



**west virginia** department of environmental protection

Division of Air Quality  
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**ENGINEERING EVALUATION / FACT SHEET**

BACKGROUND INFORMATION

Application No.: R13-2878  
Plant ID No.: 103-00042  
Applicant: MarkWest Liberty Midstream & Resources LLC (MarkWest)  
Facility Name: Mobley Gas Plant  
Location: Smithfield, Wetzel County  
NAICS Code: 211112  
Application Type: Construction  
Received Date: March 29, 2011  
Engineer Assigned: Jerry Williams II, P.E.  
Fee Amount: \$2,000.00  
Date Received: March 29, 2011  
Complete Date: May 9, 2011  
Due Date: August 7, 2011  
Applicant Ad Date: March 30, 2011, April 27, 2011  
Newspaper: *The Wheeling Intelligencer, The Wetzel Chronicle*  
UTM's: Easting: 538.099 km Northing: 4,378.315 km Zone: 17  
Description: Construction permit application to install a new natural gas processing plant consisting of nine (9) natural gas fired reciprocating internal combustion engines, two (2) natural gas fired heaters, and one (1) emergency flare.

DESCRIPTION OF PROCESS

The following process description was taken from Permit Application R13-2878:

The Mobley Gas Plant will be used as a gathering station for gas wells throughout southwest Pennsylvania and West Virginia. The natural gas inlet stream from surrounding area wells enters the facility through an inlet separator prior to the gas being compressed. After the inlet gas passes through a compressor, the natural gas will enter a molecular sieve, which is designed to remove liquids from the gas stream through contact. Heaters will be employed to heat and regenerate the molecular sieve on a regular basis to remove the water and hydrocarbons. After passing through the molecular sieve the gas will be cooled through a cryogenic plant with mechanical refrigeration, which serves to remove propane and heavier hydrocarbons in the gas

stream. At this point the gas is ready for compression and will pass through one of the natural gas fired compressor engines prior to entering the downstream pipeline to another facility; therefore, there will be no on-site liquids storage tanks or loading facilities. Electric pumps will be located on the site to transfer the removed saltwater and hydrocarbons to another site for further processing. A natural gas fired engine will be used for power generation. An emergency flare may be used to burn vapors released from the pressure relief valves on the demethanizer and refrigeration plant.

### SITE INSPECTION

A site inspection was conducted on June 28, 2011 by the writer and Roy Kees. The facility had not been constructed at that time. The site was remote and there were no visible residences.

Directions as given in the permit application are as follows:

*From Smithfield, head southwest on County Road 2/1/Mannington Road toward WV 20S. Turn right at WV 20N and go 1.1 miles. Take the first right onto County Road 7/8/Fallen Timber Run Road and go 2.8 miles. Continue onto County Road 80/Fallen Timber Road/Shuman Hill for 0.8 miles. Turn right at County Road 80/Shuman Hill and go 1.5 miles. Turn right at County Road 15/North Fork Road and go 2.8 miles. The site will be on the left.*

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this permit will consist of nine (9) natural gas fired compressor engines, two (2) natural gas fired heaters, and one (1) flare. The estimated emission calculations were performed by MarkWest and checked for accuracy and completeness by the writer. The following tables include the emission source, and controlled emission rate:

Emission Point ID#	Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
CM-1001	1,980 HP Waukesha P9390 Compressor Engine	Nitrogen Oxides	0.87	3.83
		Carbon Monoxide	1.14	4.99
		Particulate Matter-10	0.15	0.64
		Sulfur Dioxide	0.01	0.04
		Volatile Organic Compounds	0.52	2.29
		Formaldehyde	0.04	0.19
CM-1002	1,980 HP Waukesha P9390 Compressor Engine	Nitrogen Oxides	0.87	3.83
		Carbon Monoxide	1.14	4.99
		Particulate Matter-10	0.15	0.64
		Sulfur Dioxide	0.01	0.04
		Volatile Organic Compounds	0.52	2.29
		Formaldehyde	0.04	0.19
CM-1003	1,980 HP Waukesha P9390 Compressor Engine	Nitrogen Oxides	0.87	3.83
		Carbon Monoxide	1.14	4.99
		Particulate Matter-10	0.15	0.64
		Sulfur Dioxide	0.01	0.04
		Volatile Organic Compounds	0.52	2.29
		Formaldehyde	0.04	0.19
CM-1004	1,980 HP Waukesha P9390 Compressor	Nitrogen Oxides	0.87	3.83
		Carbon Monoxide	1.14	4.99
		Particulate Matter-10	0.15	0.64
		Sulfur Dioxide	0.01	0.04

