



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-3123
Plant ID No.: 103-00072
Applicant: EQT Production Company
Facility Name: Big 192
Location: Wetzel County
NAICS Code: 211111
Application Type: Construction
Received Date: September 19, 2013
Engineer Assigned: Roy F. Kees, PE
Fee Amount: \$2,000.00
Date Received: September 23, 2013
Complete Date: November 4, 2013
Due Date: February 4, 2013
Applicant Ad Date: October 30, 2013
Newspaper: *The Wetzel Chronicle*
UTM's: Easting: 535.800 km Northing: 4375.400 km Zone: 17
Description: Application for a well pad located in Wetzel County consisting of twelve (12) condensate tanks, eleven (11) line heaters and two (2) thermoelectric generators.

DESCRIPTION OF PROCESS

EQT Production Company (EQT) has submitted a permit application for the construction and operation of a natural gas production facility primarily consisting of eleven (11) 1.54 mmBtu/hr natural gas-fired line heaters (S013-S023), twelve (12) 400 bbl condensate storage tanks (S001 through S012), and two (2) 0.03 mmBtu/hr natural gas-fired thermoelectric generators (S024-S025). Truck loading of condensate will also take place at the site. The facility plans began operation in December 2013. The well pad consists of twelve (12) wells, each with the same basic operation.

When in production, raw gas from the wells pass through a separator where the condensate is removed from the gas and sent to one of fifteen storage tanks. Gas passing

through the separator will be sent to pipeline for transportation. The line heater shall be used to keep the lines at the facility from freezing and to promote gas/liquids flow.

From the storage tanks, condensate is loaded into trucks for removal from the site. Emissions from the truck loading are uncontrolled but the permit will require mitigation by using pipe racks and submerged fill methods. The thermoelectric generators are used to provide small amounts of electricity for switching/monitoring purposes when the facility is unable to generate sufficient solar power.

SITE INSPECTION

A site inspection of the proposed facility was conducted by Doug Hammell of the enforcement section on October 9, 2013. The site is appropriate for the proposed facility. Closest residence and bldg. are ~2800 ft away NNW, well rig ops are still in progress no perm tanks installed yet.

NORTH ON I-79 TO EXIT 119 AND MAKE LEFT ONTO US-50. TRAVEL +/-5.8 MILES AND TURN RIGHT ONTO CR-9 (WILSONBURG RD.) TRAVEL +/-0.3 MILES AND MAKE RIGHT STAYING ON CR-9. TRAVEL +/-0.7 MILES AND TURN RIGHT STAYING ON CR-9 (GREGORY RUN) AND CONTINUE +/-5.8 MILES. TURN LEFT ON WV-20 AND CONTINUE +/-23 MILES. TURN RIGHT ONTO CR-76 (RICHWOOD RUN RD). TRAVEL +/-1.9 MILES AND STAY RIGHT ON CR-76 (RICHWOOD RUN RD). CONTINUE +/-1.6 MILES AND YOU WILL ARRIVE AT THE ACCESS ROAD FOR THE BIG192.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

EQT included in Attachment N of the permit application air emissions calculations for the equipment at the Big 192 natural gas production facility. The following will summarize the calculation methodologies used by EQT to calculate the potential-to-emit (PTE) of the proposed equipment.

Gas-Fired Line Heaters/Thermoelectric Generators

Criteria Pollutant emissions from the natural gas-fired line heaters (S013-S023) and the thermoelectric generators (S024-S025) were based on the emission factors provided for natural gas combustion as given in AP-42 (AP-42 is a database of emission factors maintained by USEPA) Section 1.4. Emissions of Greenhouse Gases (GHGs) were based on Tables C-1 and C-2 of 40 CFR 98 - Federal GHG Reporting Rule.

Hourly emissions were based on the maximum design heat input (MDHI) of each unit and annual emissions were based on an annual operation of 8,760 hours. A heat content of the gas of 1,050 Btu/scf was used in the calculations.

Storage Tanks

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Working and breathing emissions from the twelve (12) 400 bbl condensate storage tanks were based on the TANKS 4.09d program as provided under AP-42, Section 7. Flashing emissions were calculated using ChemCad 6.5.0. Input and summary sheets for TANKS and ChemCAD were included in the permit application. An aggregate annual throughput of 8,406,720 gallons of condensate was used in the calculations for the storage tanks. These numbers are based on maximum historic data.

Truck Loading

Air emissions from condensate truck loading operations occur as fugitive emissions generated by displacement of vapors when loading trucks. The emission factor used to generate the VOC emissions is based on AP-42 Table 5.2-1. The equation used to generate the VOC emissions is based on AP-42 Table 5.2-1 with submerged fill loading (which the permit will require). Additionally, worst-case annual emissions were based on a maximum loading rate of 5,604,480 gal/year of condensate. As no maximum hourly pumping rate was provided, hourly emissions were based on 1,000 hours of loading per year.

