from the gas to a level not exceeding 7 pounds per million cubic feet. The glycol is then sent to the natural gas-fired reboiler, rated at 2.31 mmbtu/hr of heat input. The water is evaporated from the glycol in the reboiler and exhausted and then the glycol is sent back to the contact tower. The natural gas stream from the contact tower flows into

the pipeline to be transported further along the distribution system via the sales pipeline. The station will also be equipped with nine small storage tanks designed to support the engines, dehydration unit and pipeline fluids.

SITE INSPECTION

A site inspection of the facility was performed by the writer on September 5, 2013. The facility will be located in a rural section of Doddridge County along Brush Run Road. There are several residences adjacent to the facility. To get to the facility from Charleston take I-77 north to exit 176. Turn east on US Route 50 and go approximately 43.2 miles. Then turn left on State Route 18 and go approximately 0.5 miles. Turn right and go over the bridge. At the end of the bridge turn right on Smithton Road (County Route 30/50) and go approximately 1.0 mile. Then turn left on Rock Run Road (County Route 5) and go approximately 5.3 miles. At the stop sign turn left on Big Flint Road (County Route 3) and go approximately 1.6 miles. Next, turn right on Brush Run Road (County Route 3/1). Go approximately 1.0 mile and the access road should be on the right. It should be noted that no access road currently exists at this entry point. Since EQT has numerous new and existing wells in the area, there may or may not be existing access roads to the site from other entry points. The following picture of the area was taken on the day of the inspection. The facility will be located at the top of the hill in the background (obscured by trees), not the field in the foreground.



Fact Sheet R13-3095
EQT Gathering, LLC
Pandora Station

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Compressor Engines

Potential emissions from both of the two (2) compressor engines that will be/remain at the site are based on the following: Hourly emissions, where applicable, were based on maximum design heat input (MDHI) of each engine. NO_x, VOC, CO and formaldehyde emissions were based on vendor information. Emissions of greenhouse gasses were based on 40 CFR 98. Emissions of all other pollutants were based on AP-42. Annual emissions were based on 8,760 hours of operation per year. The following table details the potential-to-emit (PTE) of the compressor engines:

Table 1: Compressor Engine PTE

Pollutant	Caterpillar 3616LE (CE-1)		Caterpillar 3616LE (CE-2)		Caterpillar 3608 (CE-3)		Caterpillar 3608 (CE-4)	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
CO	2.87	12.57	2.87	12.57	1.44	6.29	1.44	6.29
NO _x	5.22	22.86	5.22	22.86	2.61	11.44	2.61	11.44
PM _{2.5} ⁽¹⁾	0.36	1.56	0.36	1.56	0.18	0.78	0.18	0.78
PM ₁₀ ⁽¹⁾	0.36	1.56	0.36	1.56	0.18	0.78	0.18	0.78
PM ⁽¹⁾	0.36	1.56	0.36	1.56	0.18	0.78	0.18	0.78
SO ₂	0.02	0.09	0.02	0.09	0.01	0.05	0.01	0.05
VOCs	2.24	9.83	2.24	9.83	1.12	4.92	1.12	4.92
Formaldehyde	0.27	1.19	0.27	1.19	0.14	0.60	0.14	0.60
CH ₄	n/a	245	n/a	245.00	n/a	123	n/a	123
N ₂ O	n/a	0.03	n/a	0.03	n/a	0.02	n/a	0.02
CO ₂	n/a	20,072	n/a	20,072	n/a	10,092	n/a	10,092
CO ₂ e	n/a	25,229	n/a	25,229	n/a	12,674	n/a	12,674

(1) Filterable + Condensable.

Table 2: GDU PTE (Per Unit)

Pollutant	Source	Hourly (lb/hr)	Annual (ton/yr)
VOC	GLYCalc Results ⁽¹⁾	2.25	9.87
Hexane	GLYCalc Results ⁽¹⁾	0.04	0.16
Benzene	GLYCalc Results ⁽¹⁾	0.09	0.41
Toluene	GLYCalc Results ⁽¹⁾	0.22	0.96
Ethyl-benzene	GLYCalc Results ⁽¹⁾	0.41	1.80
Xylene	GLYCalc Results ⁽¹⁾	0.35	1.53
Total HAPs	GLYCalc Results ⁽¹⁾	1.14	4.98
GHG (CO _{2e})	40 CFR 98	--	163.03

⁽¹⁾Glycalc Results with a control efficiency of 95% for the use of an enclosed vapor combustor.

