



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.: G70-A107
Plant ID No.: 103-00096
Applicant: EQT Production Company
Facility Name: BIG-367
Location: Near Jacksonburg, Wetzel County
NAICS Code: 211111
Application Type: Construction
Received Date: October 31, 2015
Engineer Assigned: David Keatley
Fee Amount: \$4,000
Date Received: November 12, 2014
Complete Date: May 11, 2015
Due Date: June 25, 2015
Applicant Ad Date: November 5, 2015
Newspaper: *Wetzel Chronicle*
UTM's: Easting: 536.095 km Northing: 4,378.630 km Zone: 17
Description: Installation and operation of: thirteen (13) 1.00-mmBtu/hr line heaters, thirteen (13) 400-bbl produced liquid tanks, three (3) 11.66-mmBtu/hr combustors, two (2) 0.013-mmBtu/hr thermoelectric generators, one (1) 140-bbl sand blowdown tank, and one (1) 90-mmscf/day triethylene glycol (TEG) dehydration unit with associated 0.75 mmBtu/hr reboiler.

DESCRIPTION OF PROCESS

Raw natural gas from thirteen (13) natural gas wells will be sent to sand traps to help remove sediment. Liquids from these sand traps are blowdown to one (1) 140-bbl sand trap blowdown tank (S016). The natural gas from the sand traps are sent to thirteen (13) 1.0- mmBtu/hr line heaters (S001 - S013) to increase the temperature of the natural gas and encourage separation in the separators. The gas from the separators is sent to a 90 mmscf/day TEG dehydration unit (S040) with associated 0.75 mmBtu/hr reboiler (S041).

The TEG dehydration unit reduces the water content of the natural gas stream before the stream exits the facility. TEG will circulate countercurrent to the natural gas stream in the contactor. The dehydrated natural gas stream will exit the facility via pipeline. The rich TEG flows to a flash tank which will allow volatile organic to vaporize. The liquid from the flash tank will flow to the regenerator. The regenerator is heated by the reboiler to remove water from the rich TEG. The TEG can now be sent back to the contactor. Both the flash tank and the still vent will be controlled by one (1) 11.67 mmBtu/hr 48" LEED Fabrication combustor (C042). The liquid from the separators flows to thirteen (13) 400-bbl produced liquid tanks (S021 - S034). Working, breathing, flash, and truck loading losses from the produced liquid tanks will be controlled by two (2) 11.66-mmBtu/hr LEED Fabrication combustors (C017 and C018). Produced liquids will exit the facility via truck at a maximum rate of 13,140,000 gallons/year and will have vapor return during truck loading to a combustor (C017 or C018). The two (2) 0.013- mmBtu/hr thermoelectric generators (S019 and S020) are run to provide power to the facility.

SITE INSPECTION

James Robertson of DEP DAQ Compliance and Enforcement Section performed a site visit on November 13, 2015. The wellpad will be on a hill approximately 900 feet from the nearest residence. It seems the site will meet the G70-A siting criteria.

From the intersection of WV 2 and WV 7 (Wetzel County) turn onto WV7 east. Take WV 7 until WV 20. Turn onto WV 20 and travel east until 0.3 miles past Jacksonburg. Turn onto CR 76 (Richwood Run Rd.) Travel for approximately 1.9 miles, take slight left onto CR 15/2 (North Fork of Richwood Run). Travel on CR 15/2 for approximately 2.6 miles and turn right onto CR 74 (Sheep Run). Travel on CR 74 for approximately 0.6 miles and the site will be on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions from the line heaters (E001 through E013) and thermoelectric generators (E019 and E020) were estimated with AP-42 emission factors. Emissions from the produced liquids tanks and sand trap blowdown tank were estimated using ProMax with a 98% control efficiency. Truck Loading emissions were estimated using AP-42 with a 70% capture efficiency on the vapor return.