Emissions Summary

Based on the above estimation methodology, which is determined to be appropriate, the PTE of the Big 192 natural gas production facility is given in the following table:

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
S001-S012	(12) 400 bbl Condensate Tanks with Vapor Combustor	Nitrogen Oxides	1.11	4.86
		Carbon Monoxide	0.93	4.09
		Volatile Organic Compounds	8.24	36.08
		Sulfur Dioxide	<0.01	0.03
		Particulate Matter -10	0.08	0.37
		Total HAPs	0.38	1.65
		CO _e	1,407.50	6,164.90
S013	Line Heater 1.54 MMBtu/hr	Nitrogen Oxides	0.15	0.64
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	<0.01	0.04
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	0.01	0.05
		Total HAPs	<0.01	0.01
		CO _e	180.00	788.60

S014	Line Heater 1.54 MMBtu/hr	Nitrogen Oxides	0.15	0.64
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	<0.01	0.04
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	0.01	0.05
		Total HAPs	<0.01	0.01
		CO ₂ e	180.00	788.60
S015	Line Heater 1.54 MMBtu/hr	Nitrogen Oxides	0.15	0.64
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	<0.01	0.04
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	0.01	0.05
		Total HAPs	<0.01	0.01
		CO ₂ e	180.00	788.60
S016	Line Heater 1.54 MMBtu/hr	Nitrogen Oxides	0.15	0.64
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	<0.01	0.04
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	0.01	0.05
		Total HAPs	<0.01	0.01
		CO ₂ e	180.00	788.60
S017	Line Heater 1.54 MMBtu/hr	Nitrogen Oxides	0.15	0.64
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	<0.01	0.04
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	0.01	0.05
		Total HAPs	<0.01	0.01
		CO ₂ e	180.00	788.60
S018	Line Heater 1.54 MMBtu/hr	Nitrogen Oxides	0.15	0.64
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	<0.01	0.04
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	0.01	0.05
		Total HAPs	<0.01	0.01
		CO ₂ e	180.00	788.60
S019	Line Heater 1.54 MMBtu/hr	Nitrogen Oxides	0.15	0.64
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	<0.01	0.04
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	0.01	0.05
		Total HAPs	<0.01	0.01
		CO ₂ e	180.00	788.60
		Nitrogen Oxides	0.15	0.64

S020	Line Heater 1.54 MMBtu/hr	Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	<0.01	0.04
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	0.01	0.05
		Total HAPs	<0.01	0.01
		CO ₂ e	180.00	788.60
S021	Line Heater 1.54 MMBtu/hr	Nitrogen Oxides	0.15	0.64
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	<0.01	0.04
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	0.01	0.05
		Total HAPs	<0.01	0.01
		CO ₂ e	180.00	788.60
S022	Line Heater 1.54 MMBtu/hr	Nitrogen Oxides	0.15	0.64
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	<0.01	0.04
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	0.01	0.05
		Total HAPs	<0.01	0.01
		CO ₂ e	180.00	788.60
S023	Line Heater 1.54 MMBtu/hr	Nitrogen Oxides	0.15	0.64
		Carbon Monoxide	0.12	0.54
		Volatile Organic Compounds	<0.01	0.04
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	0.01	0.05
		Total HAPs	<0.01	0.01
		CO ₂ e	180.00	788.60
S024	Thermoelectric Generator 0.03 MMBtu/hr	Nitrogen Oxides	<0.01	0.01
		Carbon Monoxide	<0.01	0.01
		Volatile Organic Compounds	<0.01	<0.01
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	<0.01	<0.01
		Total HAPs	<0.01	<0.01
		CO ₂ e	3.41	14.95
S025	Thermoelectric Generator 0.03 MMBtu/hr	Nitrogen Oxides	<0.01	0.01
		Carbon Monoxide	<0.01	0.01
		Volatile Organic Compounds	<0.01	<0.01
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	<0.01	<0.01
		Total HAPs	<0.01	<0.01
		CO ₂ e	3.41	14.95
		Nitrogen Oxides	<0.01	<0.01
		Carbon Monoxide	<0.01	<0.01

C001	Combustor Pilot	Volatile Organic Compounds	<0.01	<0.01
		Sulfur Dioxide	<0.01	<0.01
		Particulate Matter -10	<0.01	<0.01
		Total HAPs	<0.01	<0.01
		CO ₂ e	3.51	15.38
FUG	Fugitive Components	Volatile Organic Compounds	2.76	12.07
		Total HAPs	0.11	0.50
		CO ₂ e	239.6	1049.2
LOAD	Liquid Loading	Volatile Organic Compounds	0.47	2.05
		Total HAPs	0.01	0.06
		CO ₂ e	<0.01	<0.01

Facility Totals:

Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
Nitrogen Oxides	2.72	11.95
Carbon Monoxide	2.29	10.04
Volatile Organic Compounds	15.65	68.64
Sulfur Dioxide	0.02	0.07
Particulate Matter -10	0.21	0.90
Total HAPs	0.54	2.35
CO ₂ e	3,643.15	15,978.74

REGULATORY APPLICABILITY

The proposed EQT natural gas production facility is subject to substantive requirements in the following state and federal air quality rules and regulations: 45CSR2, and 45CSR13. Each applicable rule (and ones that have reasoned 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*

The Line Heaters (S013-S023) 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 the unit is less than 10 mmBtu/hr, it is 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.