Table 3: Vapor combustor PTE (Per Vapor combustor)

Pollutant	Source	Hourly (lb/hr)	Annual (ton/yr)
NO _x	AP-42	1.06	4.65
CO	AP-42	0.89	3.90
PM/PM ₁₀ /PM _{2.5} ¹	AP-42	0.08	0.35
SO _x	AP-42	0.01	0.03
GHG (CO _{2e})	40 CFR 98 Tables C-1 & C-2	--	6,150.77

(1) Filterable + Condensable.

Table 4: Reboiler PTE (Per Reboiler)

Pollutant	Source	Hourly (lb/hr)	Annual (ton/yr)
NO _x	AP-42	0.20	0.89
CO	AP-42	0.17	0.75
VOC	AP-42	0.01	0.05
PM/PM ₁₀ /PM _{2.5} ¹	AP-42	0.02	0.07
SO _x	AP-42	0.01	0.01
Total HAPs	AP-42	0.01	0.02
GHG (CO _{2e})	40 CFR 98 Tables C-1 & C-2	--	

(1) Filterable + Condensable.

Table 5: Microturbine Generator PTE (Per Generator)

Pollutant	Source	Hourly (lb/hr)	Annual (ton/yr)
NO _x	Manufacturer Data	0.03	0.13
CO	Manufacturer Data	0.08	0.36
VOC	Manufacturer Data	0.01	0.03
PM/PM ₁₀ /PM _{2.5} ¹	AP-42	0.01	0.02
SO _x	AP-42	0.01	0.01
Total HAPs	AP-42	0.01	0.01
CO ₂	Manufacturer Data	--	432.74
CH ₄	40 CFR 98	--	0.03
GHG (CO _{2e})	40 CFR 98 Tables C-1 & C-2	--	434.00

(1) Filterable + Condensable.

Table 6: Line Heater PTE

Pollutant	Source	Hourly (lb/hr)	Annual (ton/yr)
NO _x	AP-42	0.07	0.30
CO	AP-42	0.06	0.25
VOC	AP-42	0.01	0.02
PM/PM ₁₀ /PM _{2.5} ¹	AP-42	0.01	0.02
SO _x	AP-42	0.01	0.01
Total HAPs	AP-42	0.01	0.01
GHG (CO _{2e})	40 CFR 98	--	394.28

Table 7: Produced Fluids Tank PTE (Per Tank)

Pollutant	Source	Hourly (lb/hr)	Annual ² (ton/yr)
VOCs	CHEMCAD 6.5.2/TANKS4.0.6d ¹	0.15	0.64
Total HAPs	CHEMCAD 6.5.2/TANKS4.0.6d ¹	0.01	0.02

¹CHEMCAD for flashing emissions, TANKS for working and breathing losses.

²Based on 10,000 gallons of produced fluids per year (1,000 gallons of condensate/yr)

Table 8: Liquids Loading Losses

Pollutant	Source	Hourly ¹ (lb/hr)	Annual ¹ (ton/yr)
VOC	AP-42	1.00	0.01

¹Based on 20,000 gallons per year of total produced fluids and 10 hours per year of total loading time since no hourly emissions or loading time was given.

Table 9: Fugitives/Blowdown Emissions

Pollutant	Source	Hourly ¹ (lb/hr)	Annual ¹ (ton/yr)
VOC	EPA 453/R-95-017	2.00	8.74
HAPs	EPA 453/R-95-017	0.09	0.39
GHG (CO _{2e})	40 CFR 98	--	1,137.82

