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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3049
Plant ID No.:	017-00050
Applicant:	EQT Production Company
Facility Name:	WEU2
Location:	Doddridge County
NAICS Code:	211111
Application Type:	After-The-Fact Construction
Received Date:	February 13, 2013
Engineer Assigned:	Jill Harris
Fee Amount:	$2,000.00
Date Received:	March 18, 2013
Complete Date:	September 13, 2013
Due Date:	December 12, 2013
Applicant Ad Date:	February 19, 2013
Newspaper:	*The Herald Record*
UTM's:	Easting: 519.7 km Northing: 4,347.0 km Zone: 17
Description:	After-the-fact construction permit application for a well pad that consists of seven (7) natural gas wells, three (3) 210 bbl condensate/water storage tanks per well (total 21 tanks for the pad), one (1) 1.0 MMBtu/hr line heater, one (1) 0.75 MMBtu/hr line heater, five (5) 0.50 MMBtu/hr line heater, two (2) thermoelectric generator (TEG), one (1) vapor combuster.

DESCRIPTION OF PROCESS

The project involves the operation of support facilities associated with a natural gas production wellpad operation. The wellpad consist of multiple wells, each with the same basic operation. The WEU2 wellpad will consist of seven wells. The incoming gas stream from the underground well will pass through a separator. The liquid condensate in the separator will be transferred to a storage vessel. Emissions from the storage vessels are

controlled by a single enclosed combustor. Once the tanks are filled, the contents are loaded into trucks for transport. Heat and electricity is provided by a line heater and a thermoelectric generator (TEG), respectively.

SITE INSPECTION

On February 21, 2013, David Keatley, from DAQ's Permitting Section, conducted a site inspection of the facility. The inspector did not identify any houses near the site. However, Doddridge High School is located approximately one (1) mile from the facility. The facilities were operational at the time of the site visits.

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 a chemical simulation software (ChemCAD Version 6.4.2) 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.

Criteria Pollutant	Storage Tanks (tpy)	Line Heaters (tpy)	TEG (tpy)	Fugitive Components (tpy)	Liquid Loading (tpy)	Haul Roads (tpy)	Total Emissions (tpy)
NOx	4.86	2.727	1.08E-02	--	--	--	7.60
CO	4.09	2.291	9.08E-03	--	--	--	6.39
PM Total	0.37	0.207	8.22E-04	--	--	1.23	1.81
PM_{10} Total	0.37	0.207	8.22E-04	--	--	0.31	0.89
$PM_{2.5}$ Total	0.37	0.207	8.22E-04	--	--	0.03	0.61
SO_2	0.03	0.016	6.49E-05	--	--	--	0.05
VOCs	16.03	0.150	5.95E-04	5.35	1.74	--	23.27
CO_2e	6,027.92	3,351.38	13.28	618.23	0.00	--	10,010.82
Benzene	0.01	0.00	0.00	0.09	0.00	--	1.01E-01
n-Hexane	0.58	0.00	0.00	0.11	0.05	--	7.88E-01
Toluene	0.02	0.00	0.00	0.01	0.00	--	2.42E-02
Xylene	0.01	0.00	--	0.00	0.00	--	1.18E-02
Total HAPs	0.62	5.15E-02	2.04E-04	0.25	0.05	--	0.98

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 one (1) 1.0 MMBtu/hr heater, one (1) 0.75 MMBtu/hr heater, five (5) 0.5 MMBtu/hr heaters and two (2) thermoelectric generators. The heaters 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.

No person shall be considered in violation of this rule unless notified that he is discharging an air pollutant or air pollutants which causes or contributes to an objectionable odor.

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

VOC emissions to the incinerator are 500 lbs/hr.

Emissions (lb/hr) = 5.43 x 0.25 tons/hr = 1.36 lb/hr

The hourly particulate matter emission rate from the combustor are 0.37 lb/hr. The facility's proposed combustor will meet the emission requirements of this rule. The facility will demonstrate compliance by maintaining and operating the combustor properly.

The vapor 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 expected to be emitted at a negligible rate, the vapor combustor should meet the requirements of this section. The permittee will be required to operate the vapor 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 vapor combustor and Method 9 opacity checks upon request of the Director.

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.

The facility will be required to maintain their Certificate to Operate (CTO) annually.

The following rules and regulations do not apply.

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

The purpose of this rule is to prevent and control air pollution from the emission of sulfur oxides. Per §45-10-10, any fuel burning units having a design heat input under ten (10) million Btu/hr will be exempt from section 3 and 6 - 8. Section 5 of this rule is for the combustion of refinery or process gas streams. The stream combusted is a waste gas stream comprised mainly of VOCs. The fuel burning units at the site are not subject to the requirements under this rule.