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

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 construction of the Big 192 natural gas production facility has a potential to emit a regulated pollutant in excess of six (6) lbs/hour and ten (10) TPY and, therefore, pursuant to §45-13-2.24, the facility 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 natural gas production 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 October 30, 2013 in *The Wetzel Chronicle* and the affidavit of publication for this legal advertisement was submitted on November 6, 2013.

45CSR22 *Air Quality Management Fee Program*

The Big 192 Facility is not subject to 45CSR30. The facility is subject to 40CFR60 Subpart OOOO, however they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided they are not required to obtain a permit for a reason other than their status as an area source, therefore, the facility is not subject and will pay its annual fees through the Rule 22 program.

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

Subpart OOOO applies to facilities that commence construction, reconstruction, or modification after August 23, 2011 (October 15, 2012 for well completions). Since the Big 192 pad will begin operation after August 23, 2011 it is subject to the requirements of Subpart OOOO. The tanks at the Big 192 facility have the potential to emit more than 6 tpy of VOC's, therefore, EQT must install a vapor combustor with at least 95% destruction efficiency. The site will also include pneumatic controllers that were ordered and installed after August 23, 2011 therefore the controllers will be subject to the applicable provisions of Subpart OOOO. The gas wells at the Big 192 pad will also be affected facilities subject to Subpart OOOO.

Non Applicability Determinations

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

Pursuant to the exemption given under §45-10-10.1, as the MDHI of the Line Heaters (S013-S023) are less than 10 mmBtu/hr, the units are not subject to the substantive sections of 45CSR10.

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 of the Big 192 natural gas production facility is below the levels that would define the source as "major" under 45CSR14 and, therefore, the construction evaluated herein is not subject to the provisions of 45CSR14.

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).

Big 192 shares the same SIC code as several other well pads owned by EQT in the area. Therefore, the potential classification of the Big 192 facility as one stationary source any other facility depends on the determination if these stations are considered "contiguous or adjacent properties."

"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*.

The Big 192 natural gas production facility is not located contiguous with, or directly adjacent to any other EQT facility. The nearest EQT facility is over 1/4 mile away.

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

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 largest storage tanks located at the Big 192 facility are each 16,800 gallons, or 63.5 m³. Therefore, Subpart Kb does not apply to any of the storage tanks.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the Big 192 natural gas production 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

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

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
Xylene	VOC	No	Inadequate Data
Trimethylpentane	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*. For a complete discussion of the known health effects of each compound refer to the IRIS database located at www.epa.gov/iris.

AIR QUALITY IMPACT ANALYSIS

The estimated maximum emissions from the proposed Big 192 natural gas production facility 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

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

- For the purposes of demonstrating compliance with maximum limit for the aggregate production of condensate/liquids from the wells set forth in 4.1.3 of the draft permit, EQT shall be required to monitor and record the monthly and rolling twelve month total of condensate/liquids (in gallons) produced in the wells. Monitoring and recording the monthly and rolling twelve month total of condensate/liquids (in gallons) unloaded from the storage tanks can be used to show compliance with this requirement.
- For the purposes of demonstrating compliance with visible emissions limitations set forth in 4.1.2(d) of the draft permit, EQT shall be required to:
 - (1) Conduct an initial Method 22 visual emission observation on the line heaters 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 line heaters.
 - (2) Conduct monthly Method 22 visible emission observations of the line heater stack to ensure proper operation for a minimum of ten (10) minutes each month the line heaters are in operation.
 - (3) In the event visible emissions are observed in excess of the limitations given under 4.1.2(d) of the draft permit, EQT shall be required to take immediate corrective action.
- EQT shall be required to maintain records of all visual emission observations pursuant to the monitoring required under 4.2.2 of the draft permit including any corrective action taken.
- EQT shall be required to report 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 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.

PERFORMANCE TESTING OF OPERATIONS

The following substantive performance testing requirements shall be required:

- Within sixty (60) days of the issuance date of the draft permit, EQT shall be required to perform, or have performed, an analysis to determine the constituent properties of the condensate (testing done previous to permit issuance deemed to be appropriate by the Director shall be accepted). The analysis shall, at a minimum, include the same components as the analysis used to calculate storage tank emissions in Permit Application R13-3123. Where applicable, if the analysis shows average constituent properties that, when used to calculate emissions in the same manner as submitted in Permit Application R13-3123, result in emissions that are greater than the levels that define a "modification" under 45CSR13, EQT shall be required to, within thirty (30) days of receiving the results of the analysis, submit to the Director an appropriate permit application to increase emissions.

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 R13-3123 for the construction of a natural gas production facility near Smithfield, Wetzel County, be granted to EQT Production Company.

Roy F. Kees, P.E.
Engineer - NSR Permitting

Date

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