¹All emissions based on site specific gas analysis

Table 10: Facility-Wide Aggregate Hourly (lb/hr) Criteria Pollutant PTE Summary

Source	CO	NO _x	PM ⁽¹⁾	SO ₂	VOCs
CE-1	2.87	5.22	0.36	0.02	2.24
CE-2	2.87	5.22	0.36	0.02	2.24
CE-3	1.44	2.61	0.18	0.01	1.12
CE-4	1.44	2.61	0.18	0.01	1.12
Glycol Dehydration Unit #1	--	--	--	--	2.25
Glycol Dehydration Unit #2	--	--	--	--	2.25
Vapor combustor #1	0.89	1.06	0.08	0.01	--
Vapor combustor #2	0.89	1.06	0.08	0.01	2.04
Reboiler #1	0.17	0.20	0.02	0.01	0.01
Reboiler #2	0.17	0.20	0.02	0.01	0.01
Microturbine Gen. #1	0.08	0.03	0.01	0.01	0.01
Microturbine Gen. #2	0.08	0.03	0.01	0.01	0.01
Microturbine Gen. #3	0.08	0.03	0.01	0.01	0.01
Microturbine Gen. #4	0.08	0.03	0.01	0.01	0.01

Microturbine Gen. #5	0.08	0.03	0.01	0.01	0.01
Microturbine Gen. #6	0.08	0.03	0.01	0.01	0.01
Microturbine Gen. #7	0.08	0.03	0.01	0.01	0.01
Microturbine Gen. #8	0.08	0.03	0.01	0.01	0.01
Fuel Gas Heater	0.06	0.07	0.01	0.01	0.01
Produced Fluids Tank #1	--	--	--	--	0.15
Produced Fluids Tank #2	--	--	--	--	0.15
Liquids Loading	--	--	--	--	1.00
Fugitives	--	--	--	--	2.00
Facility-Wide Totals	11.44	18.49	1.37	0.19	16.67

Table 11: Facility-Wide Aggregate Annual (tpy) Criteria/GHG Pollutant PTE Summary

Source	CO	NO _x	PM ⁽¹⁾	SO ₂	VOCs	CO _{2e}
CE-1	12.57	22.86	1.56	0.09	9.83	25,229.00
CE-2	12.57	22.86	1.56	0.09	9.83	25,229.00
CE-3	6.29	11.44	0.78	0.05	4.92	12,674.00
CE-4	6.29	11.44	0.78	0.05	4.92	12,674.00
Glycol Dehydration Unit #1	--	--	--	--	9.87	163.03
Glycol Dehydration Unit #2	--	--	--	--	9.87	163.03
Vapor combustor #1	3.90	4.65	0.35	0.03	--	6,150.77
Vapor combustor #2	3.90	4.65	0.35	0.03	--	6,150.77
Reboiler #1	0.75	0.89	0.07	0.01	0.05	1,182.84
Reboiler #2	0.75	0.89	0.07	0.01	0.05	1,182.84
Microturbine Gen. #1	0.36	0.13	0.02	0.01	0.03	434.00
Microturbine Gen. #2	0.36	0.13	0.02	0.01	0.03	434.00
Microturbine Gen. #3	0.36	0.13	0.02	0.01	0.03	434.00
Microturbine Gen. #4	0.36	0.13	0.02	0.01	0.03	434.00
Microturbine Gen. #5	0.36	0.13	0.02	0.01	0.03	434.00
Microturbine Gen. #6	0.36	0.13	0.02	0.01	0.03	434.00

Microturbine Gen. #7	0.36	0.13	0.02	0.01	0.03	434.00
Microturbine Gen. #8	0.36	0.13	0.02	0.01	0.03	434.00
Fuel Gas Heater	0.25	0.30	0.02	0.01	0.02	394.28
Produced Fluids Tank #1	--	--	--	--	0.64	--
Produced Fluids Tank #2	--	--	--	--	0.64	--
Liquids Loading	--	--	--	--	0.01	--
Fugitives	--	--	--	--	8.74	1,137.82
Facility-Wide Totals	50.15	81.02	5.70	0.45	59.63	95,803.38

Table 12: Facility-Wide Aggregate Annual (ton/yr) HAP PTE Summary (HAPs >0.01 tpy)

