



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: G70-A156
Plant ID No.: 103-00104
Applicant: American Energy - Marcellus, LLC
Facility Name: Mary Miller
Location: Wetzel County
NAICS Code: 211111
Application Type: Construction
Received Date: April 21, 2015
Engineer Assigned: Roy F. Kees, P.E.
Fee Amount: \$4,000.00
Date Received: April 14, 2015
Complete Date: May 20, 2015
Due Date: July 5, 2015
Applicant Ad Date: April 22, 2015
Newspaper: *The Wetzel Chronicle*
UTM's: Easting: 533.057 km Northing: 4,384.756 km Zone: 17
Description: Application to construct a natural gas well pad consisting of four GPUs, four line heaters, one flash separator heater, one condensate stabilizer, three condensate ans three produced water tanks, two compressors, one enclosed combustor, one natural gas generator and truck loading.

DESCRIPTION OF PROCESS

Incoming raw natural gas from the (4) wells is routed through the 1.5 MMBtu/hr gas production units (GPUs) (S001-S004) where the first stage of fluid separation occurs. The GPUs separate the well stream flow into a high pressure natural gas stream and condensate liquid stream. In the second stage of separation, the liquid streams are routed through four 1.5 MMBtu/hr line heaters (S005-S008) to aid in the downstream separation process. The fluids are then routed to the 1.0 MMBtu/hr low pressure flash separator (S009) where condensate and produced water are separated. The flash from the low pressure separator is captured via two flash gas compressors driven by natural gas-fired

engines (S017-S018) and routed to the sales gas pipeline. Produced water from the flash separator is routed to three produced water storage tanks (S014-S016). The condensate is routed to the three condensate storage tanks (S011-S013).

The natural gas stream will exit the facility for transmission via pipeline. Condensate and produced water are transported offsite via tank truck. Flashing, working and breathing emissions from the three produced water and three condensate tanks will be routed to the enclosed combustor (S019). Tank truck loading operations from the produced water and condensate loading (S020-S021) will be vapor balanced to the tanks and controlled by the enclosed combustor.

Based upon current observed daily condensate production at similar facilities, AEM does not expect the quantity of condensate production that would justify the operation of the condensate stabilizer. AEM is filing this application to account for the loading of the condensate tank directly from the flash separator. With this permitting approach, AEM is reasonably conservative in its permitting actions and has the authorization to operate the condensate stabilizer should field conditions deem it necessary.

One 47 bhp Hipower prime power natural gas generator (S022) is included in the permit application and provides power to the Mary Miller site.

SITE INSPECTION

A site inspection was conducted on May 27, 2015 by James Robertson of the enforcement section. *"The site was under active drilling at the time of my visit but it did not appear that any permitted equipment had been installed. The pad is located in a remote location on top of a hill. There is one house near the entrance to the pad but it is well over 300' away from the pad itself. I did not see any other houses that would be within 300' of the pad.*

In my opinion this site is suitable for a General Permit."

From Route 7 East out of New Martinsville towards Morgantown for 17 miles. Turn left onto Barker Run Road and continue for 1.2 miles, before taking a left onto Hoyt Ridge Road. Follow Hoyt Ridge Road for three miles. Well Site Mary Miller will be on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Maximum controlled point source emissions listed below were calculated by American Energy and reviewed for accuracy by the writer. GPU, Line Heater, Flash Separator, and Condensate Stabilizer Heater emissions were calculated using AP-42 emission factors. Storage tank and loading emissions were calculated using E&P Tanks, TANKS 4.0.9. and AP-42. Engine emissions were calculated using manufacturer data and AP-42.

