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**west virginia department of environmental protection**

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**ENGINEERING EVALUATION / FACT SHEET**

**BACKGROUND INFORMATION**

Application No.: G70-A009A  
Plant ID No.: 103-00080  
Applicant: American Energy - Marcellus, LLC  
Facility Name: Long 408/409 Well Pad  
Location: Wetzel County  
NAICS Code: 211111  
Application Type: Construction  
Received Date: December 9, 2014  
Engineer Assigned: Roy F. Kees, P.E.  
Fee Amount: \$1500.00  
Date Received: December 11, 2014  
Complete Date: January 14, 2015  
Due Date: March 1, 2015  
Applicant Ad Date: January 21, 2015  
Newspaper: *The Wetzel Chronicle*  
UTM's: Easting: 527.792 km Northing: 4,381.585 km Zone: 17  
Description: Application to modify a natural gas well pad by adding a condensate stabilizer with a natural gas-fired burner, changing the design capacity of the existing GPUs and flash separator heaters from 1.5 to 1.0 mmBtu/hr, removal of the VRU and backup flare, adding an enclosed vapor combustor and removal of flash emissions from tanks.

**DESCRIPTION OF PROCESS**

The facility is an oil and natural gas exploration and production facility, responsible for the production of natural gas. Storage of condensate and produced water will also occur on site. A description of the facility process is as follows: Condensate, gas and water come from the wellheads to production units (1E-11E) where the first stage of separation occurs. The GPUs separate the well stream flow into a high pressure gas vapor product, while generating a high pressure natural gas stream and condensed liquid stream. In the second stage of separation, the liquid streams are routed to the heated low pressure flash

separators (28E-29E) where condensate and produced water are separated. The flash from the low pressure separators is captured via a flash gas compressor driven by a natural gas-fired engine (35E) and is routed to the sales gas pipeline. Produced water from the separators is sent to eight 210 bbl produced water storage tanks (20E-27E). The condensate is sent to a 1200 bbl/day condensate stabilizer with a natural gas-fired burner assembly (36E). The condensate stabilizer raises the temperature and drives off light hydrocarbons. The light hydrocarbons are then transferred under pressure to a natural gas liquids (NGL) tank on site. The depleted condensate stream is then transferred to eight 210 bbl condensate storage tanks (12E-19E). Note that there are no flash emissions anticipated from the condensate tanks due to the depletion of the condensate stream. These tanks produce only working and breathing losses.

The natural gas stream will exit the facility via pipeline. Condensate is transported offsite via truck, and produced water will be transported via pipeline to a storage area for subsequent reuse and/or disposal. Working and breathing losses from the condensate and produced water tanks will be routed to the on-site enclosed vapor combustor (31E). Both condensate and produced water loading emissions (32E-33E) will be vented to the atmosphere.

#### SITE INSPECTION

A site inspection was conducted on January 16, 2014 by Douglas Hammel of the enforcement section. "Closest residences are both ~0.4mi away, either the one West or the one to the South. Drilling ops underway while I was there, No perm.equip yet on site."

*Route 7 East out of New Martinsville towards Morgantown, Bear right on Route 20 towards Pine Grove, left onto North Fork C/R 15/17, left onto Baker Run C/R 17, left onto McKimmie Ridge C/R 17/1, left on C/R 40, right on lease road.*

**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 & Heater treater and combustor emissions were calculated using AP-42 emission factors. Storage tank and loading emissions were calculated using 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) |
|---|----------------------------|----------------------------------|--------------------------------|
| 1S-11S (11)<br>1.0 mmBtu/hr<br>GPUs<br>(Combined)               | Nitrogen Oxides            | 0.86                             | 3.75                           |
|   | Carbon Monoxide            | 0.72                             | 3.15                           |
|   | Volatile Organic Compounds | 0.05                             | 0.21                           |
|   | Sulfur Dioxide             | 0.01                             | 0.02                           |
|   | Particulate Matter-10      | 0.07                             | 0.28                           |
|   | CO <sub>2</sub> e          | 1,032                            | 4,520                          |
| 12S-19S (8)<br>210 bbl<br>Condensate<br>Tanks<br>(Combined)     | Volatile Organic Compounds | 0.04                             | 0.19                           |
|   | Total HAPs                 | <0.01                            | <0.01                          |
| 20S-27S (8)<br>210 bbl<br>Produced<br>Water Tanks<br>(Combined) | Volatile Organic Compounds | <0.01                            | <0.01                          |
|   | Total HAPs                 | <0.01                            | <0.01                          |