Source	Benzen e	Toluene	Ethybenzene	Xylene	Hexane	224- TMP	Acetaldehyde	Acrolein	Biphenyl	Methanol	1122 TCE	C. Tetrachl.	Ethyl. Dibr.	Naphthal.	Formalde.
CE-1	0.07	0.06	0.01	0.03	0.17	0.04	1.30	0.80	0.03	0.39	0.01	0.01	0.01	0.01	1.19
CE-2	0.07	0.06	0.01	0.03	0.17	0.04	1.30	0.80	0.03	0.39	0.01	0.01	0.01	0.01	1.19
CE-3	0.03	0.03	--	0.01	0.09	0.02	0.65	0.40	0.02	0.20	--	--	--	0.01	0.60
CE-4	0.03	0.03	--	0.01	0.09	0.02	0.65	0.40	0.02	0.20	--	--	--	0.01	0.60
Glycol Dehy #1	0.41	0.96	1.80	1.53	0.16	0.11	--	--	--	--	--	--	--	--	--
Glycol Dehy #2	0.41	0.96	1.80	1.53	0.16	0.11	--	--	--	--	--	--	--	--	--
Reboiler #1	--	--	--	--	0.02	--	--	--	--	--	--	--	--	--	--
Reboiler #2	--	--	--	--	0.02	--	--	--	--	--	--	--	--	--	--
Fuel Gas Heater	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--
Prod. Fluids Tk #1	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--
Prod. Fluids Tk #2	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--
Fugitives	0.01	0.01	--	0.02	0.13	0.17	--	--	--	--	--	--	--	--	--
<i>Facility-Wide Total</i>	1.03	2.11	3.62	3.16	1.04	0.51	3.90	2.40	0.10	1.18	0.02	0.02	0.02	0.04	3.58
Total HAPs	22.73														

Fact Sheet R13-3095
EQT Gathering, LLC
Pandora Station

REGULATORY APPLICABILITY

The proposed Pandora Station is subject to the following substantive state and federal air quality rules and regulations: 45CSR2, 45CSR6, 45CSR13, 40 CFR 60 Subpart JJJJ, and 40 CFR 63, Subpart ZZZZ. Each applicable rule (and those that have questionable non-applicability) and EQT's compliance therewith will be discussed in detail below.

45CSR2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

Pursuant to the definition of “fuel burning unit” under 45CSR2 (“producing heat or power by indirect heat transfer”), 45CSR2 does not apply to the compressor engines or microturbines.

The GDU Reboilers have been determined to meet the definition of a “fuel burning unit” under 45CSR2 and are, therefore, subject to the applicable requirements therein. However, pursuant to the exemption given under §45-2-11, as the MDHI of each GDU Reboiler is less than 10 mmBtu/hr, the units are not subject to sections 4, 5, 6, 8 and 9 of 45CSR2. The only remaining substantive requirement is under Section 3.1 - Visible Emissions Standards.

Pursuant to 45CSR2, Section 3.1, the reboilers are subject to an opacity limit of 10%. Proper maintenance and operation of the reboiler (and the use of natural gas as fuel) should keep the opacity of the unit well below 10% during normal operations.

45CSR6: To Prevent and Control Particulate Air Pollution from Combustion of Refuse

EQT has proposed flaring for control of the waste gas produced from GDU. The vapor combustor meets the definition of an “incinerator” under 45CSR6 and is, therefore, subject to the requirements therein. The substantive requirements applicable to the vapor combustor are discussed below.

45CSR6 Emission Standards for Incinerators - Section 4.1

Section 4.1 limits PM emissions from incinerators to a value determined by the following formula:

$$\text{Emissions (lb/hr)} = F \times \text{Incinerator Capacity (tons/hr)}$$

Where, the factor, F, is as indicated in Table I below:

Table I: Factor, F, for Determining Maximum Allowable Particulate Emissions

<u>Incinerator Capacity</u>	<u>Factor F</u>
A. Less than 15,000 lbs/hr	5.43
B. 15,000 lbs/hr or greater	2.72

Based on information included in the application, the maximum vapor mass sent to each vapor combustor will be 415.25 lb/hr (p. 4 of glycalc report). Based on the above equation, the particulate matter limit of the vapor combustor is 1.13 lbs/hr. Particulate matter emissions from each vapor combustor are expected to be 0.08 pounds per hour.

45CSR6 Opacity Limits for - Section 4.3, 4.4

Pursuant to Section 4.3, and subject to the exemptions under 4.4, the vapor combustor has a 20% limit on opacity during operation. Proper design and operation of the vapor combustor should prevent any substantive opacity from the vapor combustors.

45CSR10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides (non-applicability)

Pursuant to the definition of “fuel burning unit” under 45CSR10 (“producing heat or power by indirect heat transfer”), the limitations on fuel burning units under 45CSR10 do not apply to the compressor engines or microturbines.