Emission Unit	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
S001-S008 1.5 mmBtu/hr (4) GPUs and (4) Line Heaters (Combined)	Nitrogen Oxides	0.96	4.08
	Carbon Monoxide	0.80	3.44
	Volatile Organic Compounds	0.05	0.24
	Sulfur Dioxide	<0.01	0.02
	Particulate Matter-10	0.07	0.32
	CO ₂ e	1405	6155
S009 1.0 mmBtu/hr Flash Separator Heater	Nitrogen Oxides	0.08	0.34
	Carbon Monoxide	0.07	0.29
	Volatile Organic Compounds	<0.01	0.02
	Sulfur Dioxide	<0.01	<0.01
	Particulate Matter-10	<0.01	0.03
	CO ₂ e	117	513
S010 0.75 mmBtu/hr Condensate Stabilizer	Nitrogen Oxides	0.06	0.26
	Carbon Monoxide	0.05	0.21
	Volatile Organic Compounds	<0.01	0.01
	Sulfur Dioxide	<0.01	<0.01

	Particulate Matter-10	<0.01	0.02
	CO ₂ e	88	385
S011-S013 (3) 400 bbl Condensate Tanks (Combined)	Volatile Organic Compounds	1.01	4.43
	Total HAPs	0.03	0.11
S014-S016 (3) 400 bbl Produced Water Tanks (Combined)	Volatile Organic Compounds	0.02	0.07
	Total HAPs	<0.01	<0.01
S017 203 bhp Flash Gas Compressor	Nitrogen Oxides	0.89	3.90
	Carbon Monoxide	1.78	7.80
	Volatile Organic Compounds	0.05	0.24
	Sulfur Dioxide	<0.01	0.01
	Particulate Matter-10	0.02	0.08
	CO ₂ e	205	899
S018 203 bhp Flash Gas Compressor	Nitrogen Oxides	1.49	6.52
	Carbon Monoxide	0.16	0.71
	Volatile Organic Compounds	0.05	0.22
	Sulfur Dioxide	<0.01	0.01
	Particulate Matter-10	0.02	0.07
	CO ₂ e	200	874
S019 18.42 MMBtu/hr Combustor	Nitrogen Oxides	1.43	6.28
	Carbon Monoxide	1.21	5.28

S020-S021 Cond. & PW Loading	Volatile Organic Compounds	0.03	0.11
	Total HAPs	<0.01	<0.01
S022 47 bhp Natural Gas Generator	Nitrogen Oxides	0.37	1.63
	Carbon Monoxide	0.61	2.68
	Volatile Organic Compounds	0.37	1.63
	Sulfur Dioxide	<0.01	<0.01
	Particulate Matter-10	0.01	0.02
	CO ₂ e	58	253
Fugitives	Volatile Organic Compounds	0.06	0.27
	Total HAPs	<0.01	0.01

The total facility potential to emit (PTE) is shown in the following table:

Pollutant	Facility Wide Emissions (tons/year)
Nitrogen Oxides	23.02
Carbon Monoxide	20.40
Volatile Organic Compounds	10.00
Particulate Matter-10/2.5	1.00
Sulfur Dioxide	0.08
Total HAPs	1.34
Carbon Dioxide Equivalent	18,247.47

REGULATORY APPLICABILITY

The proposed American Energy natural gas production facility is subject to substantive requirements in the following state and federal air quality rules and regulations: 45CSR2, 45CSR6 and 45CSR13. Each applicable rule (and ones that have reasoned non-applicability), and American Energy'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 GPUs (S001-S004), Line Heaters (S005-S008), Flash Separator Heater (S009) and Condensate Stabilizer Heater (S010) 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.

Pursuant to 45CSR2, Section 3.1, the GPUs and 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.

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

The purpose of this rule is to prevent and control air pollution from combustion of refuse. AEM has one (1) enclosed combustor at the facility. The combustor is subject to section 4, emission standards for incinerators. The combustor has an allowable emission rate of 1.71 pounds of particulate matter per hour (assuming a natural gas density of 0.044 lb/ft³). The combustor has negligible amounts of particulate matter emissions per hour. Therefore, the facility's combustor should demonstrate compliance with this section. The facility will demonstrate compliance by maintaining records of the amount of natural gas consumed by the combustor and the hours of operation. The facility will also monitor the flame of the combustor and record any malfunctions that may cause no flame to be present during operation.

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 Mary Miller natural gas production facility does not have a potential to emit a regulated pollutant in excess of six (6) lbs/hour and ten (10) TPY, however it is subject to a substantive requirement (45CSR6), 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, American Energy is required to obtain a permit registration under 45CSR13 for the construction and operation of the natural gas production facility.