	Engine	Volatile Organic Compounds	0.52	2.29
		Formaldehyde	0.04	0.19
CM-1005	1,980 HP Waukesha P9390 Compressor Engine	Nitrogen Oxides	0.87	3.83
		Carbon Monoxide	1.14	4.99
		Particulate Matter-10	0.15	0.64
		Sulfur Dioxide	0.01	0.04
		Volatile Organic Compounds	0.52	2.29
		Formaldehyde	0.04	0.19
CM-1006	1,980 HP Waukesha P9390 Compressor Engine	Nitrogen Oxides	0.87	3.83
		Carbon Monoxide	1.14	4.99
		Particulate Matter-10	0.15	0.64
		Sulfur Dioxide	0.01	0.04
		Volatile Organic Compounds	0.52	2.29
		Formaldehyde	0.04	0.19
C-102	4,735 HP Caterpillar G3616 LE Compressor Engine	Nitrogen Oxides	5.22	22.86
		Carbon Monoxide	1.44	6.29
		Particulate Matter-10	0.01	0.01
		Sulfur Dioxide	0.02	0.09
		Volatile Organic Compounds	2.63	11.52
		Formaldehyde	0.27	1.19
C-103	4,735 HP Caterpillar G3616 LE Compressor Engine	Nitrogen Oxides	5.22	22.86
		Carbon Monoxide	1.44	6.29
		Particulate Matter-10	0.01	0.01
		Sulfur Dioxide	0.02	0.09
		Volatile Organic Compounds	2.63	11.52
		Formaldehyde	0.27	1.19
G-1001	3,550 Caterpillar G3612 LE Compressor	Nitrogen Oxides	3.91	17.14
		Carbon Monoxide	1.08	4.71
		Particulate Matter-10	0.01	0.01
		Sulfur Dioxide	0.01	0.06

	Engine	Volatile Organic Compounds	2.03	8.91
		Formaldehyde	0.20	0.89
H-741	7.62 MMBtu/hr Mole Sieve Regeneration Heater	Nitrogen Oxides	0.68	2.97
		Carbon Monoxide	0.57	2.49
		Particulate Matter-10	0.04	0.17
		Sulfur Dioxide	0.01	0.02
		Volatile Organic Compounds	0.04	0.16
H-781	16.3 MMBtu/hr Mole Sieve Regeneration Heater	Nitrogen Oxides	1.45	6.35
		Carbon Monoxide	1.22	5.34
		Particulate Matter-10	0.08	0.36
		Sulfur Dioxide	0.01	0.04
		Volatile Organic Compounds	0.08	0.35
FL-991	Emergency Flare System	Nitrogen Oxides	0.11	0.48
		Carbon Monoxide	0.09	0.40
		Particulate Matter-10	0.01	0.03
		Volatile Organic Compounds	0.01	0.03
FUG-001	Fugitive Emissions (Connections/Valves)	Volatile Organic Compounds	0.85	3.71
		Total HAPs	0.08	0.36

The following table indicates the control device efficiencies that are being utilized:

Emission Point ID	Control Device	Emission Unit	Pollutant	Control Efficiency
CM-1001 – CM-1006	NSCR	Waukesha P9390 Compressor Engines	Nitrogen Oxides	98.46 %
			Carbon Monoxide	97.1 %
			Volatile Organic Compounds	40.0 %
C-102 C-103	Oxidation Catalyst	Caterpillar G3616 LE Compressor Engines	Carbon Monoxide	95.0 %
			Volatile Organic Compounds	60.0 %
G-1001	Oxidation Catalyst	Caterpillar G3612 LE Compressor Engines	Carbon Monoxide	95.0 %
			Volatile Organic Compounds	60.0 %

The total facility emissions associated with this application are shown in the following table:

Pollutant	Annual Emissions (tons/year)
Nitrogen Oxides	95.63
Carbon Monoxide	55.46
Volatile Organic Compounds	49.97
Particulate Matter	12.74
Sulfur Dioxide	0.54
Formaldehyde	4.42
Total Hazardous Air Pollutants	16.40

### REGULATORY APPLICABILITY

The following rules apply to the facility:

**45CSR4** (To Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors)

45CSR4 states that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly authorized representative of the Air Pollution Control Commission (Division of Air Quality), based upon their investigations and complaints, such odor is objectionable. No odors have been deemed objectionable.

**45CSR6** (To Prevent and Control the Discharge of Air Pollution from Combustion of Refuse)

MarkWest has proposed to install an emergency and maintenance flare (FL-991). This rule defines incineration as the destruction of combustible refuse by burning in a furnace designed for that purpose. The purpose of this flare is to destroy VOC emissions through incineration. Therefore, it meets this definition.

According to 45CSR6, Section 4.1, this flare must meet the particulate matter limit by weight. The flare's proposed emission rate is less than the allowable under Section 4.1. Therefore, MarkWest will meet this rule.

The flare is also subject to the 20% opacity limitation in section 4.3 of this rule. Typically, the incineration of most gases produce minimal visible emissions.