45CSR10 has requirements limiting SO₂ emissions from “fuel burning units,” limiting in-stack SO₂ concentrations of “manufacturing processes,” and limiting H₂S concentrations in process gas streams. The only potential applicability of 45CSR10 to the Pandora Station is the limitations on fuel burning units. The GDU Reboilers have been determined to meet the definition of a “fuel burning unit” under 45CSR10. However, pursuant to the exemption given under §45-10-10.1, as the MDHI of each of the GDU Reboilers are less than 10 mmBtu/hr, the unit is not subject to the limitations on fuel burning units under 45CSR10.

45CSR13: Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation

The proposed construction of the Pandora Station has a potential to emit in excess of six (6) lbs/hour and ten (10) TPY of a regulated pollutant and, therefore, pursuant to §45-13-2.24, the construction is defined as a “stationary source” under 45CSR13. Pursuant to §45-13-5.1, “[n]o person shall cause, suffer, allow or permit the construction . . . and operation of any stationary source to be commenced without . . . obtaining a permit to

construct.” Therefore, EQT is required to obtain a permit under 45CSR13 for the construction and operation of the facility.

As required under §45-13-8.3 (“Notice Level A”), EQT placed a Class I legal advertisement in a “newspaper of *general circulation* in the area where the source is . . . located.” The ad ran on June 6, 2013 in the *Herald Record* and the affidavit of publication for this legal advertisement was submitted on July 19, 2013.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration - (NON APPLICABILITY)

The Pandora Compressor Station is proposed to be located in Doddridge County, WV. Doddridge County is classified as "in attainment" with all National Ambient Air Quality Standards. Therefore, as the facility is not a "listed source" under §45-14-2.43, the individual major source applicability threshold for all pollutants is 250 TPY (and pursuant to 2.80(e)(1), 100,000 TPY of CO₂e). As given above in Table 11, the facility-wide PTE of the proposed Pandora Station is less than 250 TPY for all criteria pollutants and less than 100,000 TPY of CO₂e. Therefore, the facility is not defined as a "major stationary source" under either 45CSR14 and the rule does not apply.

45CSR27: To Prevent and Control the Emissions of Toxic Air Pollutants - (NON APPLICABILITY)

Pursuant to §45-27-3.1, the “owner or operator of a plant that discharges or may discharge a toxic air pollutant into the open air in excess of the amount shown in the Table A [of 45CSR27] shall employ [Best Available Technology] at all chemical processing units emitting the toxic air pollutant.” As shown in Table 12 above, the facility-wide PTE of formaldehyde is 3.58 TPY - greater than the 1,000 pound per year threshold given in Table A of 45CSR27. However, internal combustion engines do not meet the definition of “chemical processing units” under §45-27-2.4 and, therefore, they are not subject to BAT under 45CSR27.

45CSR30: Requirements for Operating Permits - (NON APPLICABILITY)

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The proposed Pandora Station does not meet the definition of a “major source under §112 of the Clean Air Act” as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b. The proposed facility-wide PTE of any regulated pollutant does not exceed 100 TPY (and, in the case of CO₂e, does not exceed 100,000 TPY). Additionally, the facility-wide PTE does not

exceed 10 TPY of any individual HAP or 25 TPY of aggregate HAPs.

However, as the facility is subject to two New Source Performance Standard (NSPS) - 40 CFR 60, Subpart JJJJ and Subpart OOOO - and two Maximum Achievable Control Technology (MACT) rules - 40 CFR 63, Subpart ZZZZ and 40 CFR 63, Subpart HH, the facility would, in most cases, be subject to Title V as a “deferred source.” However, pursuant to §60.4230(c), §60.5370(c), §63.6585(d), and §63.760(h) as a non-major “area source,” EQT is not required to obtain a Title V permit for the proposed facility. Therefore, the Pandora Station is not subject to 45CSR30.

Subpart Kb—Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 - (NON APPLICABILITY)

Pursuant to §60.110b, 40 CFR 60, Subpart Kb applies to “each storage vessel with a capacity greater than or equal to 75 cubic meters (m³) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984.” The storage tanks proposed for the Pandora Station are each 8,820 gallons, or 33.4 m³. Therefore, Subpart Kb does not apply to the storage tanks.

