west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	G70-A169
Plant ID No.:	017-00053
Applicant:	EQT Production Company (EQT)
Facility Name:	OXF-153
Location:	Doddridge County
NAICS Code:	211111
Application Type:	Modification
Received Date:	July 17, 2015
Engineer Assigned:	David Keatley
Fee Amount:	$1,500
Date Fee Received:	July 28, 2015
Complete Date:	January 11, 2016
Due Date:	February 25, 2016
Applicant Ad Date:	July 21, 2015
Newspaper:	*The Herald Record*
UTM's:	Easting: 515.7 km Northing: 4,337.9 km Zone: 17
Description:	Installation and operation of: ten (10) 400-bbl produce liquid tanks, one (1) 140-bbl sand separator tank, four (4) 1.54-mmBtu/hr line heaters, and one (1) 0.013-mmBtu/hr thermoelectric generator. Removal of fifteen (15) 210-bbl produced liquid tanks.

DESCRIPTION OF PROCESS

This facility is an existing natural gas production facility. Natural gas and produced liquid from five (5) natural gas wells will go to sand separator(s). The produced liquids and sand from the sand separator(s) will go to one (1) 140-bbl sand separator tank. The gas from the sand separator(s) will go to the six (6) 1.54-mmBtu/hr and one (1) 0.77-mmBtu/hr Line Heaters (S016-S018 and S032-S035) to heat the gas to encourage separation in a separator. The gas from the separator exits the facility via pipeline. The liquid from the separator is sent to ten (10) 400-bbl produced liquid tanks. The vapors from the produced

liquid tanks and sand separator tank will be controlled by a 11.66 mmBtu/hr enclosed combustor. Produced liquids will be trucked off site which vapor return. Three (3) 0.013-mmBtu/hr thermoelectric generators will provide electrical power for the facility.

SITE INSPECTION

James Robertson of DAQ's Compliance and Enforcement Section performed a site

visit on July 20, 2015 and the facility was not in operation at that time.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Line Heaters and TEGs: Potential emissions from the line heater and TEGs of all criteria pollutants and HAPs are calculated using U.S. EPA's AP-42 emission factors for natural gas combustion. These calculations are based on a site-specific heat content of natural gas of 1,050 Btu/scf and a maximum design heat input. Greenhouse gas emissions are calculated according to 40 CFR 98 Subpart C.

Storage Tanks: Emissions of VOC and HAPs from the condensate/water stored in the tanks at the facility are calculated using EPA TANKS Version 4.0.9d. Emissions for VOC and HAPs from flashing of the liquids in the storage tanks are calculated using E&P Tanks based on the Peng-Robinson equation of state.

Fugitive Equipment Leaks: Emission of VOC and HAPs from leaking equipment components have been estimated using facility estimated component counts and types along with Table 2-4: Oil & Gas Production Operations Average Emission Factors,

Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995. Emission factors used are based on average measured total organic carbon (TOC) from component types indicated in gas service at O&G Production operations. Greenhouse gas emission from component leaks are calculated according to the procedures in 40 CFR 98 Subpart W.

Tank Truck Loadings: Emissions of VOC and HAPs from the loading of organic liquids from storage tanks to tank truck are calculated using U.S. EPA's AP-42 Chapter 5 Section 2 factors.

Haul Roads: Fugitive dust emitted from facility roadways has been estimated using projected vehicle miles traveled along with U.S. EPA's AP-42 factors for unpaved haul roads.

Table 1: Estimated New/Modified Maximum Controlled PTE

Emission Point ID	Emission Unit ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
E032-E035	S032-S035	Line Heaters 1.54 mmBtu/hr (Air Emissions from Each)	Nitrogen Oxides	0.13	0.55
			Carbon Monoxide	0.11	0.46
			Volatile Organic Compounds	0.01	0.04
			PM	0.01	0.04
			PM_{10}	0.01	0.04
			CO_2e	180	789
E036	S036	Thermoelectric Generator	CO_2e	2	7