As required under §45-13-8.3 (“Notice Level A”), American Energy placed a Class I legal advertisement in a “newspaper of general circulation in the area where the source is . . . located.” The ad ran on April 22, 2015 in *The Wetzel Chronicle*.

45CSR22: *Air Quality Management Fee Program*

The Mary Miller 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.

40CFR60 Subpart JJJJ (*Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE)*)

40CFR60.4230 states that a source that commenced construction after June 12, 2006 whose SI ICE was less than 500 hp and was manufactured on or after July 1, 2008 is subject to this rule. American Energy has proposed to install two (2) 203 HP SI ICE. One engine (S017) was manufactured on August 8, 2005 therefore it is not subject to the rule. The second engine (S018) was manufactured on January 21, 2008 which is prior to July 1, 2008 therefore it is not subject to this rule.

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 Mary Miller pad will begin operation after August 23, 2011 it is subject to the

requirements of Subpart OOOO. The tanks at the Mary Miller facility will utilize a vapor combustor, therefore the tanks will not have the potential to emit more than 6 tpy of VOC's, therefore the tanks will not be subject to the rule. 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 proposed controllers have a bleed rate of 6.6 scf/day. The gas wells at the Mary Miller pad will also be affected facilities subject to Subpart OOOO.

40CFR63 Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines)

Subpart ZZZZ establishes national emission limitations and operating limitations for HAPs emitted from stationary RICE located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations. One of the engines (S017) Mary Miller facility is subject to the area source requirements for non-emergency 4SRB spark ignition engines. The engine was manufactured on August 8, 2005, therefore the engine is existing and will be subject to the applicable provisions or 40CFR63 Subpart ZZZZ.

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 GPUs (S001-S004), Line Heaters (S005-S008), Flash Separator Heater (S009) and Condensate Stabilizer Heater (S010) 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 Mary Miller 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).

Mary Miller shares the same SIC code as several other well pads in the area. Therefore, the potential classification of the Mary Miller facility as one stationary source any other facility depends on the determination if these stations are considered “contiguous or adjacent properties.”

The surrounding wells are not under common control with Mary Miller. Mary Miller is operated by American Energy but is owned by more than one company. Through proprietary agreements, American Energy's operation of Mary Miller is controlled by the system owners. The ownership and control of the wells in the area may be distinct for each well. The owners and operators of the wells each may take their gas in kind and consequently affect the operation of the wells in which they have an ownership interest. Furthermore, no well is dependent on the operation of another

well, specifically Mary Miller, to function, nor is Mary Miller dependent on any specific well to operate. Based on this, American Energy concluded that common control was not met.

"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 Mary Miller natural gas production facility is not located contiguous with, or directly adjacent to any other American Energy facility.

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 Mary Miller 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 Mary Miller 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 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. American Energy 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 Mary Miller 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 Section 4.0 of the general permit registration, American Energy 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.

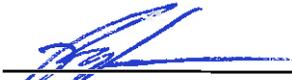
- For the purposes of demonstrating compliance with visible emissions limitations set forth in Section 7.0 of the G70-A general permit, American Energy shall be required to:
 - (1) Conduct an initial Method 22 visual emission observation on the GPUs and Flash Separator Heaters to determine the compliance with the visible emission provisions. American Energy shall be required to take a minimum of two (2) hours of visual emissions observations on the GPU and Flash Separator Heaters.
 - (2) Conduct monthly Method 22 visible emission observations of the GPU and Flash Separator 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 Section 7.5 of the G70-A general permit, American Energy shall be required to take immediate corrective action.

- American Energy shall be required to maintain records of all visual emission observations pursuant to the monitoring required under Section 7.2 of the G70-A general permit including any corrective action taken.

- American Energy 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.

RECOMMENDATION TO DIRECTOR

Information supplied in the registration application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that general permit registration G70-A156 for the construction of a natural gas production facility near Wileyville, Wetzel County, be granted to American Energy - Marcellus, LLC



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



DATE

Fact Sheet G70-A156
American Energy - Marcellus, LLC
Mary Miller