40 CFR 60 Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.

The Pandora station will consist of four (4) compressor engines. Two are Caterpillar 3616 LE engines and two are Caterpillar 3608 LE engines. The 3616 engines 4,735 hp while the 3608 engines are 2,370 hp. All four are defined under 40 CFR 60, Subpart JJJJ as stationary spark-ignition internal combustion engines (SI ICE) and are each, pursuant to §60.4230(a)(4)(i), subject to the applicable provisions of the rule. Pursuant to §60.4233(e): “Owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in Table 1 to this subpart for their stationary SI ICE.” Therefore, as the proposed EQT engines are greater than 100 HP, each engine must comply with the emission standards under Table 1 for “Non-Emergency SI ICE ≥ 500 hp manufactured after July 1, 2010:” NO_x - 1.0 g/HP-hr, CO - 2.0 g/HP-hr, and VOC - 0.7 g/HP-hr. The emission standards and the proposed compliance therewith of the engines are given in the following table:

Pollutant	Standard (g/HP-hr)	Uncontrolled Emissions (g/bhp)	Control Percentage ¹	Controlled Emissions (g/bhp)	JJJJ Compliant?
NO _x	1.0	0.50	0.00%	0.50	Yes
CO	2.0	2.75	90.00%	0.28	Yes
VOC	0.7	0.63	70.00%	0.19	Yes

¹Oxidation Catalyst

The Caterpillar 3616 LE and 3608 LE are not “certified” engines under Subpart JJJJ so EQT will have to show compliance with the emission standards pursuant to §60.4243(b)(2)(ii): conducting an initial performance test and thereafter conducting subsequent performance testing every 8,760 hours or 3 years, whichever comes first, to demonstrate compliance. Performance testing requirements are given under §60.4244 of Subpart JJJJ. EQT will additionally have to meet all applicable monitoring, recording, and record-keeping requirements under Subpart JJJJ.

40 CFR 60, Subpart OOOO: Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution

On April 27, 2012, the USEPA issued a final rule (Federal Register Date: August 16, 2012) that consists of federal air standards for natural gas wells that are hydraulically fractured, along with requirements for several other sources of pollution in the oil and gas industry that currently are not regulated at the federal level. Each potentially applicable section of Subpart OOOO is discussed below.

Compressor Engines

Pursuant to §60.5365(c), “[e]ach reciprocating compressor affected facility, which is a single reciprocating compressor located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment” that is constructed after August 23, 2011 is subject to the applicable provisions of Subpart OOOO. As the Pandora Station is located before the point of custody transfer, the compressor engines are applicable to Subpart OOOO. The substantive requirements for the engines are given under §60.5385(a): the engines’ “rod packing” must be replaced according to the given schedule and the engine must meet applicable MRR given under §60.5410(c), §60.5415(c), and §60.5420(b)(1).

Pneumatic Controllers

Pursuant to §60.5365(d)(2), “[f]or the natural gas production segment (between the wellhead and the point of custody transfer to the natural gas transmission and storage

segment and not including natural gas processing plants), each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh" that is constructed after August 23, 2011 is subject to the applicable provisions of Subpart OOOO. As the Pandora Station is located before the point of custody transfer, any pneumatic controllers that meet the above definition will be required to meet the substantive requirement for pneumatic controllers as given under §60.5390. However, EQT has stated that no pneumatic controllers will have a bleed rate in excess of 6 scfh.

Storage Tanks

Pursuant to §60.5365(e), for "[e]ach storage vessel affected facility, which is a single storage vessel, located in the oil and natural gas production segment, natural gas processing segment or natural gas transmission and storage segment" that is constructed after August 23, 2011 and, pursuant to §60.5395 has "VOC emissions equal to or greater than 6 tpy" must meet the control requirements under §60.5395 as of October 15, 2013. The substantive requirement is to "reduce VOC emissions by 95.0 percent or greater."

EQT has two storage tanks that have maximum uncontrolled emissions that, because of the low expected throughput (10,000 gal/year/tank) are less than 6 TPY. Therefore, the storage tanks are not subject to the control requirements of Subpart OOOO.