C001	S021-S030, S037, and C001 S031 (optional, emissions included)	LEED 48" Enclosed Combustor (Controlling: Produced Liquid Tanks, Sand Tank, and Truck Loading) 11.66 mmBtu/hr	Nitrogen Oxides	0.95	4.18
			Carbon Monoxide	0.80	3.51
			Total Particulate Matter	0.07	0.32
			Sulfur Dioxide	0.01	0.03
			Volatile Organic Compounds	11.48	50.25
			Benzene	<0.01	0.02
			Toluene	<0.01	0.03
			Xylenes	<0.01	0.01
			n-Hexane	0.13	0.57
			CO_2e	1,436	6,291
E037	S037	Tank Truck Loading (uncaptured)	Volatile Organic Compounds	0.15	0.66
			n-hexane	<0.01	0.02
E031	S031	Sand Separator Tank (Emissions when not Controlled)	Volatile Organic Compounds	0.14	0.63
			n-hexane	<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	7.77
Carbon Monoxide	6.52
Volatile Organic Compounds	68.46
Total Particulate Matter	34.41
PM_{10}	9.21
Sulfur Dioxide	0.05
Benzene	0.03
Toluene	0.05
Xylenes	0.02
n-Hexane	0.90
Total HAP Emissions	1.18
CO_2e	12,520

REGULATORY APPLICABILITY

The following rules and regulations apply to the facility.

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

This rules establishes emission limitations for smoke and particulate matter which are discharged from fuel burning units. Per §45-2-11, any fuel burning unit(s) having a heat input under ten (10) million Btu/hr will be exempt from sections 4, 5, 6, 8 and 9. The facility is proposing to install four (4) line heaters rated at 1.54 MMBtu/hr, one (1) thermoelectric generator rated at 0.013 MMBtu/hr. The fuel buring units will be subject to the opacity requirements set forth in section §45-2-3 of this rule.

The facility will demonstrate compliance with this rule by conducting monthly visible emission checks in accordance with 40 CFR 60, Appendix A, Method 9 at the request of the Director.

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 rule is designed to prevent and control the discharge of 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 Control of Air Pollution from Combustion of Refuse

This rule establishes emission standards for particulate matter and requirements for particulate matter and requirements for activities involving incineration of refuse which are not subject to, or are exempted from regulation under a federal counterpart for specific combustion sources. This rule also prohibits open burning and sets forth the registration, permitting, reporting, testing, emergency, natural disaster and exemption provisions for activities involving the combustion of refuse and land clearing debris.

The facility has proposed a vapor combustor for controlling the working/breathing/flashing emissions from the condensate/produced water storage tanks. The vapor combustor must meet the requirements for the emission standards set forth in

section 4.1 of this rule, were the allowable particulate matter emission rate to be discharged is determined below.

Emissions (lb/hr) = F x 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.

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

Emissions to the incinerator are 720 lbs/hr.

Emissions (lb/hr) = 5.43 x 0.36 tons/hr = 1.96 lb/hr

The hourly particulate matter emission rate from the combustor are 0.07 lb/hr. The facility's proposed enclosed combustor will meet the emission requirements of this rule. The facility will demonstrate compliance by maintaining and operating the combustor properly.

The enclosed combustor must meet the visible emissions requirements of this rule, which limits the combustor to 20% opacity during operation per section 4.3 of this rule. Since particulate matter is estimated to be emitted at 0.07 lb/hr, the enclosed combustor should meet the requirements of this section. The permittee will be required to operate the enclosed combustor according to manufacturer specifications in order to maintain a smokeless operation. The permittee will also be required to conduct a Method 22 opacity check upon startup of the enclosed combustor and Method 9 opacity checks upon request of the Director.

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

The primary purpose of this rule is to prevent and control air pollution from the emission 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 (S032 through S036) 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, Permission to Commence Construction, and Procedures for Evaluation

The purpose of this rule is to set forth the procedures for stationary source reporting, and the criteria for obtaining a permit to construct and operate a new stationary source which is not a major stationary source, to modify a non-major stationary source, to make modifications which are not major modifications to an existing major stationary source, to relocate non-major stationary sources within the state of West Virginia, and to set forth procedures to allow facilities to commence construction in advance of permit issuance. Such construction, modification, relocation and operation without a required permit is a violation of this rule. This rule also establishes the requirements for obtaining an administrative update to an existing permit, a temporary permit or a general permit registration, and for filing notifications and maintaining records of changes not otherwise subject to the permit requirements of this rule. This rule does not apply to nonroad engines, nonroad vehicles, motor vehicles, or other emission sources regulated under Subchapter II of the federal Clean Air Act; provided, however that the Secretary may regulate such sources pursuant to another rule promulgated for that purpose.