Table 1: Estimated Maximum Controlled PTE

Emission Point ID	Emission Unit ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
E001 through E013	S001 through S013	Line Heaters (Air Emissions from Each)	Nitrogen Oxides	0.08	0.35
			Carbon Monoxide	0.07	0.30
			Volatile Organic Compounds	<0.01	0.02
			PM	<0.01	0.03
			PM ₁₀	<0.01	0.03
			CO ₂ e	97	424
E019 and E020	S019 and S020	Thermoelectric Generators	CO ₂ e	2	6
E017	S021 - S034 S016 and S043	LEED 48" Combustor (Produced Liquid Tanks, Truck Loading, and Sand Tank) 11.66 mmBtu/hr	Nitrogen Oxides	1.15	5.02
			Carbon Monoxide	0.96	4.22
			Volatile Organic Compounds	0.06	0.28
			n-Hexane	<0.01	0.01
			Total Particulate Matter	0.09	0.38
			CO ₂ e	1,370	5,998
E018	S021 - S034 S016 and S043	LEED 48" Combustor (Produced Liquid Tanks, Truck Loading, and Sand Tank) 11.66 mmBtu/hr	Nitrogen Oxides	1.15	5.02
			Carbon Monoxide	0.96	4.22
			Volatile Organic Compounds	0.06	0.28
			n-Hexane	<0.01	0.01
			Total Particulate Matter	0.09	0.38
			CO ₂ e	1,370	5,998

E041	S041	Reboiler 0.75 mmBtu/hr	Nitrogen Oxides	0.06	0.26
			Carbon Dioxide	0.05	0.22
			PM ₁₀	<0.01	0.02
			CO _{2e}	73	318
E042	S040	Dehydrator Vents (Controlled by a Combustor)	Nitrogen Oxides	1.15	5.02
			Carbon Monoxide	0.96	4.22
			Volatile Organic Compounds	0.65	2.85
			Sulfur Dioxide	0.01	0.03
			Total Particulate Matter	0.09	0.38
			n-Hexane	0.02	0.08
			Benzene	<0.01	0.01
			Toluene	<0.01	0.02
			Xylenes	<0.01	0.01
			CO _{2e}	1,893	8,290
E043	S016	Tank Truck Loading	Volatile Organic Compounds	<0.01	0.01

Table 2: Summarized Estimated Maximum Controlled Regulated Facility Wide Air Emissions

Pollutant	Maximum Annual Facility Wide Emissions (tons/year)
Nitrogen Oxides	20.98
Carbon Monoxide	17.62
Volatile Organic Compounds	5.98
Total Particulate Matter	2.69
PM ₁₀	2.69
Sulfur Dioxide	0.13
Benzene	0.01
Toluene	0.02
Xylenes	0.01
n-Hexane	0.37
Total HAP Emissions	0.45
CO _{2e}	27,596

REGULATORY APPLICABILITY

The following rules and regulations apply to this facility:

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

The Line Heaters (S001 - S013) have been determined to meet the definition of a "fuel burning unit"s 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 the units are less than 10 mmBtu/hr, they 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 line heaters are subject to an opacity limit of 10%. Proper maintenance and operation of the units (and the use of natural gas as fuel) should keep the opacity of the units well below 10% during normal operations.

45CSR4: To Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors

This facility shall not cause the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public. 45CSR4 states that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly authorized representative of the Air Pollution Control Commission (Division of Air Quality), based upon their investigations and complaints, such odor is objectionable.

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

EQT has proposed an enclosed combustor for controlling the working/breathing/flashing emissions produced from the produced liquid tanks. 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

While particulate matter emissions from the combustor are expected to be nominal, for a conservative estimate, EQT calculated potential particulate matter emissions from the unit based on an emission factor taken from AP-42, Section 1.4. Using this emission factor, the hourly particulate matter emission rate from each of the three combustors is 0.09 lbs/hr. Based on information included in the application, the maximum capacity of the combustors is 245 lb/hr, which gives a factor of 5.43. Based on the above, the aggregate particulate matter limit of the combustor is 0.34 lbs/hr. Therefore, the combustor should demonstrate compliance with this standard.

45CSR6 Opacity Limits for - Section 4.3, 4.4

Pursuant to Section 4.3, and subject to the exemptions under 4.4, the combustor has a 20% limit on opacity during operation. As the primary constituent in the vapors combusted in the unit shall be clean burning methane/ethane, particulate matter emissions from the combustor are expected to be nominal. Therefore, the vapor combustor should easily meet this requirement.

45CSR10: To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides

45CSR10 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 3 (weight emission standard), 6 (registration), 7 (permits), and 8 (testing, monitoring, recordkeeping, reporting). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The individual heat input of all of the proposed fuel burning units (S001 through S013) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 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 uncontrolled VOC PTE exceeds the thresholds of 6 lb/hr and 10 tons/year and therefore this facility requires a permit.