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

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart HH. Pursuant to §63.760(a)(3), as the Pandora Station - an area source of HAPs (see Table 12) - "process[es], upgrade[s], or store[s] natural gas prior to the point at which natural gas enters the natural gas transmission and storage source category or is delivered to a final end user," it is defined as an area source subject to the applicable provisions under Subpart HH.

Pursuant to §63.760(b)(2), each TEG GDU located at an area source that meets the requirements under §63.760(a)(3) is defined as an affected facility under Subpart HH. The requirements for affected sources at area sources are given under §63.764(d). However, for a GDU, exemptions to these requirements are given under §63.764(e): if (1) "actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters [3 mmscf/day] per day" or (2) "actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram [1 TPY] per year."

As shown in Table 12 above, the maximum PTE of benzene emissions from each GDU process vent is 0.41 TPY. Therefore, the GDUs are exempt from the Subpart HH requirements given under §63.764(d).

40 CFR 63 Subpart ZZZZ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart ZZZZ. As the Pandora Station is defined as an area source of HAPs (see Table 12), the facility is subject to applicable requirements of Subpart ZZZZ. Pursuant to §63.6590(c):

An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

§63.6590(c)(1) specifies that "[a] new or reconstructed stationary RICE located at an area source" is defined as a RICE that shows compliance with the requirements of Subpart ZZZZ by "meeting the requirements of . . . 40 CFR part 60 subpart JJJJ, for spark ignition engines." Pursuant to §63.6590(a)(2)(iii), a "stationary RICE located at an area source of HAP emissions is new if [the applicant] commenced construction of the stationary RICE on or after June 12, 2006." The engines proposed for the Pandora Station are each defined as a new stationary RICE and, therefore, will show compliance with Subpart ZZZZ by meeting the requirements of 40 CFR 60, Subpart JJJJ. Compliance with Subpart JJJJ is discussed above.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the Pandora natural gas gathering facility and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM), Particulate Matter less than 10 microns (PM₁₀), Particulate Matter less than 2.5 microns (PM_{2.5}), and Sulfur Dioxide (SO₂). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) standards promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs were discussed above under REGULATORY APPLICABILITY.

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. EQT included the HAPs listed in the following table as emitted in substantive amounts (at least 0.01 lb/hr or 0.01 tpy) in their emissions estimate. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

HAPs	Type	Known/Suspected Carcinogen	Classification
1,1,2,2-tetrachloroethane	VOC	Yes	Category C - Possible Human Carcinogen
2,2,4-trimethylpentane	VOC	No	Inadequate Data
Acetaldehyde	VOC	Yes	Category B2 - Probable Human Carcinogen
Acrolein	VOC	No	Inadequate Data
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Biphenyl	VOC	No	Category D - Not Classifiable as to Human Carcinogenicity
Carbon Tetrachloride	VOC	Yes	Category B2 - Probable Human Carcinogen
Ethylbenzene	VOC	No	Category D - Not Classifiable as to Human Carcinogenicity
Ethylene Dibromide	VOC	Yes	Category B2 - Probable Human Carcinogen
Formaldehyde	VOC	Yes	Category B1 - Probable Human Carcinogen
Methanol	VOC	No	Not Assessed
Naphthalene	VOC	Yes	Category C - Possible Human Carcinogen
n-Hexane	VOC	No	Inadequate Data
Toluene	VOC	No	Inadequate Data
Trimethylpentane	VOC	No	Inadequate Data
Xylene	VOC	No	Inadequate Data

AIR QUALITY IMPACT ANALYSIS

The estimated maximum emissions from the proposed Pandora natural gas gathering station are less than applicability thresholds that would define the proposed facility as a "major stationary source" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature of the proposed construction,

modeling was not required under 45CSR13, Section 7.