45CSR14 Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration

The facility-wide potential-to-emit is below the levels that would define the proposed source as a major source per the definition in this rule.

<u>Potential Source Aggregation</u>

Classifying multiple facilities as one “stationary source” under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of "Building, structure,

facility, or installation" as given in §45-14-2.13 and §45-19-2.12. The definition states:

> “Building, Structure, Facility, or Installation” means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same “Major Group” (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

"Contiguous or Adjacent" determinations are made on a case by case basis. These determinations are proximity-based, and it is important to focus on this and whether or not it meets the common sense notion of one stationary source. The terms "contiguous" or "adjacent" are not defined by USEPA. Contiguous has a dictionary definition of being in actual contact; touching along a boundary or at a point. Adjacent has a dictionary definition of not distant; nearby; having a common endpoint or border.

There are no Marcellus facilities within a quarter-mile radius of the WEU2 pad. The WEU1 pad owned and operated by EQT is located approximately 0.5 miles. They are no considered to be contiguous or adjacent. Therefore, the emissions from the WEU1 well pad will not be aggregated with another well pad.

45CSR19 Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution Which Cause or Contribute to Nonattainment

It is the intent of the Secretary that all applications filed by any person to construct major new or modified stationary air pollution sources, intending to locate in areas with air quality worse than the levels set to protect the public health and welfare, or that might impact those areas, must adequately meet the preconstruction review procedures and conditions of the Clean Air Act as amended and this rule.

These conditions are designed to ensure that the major new or modified source's emissions will be controlled to the greatest degree practicable; that more than equivalent offsetting emission reductions will be obtained from existing sources; that there will be progress toward achievement of the National Ambient Air Quality Standards; and that all applicable air pollution regulations adopted by the Secretary will be met.

The facility is not defined as a major source per section 2.35 and in not proposing to locate in a nonattainment area. Doddridge County is considered an attainment area. Attainment is a designation of an area that meets the National Ambient Air Quality Standards. National Ambient Air Quality Standards are set by EPA to protect human health and welfare.

Pollutant	PSD (45CSR14) Threshold (tpy)	NANSR (45CSR19) Threshold (tpy)	WEU2 Pad (tpy)	45CSR14 or 45CSR19 Review Required
Carbon Monoxide	250	N/A (attainment)	6.39	No
Nitrogen Oxides	250	N/A (attainment)	7.60	No
Sulfur Dioxides	250	N/A (attainment)	0.05	No
Particulate Matter2.5	250	N/A (attainment)	0.61	No
Ozone (VOC)	250	N/A (attainment)	23.27	No
Greenhouse Gas (CO2e)	100,000	N/A (attainment)	10,010.82	No

45CSR30 Requirements for Operating Permits

This rule provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. All fees collected pursuant to this rule shall be expended solely to cover all reasonable direct and indirect costs required to administer the Title V operating permit program and accounted for in accordance with this rule.

The facility is not defined as a major stationary source per section 2.26 of this rule. Therefore, EQT Production Company is not subject to 45CSR30.

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 twenty-one (21) 210 bbl (8,820 gallons) condensate storage tanks. The condensate is considered a VOC. Since the capacity is below the volume specified in the regulation, this regulation doesn't apply.

40 CFR 60 Subpart KKK Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984, and on or Before August 23, 2011

The provisions of this subpart apply to affected facilities in onshore natural gas processing plants. A natural gas processing plant means any processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both.

The facility is not a natural gas processing plant as defined by this rule. Therefore, the requirements of this rule do not apply.

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

The facility is considered an area source that processes, upgrades, and stores hydrocarbon liquids, per section §63.760(a)(2). Affected sources for area sources are defined in section §63.760(b)(2), which includes each triethylene glycol (TEG) dehydration unit located at the facility that meets the criteria specified in section §63.760(a). Section §63.760(d) states that owners and operators of a facility that does not contain an affected source as specified in §63.760(b) are not subject to the requirements of this subpart.

The facility is defined as an area source, but is not proposing to construct a triethylene glycol (TEG) dehydration unit at the site. Since the facility is not proposing an affected source, the facility is not subject to the requirements of this subpart.

40CFR60.18 General Control Device and Work Practice Requirements

The requirements apply only to flares that are required for compliance to an NSPS Standard. Enclosed combustion devices do not meet the definition of a flare, as defined in this subpart. The facility is installing an enclosed vapor combustor unit. Therefore, the facility is not subject to the requirements of 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 gas wells were constructed in May 2011. This is before the August 23, 2011 applicability date set forth in this subpart. Therefore, the facility is not subject to the requirements of this subpart.