|  |                            |       |       |
|--|----------------------------|-------|-------|
| 28S-29S (2)<br>1.0 mmBtu/hr<br>Flash<br>Separator<br>Heaters<br>(Combined) | Nitrogen Oxides            | 0.16  | 0.68  |
|  | Carbon Monoxide            | 0.13  | 0.57  |
|  | Volatile Organic Compounds | 0.01  | 0.04  |
|  | Sulfur Dioxide             | <0.01 | <0.01 |
|  | Particulate Matter-10      | 0.01  | 0.05  |
|  | CO <sub>2</sub> e          | 188   | 823   |
| 32S-33S Cond.<br>& PW Loading  | Volatile Organic Compounds | 7.32  | 32.08 |
|  | Total HAPs                 | 0.57  | 2.48  |
| Vapor Comb.<br>31S   | Nitrogen Oxides            | 1.43  | 6.28  |
|  | Carbon Monoxide            | 1.20  | 5.27  |
|  | Volatile Organic Compounds | 0.08  | 0.35  |
| 35S USA<br>Compression<br>118 hp<br>Compressor<br>Engine                   | Nitrogen Oxides            | 0.52  | 2.28  |
|  | Carbon Monoxide            | 1.04  | 4.56  |
|  | Volatile Organic Compounds | 0.26  | 1.14  |
|  | Particulate Matter - 10    | <0.01 | <0.01 |
|  | Formaldehyde               | <0.01 | <0.01 |
|  | CO <sub>2</sub> e          | 124   | 542   |
| 36S 0.75<br>mmBtu/hr<br>Condensate<br>Stabilizer<br>Heater                 | 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 <sub>2</sub> e          | 70    | 308   |
| Fugitives<br>30S   | Volatile Organic Compounds | 1.30  | 13.22 |
|  | Total HAPs                 | 0.10  | 1.02  |

Fact Sheet G70-A009A  
American Energy - Marcellus, LLC  
Long 408/409 Well Pad

## 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, 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 (1S-11S), Flash Separator Heaters (28S-29S) and condensate stabilizer heater (36S) 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 Flash Separator 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 Long 408/409 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, 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 January 21, 2015 in *The Wetzel Chronicle*.

**45CSR22      *Air Quality Management Fee Program***

The Long 408/409 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 one (1) 118 HP SI ICE. Since the SI ICE that American Energy will install was manufactured November 3, 2008, American Energy is 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 Long 408/409 pad will begin operation after August 23, 2011 it is subject to the requirements of Subpart OOOO. The tanks at the Long 408/409 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 Long 408/409 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 GPUs, Flash Separator Heaters and Condensate Stabilizer Heater (1S-11S, 28S-29S, 36S) 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 Long 408/409 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).

Long 408/409 shares the same SIC code as several other well pads in the area. Therefore, the potential classification of the Long 408/409 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 Long 408/409. Long 408/409 is operated by American Energy but is owned by more than one company. Through proprietary agreements, American Energy's operation of Long 408/409 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 Long 408/409, to function, nor is Long 408/409 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 Long 408/409 natural gas production facility is not located contiguous with, or directly adjacent to any other American Energy facility. The nearest American Energy facility is over 1/4 miles 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 (m<sup>3</sup>) 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 Long 408/409 facility are each 16,800 gallons, or 63.5 m<sup>3</sup>. 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 Long 408/409 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<sub>x</sub>), Ozone, Particulate Matter (PM), Particulate Matter less than 10 microns (PM<sub>10</sub>), Particulate Matter less than 2.5 microns (PM<sub>2.5</sub>), and Sulfur Dioxide (SO<sub>2</sub>). 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)):

Fact Sheet G70-A009A  
American Energy - Marcellus, LLC  
Long 408/409 Well Pad

## 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](http://www.epa.gov/iris).

## AIR QUALITY IMPACT ANALYSIS

The estimated maximum emissions from the proposed Long 408/409 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.

Fact Sheet G70-A009A  
American Energy - Marcellus, LLC  
Long 408/409 Well Pad

- 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-A009A for the construction of a natural gas production facility near Pine Grove, Wetzel County, be granted to American Energy - Marcellus, LLC



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

2/27/15

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DATE

Fact Sheet G70-A009A  
American Energy - Marcellus, LLC  
Long 408/409 Well Pad