MONITORING OF OPERATIONS

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

The following substantive monitoring, compliance demonstration, and record-keeping requirements (MRR) shall be required:

- For the purposes of demonstrating compliance with the maximum wet gas throughput limit set forth in 4.1.4. of the permit, EQT shall be required to monitor daily, monthly and rolling twelve month records of the wet gas throughput of the Glycol Dehydration Unit.
- In order to demonstrate compliance with 4.1.5(a) of the permit, upon request of the Director, EQT shall be required to demonstrate compliance with the HAP emissions thresholds using GLYCalc Version 4.0 or higher. EQT shall be required to sample in accordance with GPA Method 2166 and analyze the samples utilizing the extended GPA Method 2286 as specified in the GRI-GLYCalc V4 Technical Reference User Manual and Handbook. For the purpose of demonstrating compliance with the requirements set forth in sections 4.1.7 and 4.2.3. of the permit, EQT shall be required to maintain records of testing conducted in accordance with 4.2.3. of the permit. If permittee is required by the Director to demonstrate compliance with section 4.2.3, then EQT shall be required to submit a testing protocol at least thirty (30) days prior to testing and shall submit a notification of the testing date at least fifteen (15) days prior to testing. EQT shall be required to submit the testing results within sixty (60) days of testing and provide all supporting calculations and testing data.
- For the purposes of demonstrating compliance with visible emissions limitations set forth in 4.1.6(d) and 4.1.7(d) of the permit, EQT shall be required to:
 - Conduct an initial Method 22 visual emission observation on the Reboiler exhaust and vapor combustor to determine the compliance with the visible emission provisions. EQT shall be required to take a minimum of two (2) hours of visual emissions observations on the units.
 - Conduct monthly Method 22 visible emission observations of the Reboiler exhaust and vapor combustor to ensure proper operation for a minimum of ten (10) minutes each month the units are in operation.
 - In the event visible emissions are observed in excess of the limitations given under 4.1.6(d) or 4.1.7(d) of the permit, EQT shall be required to take immediate

corrective action.

- Maintain records of the visible emission opacity tests conducted per Section 4.2.4. of the permit.
- Any deviation(s) from the allowable visible emission requirement for any emission source discovered during observations using 40CFR Part 60, Appendix A, Method 9 or 22 shall be reported in writing to the Director of the Division of Air Quality as soon as practicable, but in any case within ten (10) calendar days of the occurrence and shall include at least the following information: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any corrective measures taken or planned.
- Operation of the vapor combustor shall meet the following Monitoring, Compliance Demonstration and Source-Specific Recordkeeping Requirements:
 - EQT shall be required to maintain records of all startups, shutdowns, and/or malfunctions of the vapor combustor. These records shall include the date, time, and duration of each event.
 - EQT shall be required to maintain records of the date, time, and duration each time the permittee does not detect the presence of a pilot flame in the vapor combustor.
- For the purposes of demonstrating compliance with the truck loadout throughput limit set forth in 4.1.10(b) of the permit, EQT shall be required to monitor and maintain monthly and rolling twelve month records of the amount of liquids loaded out.
- EQT shall be required to meet all applicable Monitoring, Compliance Demonstration and Source-Specific Recordkeeping and Reporting Requirements as given under 45CS2, 45CSR6, 40 CFR 60, Subpart JJJJ, and Subpart OOOO, and 40 CFR 63, Subpart HH and Subpart ZZZZ.

PERFORMANCE TESTING OF OPERATIONS

The following substantive performance testing requirements shall be required:

- At such reasonable time(s) as the Secretary may designate, in accordance with the provisions of 3.3 of the permit, EQT shall be required to conduct or have conducted test(s) to determine compliance with the emission limitations established in this permit and/or applicable regulations.
- EQT shall be required to, pursuant to the timing and other requirements of 40 CFR 60, Subpart JJJJ, conduct, or have conducted, performance testing on the compressor

engines to determine the emission rates of CO, NOx, and VOCs. The testing shall, in addition to meeting all applicable requirements under 40 CFR 60, Subpart JJJJ, be in accordance with 3.3.1. Results of the this performance testing shall, unless granted in writing a waiver by the Director, be used to determine compliance with the CO, NOx, and VOC emission limits given under 4.1.2(c) of the permit.

- EQT shall be required to meet all applicable Performance Testing Requirements as given under 45CS2, 45CSR6, 40 CFR 60, Subpart JJJJ, and Subpart OOOO, and 40 CFR 63, Subpart HH and Subpart ZZZZ.

RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that permit R13-3095 for the construction of the Pandora Station near, West Union, Doddridge County, be granted to EQT Gathering, LLC.

Steven R. Pursley, PE
Engineer

September 11, 2013

Fact Sheet R13-3095
EQT Gathering, LLC
Pandora Station