(b) Each centrifugal compressor affected facility, which is a single centrifugal compressor using wet seals that is located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. A centrifugal compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

There are no centrifugal compressor onsite. Therefore, this subpart doesn't apply.

(c) Each 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. A reciprocating compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

There are no reciprocating compressors onsite. Therefore, this subpart doesn't apply.

(d)

(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.

There are no pneumatic controllers onsite. Therefore, this subpart doesn't apply.

(e) 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.

There are currently twenty one (21) condensate storage vessels at the wellpad. It is stated in the application that all the storage vessels were constructed prior to August 23, 2011. In addition, all the storage vessels emissions are captured and controlled by a vapor combustor with a 95% waste gas destruction efficiency.

(f) The group of all equipment, except compressors, within a process unit is an affected facility.

(1) Addition or replacement of equipment for the purpose of process improvement that is accomplished without a capital expenditure shall not by itself be considered a modification under this subpart.

(2) Equipment associated with a compressor station, dehydration unit, sweetening unit, underground storage vessel, field gas gathering system, or liquefied natural gas unit is covered by §§ 60.5400, 60.5401, 60.5402, 60.5421, and 60.5422 of this subpart if it is located at an onshore natural gas processing plant. Equipment not located at the onshore natural gas processing plant site is exempt from the provisions of §§ 60.5400, 60.5401, 60.5402, 60.5421, and 60.5422 of this subpart.

(3) The equipment within a process unit of an affected facility located at onshore natural gas processing plants and described in paragraph (f) of this section are exempt from this subpart if they are subject to and controlled according to subparts VVa, GGG or GGGa of this part.

The proposed facility is not a natural gas processing plant that was modified after August 23, 2011. A natural gas processing plant is

defined as any processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both. Therefore, Leak Detection and Repair (LDAR) requirements for onshore natural gas processing plants would not apply to the proposed site.

(g) Sweetening units located at onshore natural gas processing plants that process natural gas produced from either onshore or offshore wells.

(1) Each sweetening unit that processes natural gas is an affected facility; and

(2) Each sweetening unit that processes natural gas followed by a sulfur recovery unit is an affected facility.

(3) Facilities that have a design capacity less than 2 long tons per day (LT/D) of hydrogen sulfide (H2 S) in the acid gas (expressed as sulfur) are required to comply with recordkeeping and reporting requirements specified in § 60.5423(c) but are not required to comply with §§ 60.5405 through 60.5407 and §§ 60.5410(g) and 60.5415(g) of this subpart.

(4) Sweetening facilities producing acid gas that is completely reinjected into oil-or-gas-bearing geologic strata or that is otherwise not released to the atmosphere are not subject to §§ 60.5405 through 60.5407, 60.5410(g), 60.5415(g), and 60.5423 of this subpart.

The facility doesn't propose to install any sweetening facilities at the site. Sweetening unit is defined as a process device that removes hydrogen sulfide and/or carbon dioxide from the sour natural gas stream. Therefore, this section of the rule doesn't apply to the facility.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There will be small amounts of various non-criteria regulated pollutants emitted from the combustion of natural gas. However, due to the concentrations emitted, detailed toxicological information is not included in this evaluation.

AIR QUALITY IMPACT ANALYSIS

Modeling was not required of this source due to the fact that the facility is not subject to 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants) as seen in the table listed in the Regulatory Discussion Section.

MONITORING OF OPERATIONS

- Maintain constant pilot flame in the vapor combustor (C001). Monitor using a thermocouple or equivalent device.
- Monthly throughput of gas (waste from storage tanks and auxiliary gas) to the vapor combustor (C001).
- Visible emission checks of the vapor combustor per Method 22 upon startup. Method 9 checks at the request of the Director. (C001).
- Method 9 checks of the Line Heaters and Thermoelectric Generators (S022-S030) at the request of the Director.
- Monthly and yearly throughput of the amount of natural gas consumed in the natural gas Line Heaters and Thermoelectric Generators (S022-S030).
- Monthly and yearly throughput of condensate and produced water loaded in the truck loading operations.
- Monthly and yearly condensate production.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates EQT Production Company meets all applicable requirements. Therefore, it is recommended that the Doddridge County location should be granted a 45CSR13 “after-the-fact” construction permit for their facility.

Jill Harris
Permit Writer

September 16, 2013