**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)

45CSR13 applies to this source due to the fact that MarkWest exceeds the regulatory emission threshold for criteria pollutants of 6 lb/hr and 10 ton/year, and they are also subject to a substantive requirement of an emission control rule promulgated by the Secretary (40CFR60 Subpart JJJ and 40 CFR60 Subpart KKK).

**45CSR16** (Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60)

45CSR16 applies to this source by reference of 40CFR60, Subpart KKK, and 40CFR60, Subpart JJJJ. MarkWest is subject to the recordkeeping, monitoring, and testing required by 40CFR60 Subpart KKK, and 40CFR60 Subpart JJJJ.

**45CSR30** (Requirements for Operating Permits)

MarkWest is a nonmajor source subject to 45CSR30. MarkWest is subject to 45CSR30 due to them being subject to 40CFR60 Subpart KKK.

**40CFR60 Subpart KKK** (Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants)

40CFR60 Subpart KKK applies to onshore natural gas processing plants that commenced construction after January 20, 1984. The Mobley Gas Plant is subject to this rule due to the natural gas processing facility. MarkWest must meet the LDAR requirements of Subpart KKK.

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

40CFR60 Subpart JJJJ sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject internal combustion engine. 40CFR60 Subpart JJJJ is applicable to owners and operators of new stationary spark ignition internal combustion engines manufactured after July 1, 2007, for engines with a maximum rated power capacity greater than 500 hp. The four proposed engine will be subject to this rule. The emission limits for the 1,980 hp Waukesha P9390 compressor engines (CM-1001 – CM-1006) are the following: NO<sub>x</sub> – 2.0 g/hp-hr (8.73 lb/hr); CO – 4.0 g/hp-hr (17.46 lb/hr); and VOC – 1.0 g/hp-hr (4.36 lb/hr). The emission limits for the 4,735 hp Caterpillar G3616 LE compressor engines (C-102, C-103) are the following: NO<sub>x</sub> – 2.0 g/hp-hr (20.88 lb/hr); CO – 4.0 g/hp-hr (41.76 lb/hr); and VOC – 1.0 g/hp-hr (10.44 lb/hr). The emission limits for the 3,550 hp Caterpillar G3612 LE compressor engines (G-1001) are the following: NO<sub>x</sub> – 2.0 g/hp-hr (15.66 lb/hr); CO – 4.0 g/hp-hr (31.31 lb/hr); and VOC – 1.0 g/hp-hr (7.83 lb/hr).

Based on the manufacturer's specifications for these engines, the emission standards will be met. Because the engines will not be certified by the manufacturer, MarkWest will demonstrate compliance by conducting initial and subsequent performance testing. MarkWest will also be required to maintain a maintenance plan and associated records.

The following regulations may apply to the facility:

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

**40CFR63 Subpart HH** (National Emission Standards for Hazardous Air Pollutants: Oil and Natural Gas Production and National Emission Standards for Hazardous Air Pollutants: Natural Gas Transmission and Storage)

WVDEP DAQ did not determine whether the permittee is subject to an area source air toxics standard requiring Generally Achievable Control Technology (GACT) promulgated after January 1, 2007 pursuant to 40 CFR 63, including the area source air toxics provisions of 40 CFR 63, Subpart HH and 40 CFR 63, Subpart ZZZZ.

These promulgated national emission standards for hazardous air pollutants (NESHAP) limit emissions of hazardous air pollutants (HAP) from oil and natural gas production and natural gas transmission and storage facilities. These final rules implement section 112 of the Clean Air Act (Act) and are based on the Administrator's determination that oil and natural gas production and natural gas transmission and storage facilities emit HAP identified on the EPA's list of 188 HAPs.

#### 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

The facility will not be a major source of HAP's as defined by 45CSR14. Based on the nature of the emissions and the annual emission rate, no air quality impact analysis was performed.

The gas wells that feed this processing facility are not owned by MarkWest. The facility that the outlet gas is delivered to is in Washington County, Pennsylvania. The distance between the two facilities would not be considered contiguous and adjacent. Therefore, the emissions from any other facility would not be aggregated with this facility.

MONITORING OF OPERATIONS

MarkWest will be required to perform the following monitoring:

1. Monitor and record quantity of natural gas consumed for all engines and combustion sources.

MarkWest will be required to perform the following recordkeeping:

1. Maintain records of the amount of natural gas consumed in CM-1001 – CM-1006, C-102, C-103, G-1001, H-741, H-781, and FL-991.
2. Maintain records of testing conducted in accordance with the permit. Said records shall be maintained on-site or in a readily accessible off-site location
3. Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
4. Maintain records of the visible emission opacity tests conducted per the permit.
5. Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the natural gas compressor engines and ancillary equipment.
6. The records shall be maintained on site or in a readily available off-site location maintained by MarkWest for a period of five (5) years.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that MarkWest meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Wetzel County location should be granted a 45CSR13 construction permit for their facility.

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Jerry Williams, P.E.  
Engineer

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Date