45CSR16: *Standards of Performance for New Stationary Sources Pursuant to 40CFR60*

45CSR16 incorporates by reference the standards of performance for new stationary sources (40CFR60). This facility is subject to 40CFR60 subpart OOOO and therefore this facility is subject to 45CSR16.

45CSR22: Air Quality Management Fee Program

This facility is a minor source as can be seen in Table 2 and not subject to 45CSR30 since the regulations this facility is subject to are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71. This facility has a maximum horsepower capacity less than 1,000 hp and is a 9M source and is required to pay a \$200 annual fee. EQT is required to keep their Certificate to Operate current.

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 (published in the Federal Register on 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 were not regulated at the federal level. Final amendments to the rule were issued on September 23, 2013. Pursuant to §60.5365(a) each “gas well affected facility, which is a single natural gas well” that is constructed after August 23, 2011 is subject to the applicable provisions of Subpart OOOO as well as “[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.”

Gas Wells - §60.5370

EQT is proposing to drill gas wells at this facility and, therefore, these are defined as “affected facilities” under Subpart OOOO and subject to applicable provisions. The substantive requirements for gas wells drilled prior to January 1, 2015 are given under §60.5375(a)(3) of the rule. It requires that flowback emissions (gas produced from the well after fracturing) must be directed to the flow line or a completion combustion device. EQT shall direct all gas from wells during flowback at this facility into the flow line. Other requirements pertaining to the gas wells include:

- EQT must maintain a log for each well completion operation at each gas well affected facility. The log must be completed on a daily basis for the duration of the well completion operation and must contain the records specified in §60.5420(c)(1)(iii).
[40CFR§60.5375(b)]

- EQT must demonstrate initial compliance with the standards that apply to gas well affected facilities as required by §60.5410.
[40CFR§60.5375(c)]
- EQT must demonstrate continuous compliance with the standards that apply to gas well affected facilities as required by §60.5415.
[40CFR§60.5375(d)]
- EQT must perform the required notification, recordkeeping and reporting as required by §60.5420.
[40CFR§60.5375(e)]

Storage Tanks - §60.5395 - (non applicability)

Under §60.5395, the requirements for storage tanks take effect on October 15, 2013. The substantive requirement for storage tanks is given under §60.5395(a) of the rule. It requires that for each storage vessel “emitting more than 6 tpy VOC, [the permittee] must reduce VOC emissions by 95.0 percent of greater. . .” Based on a letter from USEPA to the American Petroleum Instituted dated September 28, 2012, applicability of storage vessels to Subpart OOOO is based on individual tank PTE - which includes federally enforceable control devices.

The eight (8) produced liquid tanks are each calculated to have a PTE (including controls) of less than 6 TPY of VOCs and, therefore, these storage tanks are not subject requirements under §60.5395.

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. The substantive requirements for pneumatic controllers are given under §60.5390. EQT has indicated in the application, that all subject pneumatic controllers will have a bleed rate of less than 6 scfh and will, therefore, be exempt from the requirements.

The following rules and regulations do not apply to the facility:

40CFR60 Subpart A §60.18 General Control Device and Work Practice Requirements

40CFR60 Subpart A §60.18 contains requirements for control devices when they are used to comply with applicable subparts of 40CFR60 and 40CFR61. The combustor that EQT has proposed is not used to comply with one of these regulations. The purpose of the combustor is to control emissions from the tanks that are routed to it and truck loading. In addition 40CFR60.18 refers to flares but makes no mention of enclosed combustion devices. Therefore, EQT is not subject to this regulation.

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

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 located at this facility are each 16,800 gallons, or about 64 m³. Therefore, Subpart Kb does not apply to the storage tanks due to the tank volume.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

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. Antero included the following HAPs as emitted in substantive amounts (0.01 tons/year) in their emissions estimate: Benzene, n-Hexane, Toluene, Ethylbenzene, and Xylenes. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Table 3: Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
n-Hexane	VOC	No	Inadequate Data
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Toluene	VOC	No	Inadequate Data
Xylenes	VOC	No	Inadequate Data

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health effects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission

rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals*. This facility is a minor source of HAPs as can be seen in Table 2. For a complete discussion of the known health effects of each compound refer to the IRIS database located at www.epa.gov/iris.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates compliance with all state and federal air quality requirements will be satisfied and this facility is expected to meet the requirements of General Permit G70-A. Therefore EQT's request to construct and operate their natural gas production facility BIG-367 is recommended to the Director of Air Quality.



David Keatley
Permit Writer - NSR Permitting

May 12, 2015

Date