The facility has the potential to emit greater than 6 pph and 10 tpy of any regulated air pollutant. The facility is subject NSR permitting requirements. The applicant has filed a permit application with the agency and published a public notice in the local paper per the requirements of §45-13-8.3. The agency will publish a Class I Legal Advertisement per the notice level requirements of §45-13-8.4.

45CSR22 Air Quality Management Fee Program

This rule establishes a program to collect fees for certificates to operate and for permits to construct, modify or relocate sources of air pollution. Funds collected from these fees will be used to supplement the Director's budget for the purpose of maintaining an effective air quality management 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 is not a natural gas compressor station and is a 9M source and is required to pay a $200 annual fee. EQT is required to keep their Certificate to Operate current.

The following regulations do not apply:

40 CFR 60 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

The affected facility to which this subpart applies is each storage vessel with a capacity greater than or equal to 75 cubic meters (19,813 gallons) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984.

The facility has installed ten (10) 400-bbl (16,800 gallons each) condensate storage tanks. The condensate is considered a VOC. Since the capacity is below the volume specified in the regulation, this subpart doesn't apply.

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 enclosed combustors that EQT has proposed/modified are not used to comply with one of these regulations. The purpose of the enclosed 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 subpart.

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

This subpart applies to the applicable provisions of this subpart if you are the owner or operator of one or more of the onshore affected facilities listed in paragraphs (a) through (g) of this section for which you commence construction, modification or reconstruction after August 23, 2011.

(a) Each gas well affected facility, which is a single natural gas well.

The pad consists of 5 natural gas wells. The wells were constructed in April 2011. This is before the August 23, 2011 applicability date. Therefore, the gas wells are not subject to this section of this subpart. The facility is aware that if another well is drilled, they will be subject to the requirements of this rule.

(b)

(1) For the oil production segment (between the wellhead and the point of custody transfer to an oil pipeline), 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.

(2) For 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.

(3) For natural gas processing plants, each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller.

The pneumatic controllers at this facility were ordered and installed after August 23, 2011, however none of the pneumatic controllers are single continuous bleed natural gas driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh. Therefore, this section of this subpart doesn't apply.

(c) Each 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.
40CFR60 Subpart OOOO defines a storage vessel as a unit that is constructed primarily of nonearthen materials (such as wood, concrete, steel, fiberglass, or plastic) which provides structural support and is designed to contain an accumulation of liquids or other materials. The following are not considered storage vessels:

- *Vessels that are skid-mounted or permanently attached to something that is mobile (such as trucks, railcars, barges or ships), and are intended to be located at a site for less than 180 consecutive days. If the source does not keep or are not able to produce records, as required by §60.5420(c)(5)(iv), showing that the vessel has been located at a site for less than 180 consecutive days, the vessel described herein is considered to be a storage vessel since the original vessel was first located at the site.*

- *Process vessels such as surge control vessels, bottoms receivers or knockout vessels.*
- *Pressure vessels designed to operate in excess of 204.9 kilpascals and without emissions to the atmosphere.*

This rule requires that the permittee determine the VOC emission rate for each storage vessel affected facility utilizing a generally accepted model or calculation methodology within 30 days of startup, and minimize emissions to the extent practicable during the 30 day period using good engineering practices. For each storage vessel affected facility that emits more than 6 tpy of VOC, the permittee must reduce VOC emissions by 95% or greater within 60 days of startup. The compliance date for applicable storage vessels is October 15, 2013.

EQT proposes installing ten (10) 400-bbl condensate storage vessels at the wellpad. All the storage vessels emissions are captured and controlled by an enclosed combustor with a 95% waste gas destruction efficiency. Since the facility installed a federally enforceable control, the facility is not subject to this section of this subpart.

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, 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 affects 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 this 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 modify and operate their natural gas production facility OXF-153 is recommended to the Director of Air Quality.

David Keatley
Permit Writer - NSR Permitting

January 12, 2015
Date