



**west virginia** department of environmental protection

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**ENGINEERING EVALUATION / FACT SHEET**

BACKGROUND INFORMATION

Application No.: R13-2914  
Plant ID No.: 017-00034  
Applicant: MarkWest Liberty Midstream & Resources LLC (MarkWest)  
Facility Name: Sherwood Gas Plant  
Location: Smithburg, Doddridge County  
NAICS Code: 211112  
Application Type: Construction  
Received Date: January 25, 2012 (Resubmitted April 18, 2012)  
Engineer Assigned: Jerry Williams, P.E.  
Fee Amount: \$2,000.00  
Date Received: January 25, 2012  
Complete Date: May 10, 2012  
Due Date: August 8, 2012  
Applicant Ad Date: April 24, 2012  
Newspaper: *The Herald Record*  
UTM's: Easting: 526.921 km      Northing: 4,346.885 km      Zone: 17  
Description: The Sherwood Gas Plant will be capable of processing up to 230 million standard cubic feet per day (mmscfd) of natural gas. Proposed emission sources for the processing facility include two (2) 4,735 hp natural gas fired compressor engines equipped with oxidation catalysts, two (2) diesel generators for generating electrical power (restricted to 3,000 hours each), one (1) natural gas fired heater for molecular sieve regeneration, one (1) natural gas fired hot oil heater, one (1) emergency flare, and associated fugitive emissions. The Sherwood facility will also have an associated compressor station located next to the processing plant. Proposed emission sources for the compressor station include one (1) natural gas fired compressor engine with oxidation catalyst, one (1) 120 mmscfd dehydration unit, one (1) reboiler, five (5) storage tanks controlled with a vapor recovery unit, and electric compressor units.

## DESCRIPTION OF PROCESS

The following process description was taken from Permit Application R13-2914:

The Sherwood Gas Plant will be used as a processing plant and compressor station for gas wells throughout West Virginia. The natural gas inlet stream from surrounding area wells enters the facility through an inlet separator prior to passing through the tri-ethylene glycol (TEG) dehydration unit, which is designed to remove unwanted liquids from the gas stream. The rich TEG is routed to the reboiler where water and organic impurities are driven from the TEG as the reboiler is heated. After passing through the TEG dehydration unit the dry natural 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 a distribution or processing company. Liquids will be transported via pipeline to another facility. Liquid storage tanks at the gas plant will be pressurized with no emissions to the atmosphere under normal conditions. Storage tanks at the compressor station will be atmospheric tanks with emissions controlled with a vapor recovery unit (VRU) rated at 98% recovery efficiency. Under normal operating conditions electric pumps will be utilized to transfer the removed saltwater and hydrocarbons to another site for further processing. In emergency conditions truck loading may occur; however, the loading will be done in a closed loop system into pressurized vehicles so any emissions would be de minimis. An emergency flare will be installed to burn vapors released from the reboiler, pressure relief valves in the demethanizer, and refrigeration plant in the event of an emergency.

## SITE INSPECTION

A site inspection was conducted on April 26, 2012 by James Robertson of the DAQ Enforcement Section. Equipment was being stored in a central area and more equipment was in the process of being offloaded while he was onsite. However, no equipment was being hooked up or put into operation. Harry Burk from MarkWest confirmed that the equipment was only being stored at the site in anticipation of well completion and issuance of the DAQ permit.

The site was remote and there were no visible residences.

Directions as given in the permit application are as follows:

*From Smithburg, take US 50 east and go 2.8 miles. Turn right at Co. Route 50/35 and go 0.1 miles. Take the first right on Blacklick Rd./So. Route 15/Sherwood-Greenbrier Road and continue 0.4 miles. The site will be 0.5 miles west on Co. Route 15.*

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this application consist of the combustion emissions from the three (3) compressor engines (CM-1101, CM-1002, CM-2001), two (2) diesel engines (G-1001, G-1002) for temporary power generation, mole sieve regeneration heater (H-711), hot oil heater (H-771), TEG dehydration unit (DH-001), TEG dehydration unit reboiler (RB-001), emergency flare (FL-991), storage tanks emissions (TNK-001), and fugitive emissions (FUG-001). The following table indicates which methodology was used in the emissions determination:

| Emission Unit ID# | Process Equipment  | Calculation Methodology   |
|-------------------|--|---|
| CM-1001, CM-1002  | 4,735 hp Caterpillar G3616LE Compressor Engines with Oxidation Catalyst      | Manufacturer's Data / EPA AP-42 Emission Factors                      |
| CM-2001           | 2,370 hp Caterpillar G3608LE Compressor Engine with Oxidation Catalyst       | Manufacturer's Data / EPA AP-42 Emission Factors                      |
| G-1001, G-1002    | 1,115 HP Cummins QST30 Diesel Engines with Oxidation Catalyst                | Manufacturer's Data / EPA AP-42 Emission Factors                      |
| H-711             | 7.86 MMBTU/hr Mole Sieve Regeneration Heater                                 | EPA AP-42 Emission Factors  |
| H-771             | 28.25 MMBTU/hr Hot Oil Heater  | EPA AP-42 Emission Factors  |
| DH-001            | 120.00 mmscf/d TEG Dehydration Unit  | GRI-GlyCalc 4.0 Emission Estimation Software                          |
| RB-001            | 2.00 MMBTU/hr TEG Reboiler   | EPA AP-42 Emission Factors  |
| TNK-001           | 5 Storage Tanks (1-500 bbl gunbarrel tank, 4-400 bbl condensate/water tanks) | EPA Tanks 4.09 Emission Estimation Software, HYSYS Process Simulation |
| FL-991            | 68,600 scf/min Flare   | EPA AP-42 Emission Factors  |

Fugitive emissions for the facility are based on calculation methodologies presented in the 2009 American Petroleum Institute Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry. The factors presented in the API Compendium are for methane emissions. Therefore, the fugitive VOC and HAP emissions were calculated using a representative gas analysis and the weight percent of each respective pollutant.

Maximum controlled point source emissions were calculated by MarkWest and checked for accuracy by the writer and are summarized in the table below.

| Emission Point ID# | Source   | Pollutant                  | Maximum Hourly Emissions (lb/hr) | Maximum Annual Emissions (tpy) |
|--------------------|--|----------------------------|----------------------------------|--------------------------------|
| CM-1001            | 4,735 HP<br>Caterpillar G3616 LE<br>Compressor<br>Engine | Nitrogen Oxides            | 5.22                             | 22.86                          |
|                    |  | Carbon Monoxide            | 1.46                             | 6.40                           |
|                    |  | Particulate Matter-10      | 0.01                             | 0.01                           |
|                    |  | Sulfur Dioxide             | 0.02                             | 0.09                           |
|                    |  | Volatile Organic Compounds | 1.67                             | 7.32                           |
|                    |  | Formaldehyde               | 0.42                             | 1.83                           |
| CM-1002            | 4,735 HP<br>Caterpillar G3616 LE<br>Compressor<br>Engine | Nitrogen Oxides            | 5.22                             | 22.86                          |
|                    |  | Carbon Monoxide            | 1.46                             | 6.40                           |
|                    |  | Particulate Matter-10      | 0.01                             | 0.01                           |
|                    |  | Sulfur Dioxide             | 0.02                             | 0.09                           |
|                    |  | Volatile Organic Compounds | 1.67                             | 7.32                           |
|                    |  | Formaldehyde               | 0.42                             | 1.83                           |
| CM-2001            | 2,370 HP<br>Caterpillar G3608<br>Compressor<br>Engine    | Nitrogen Oxides            | 2.61                             | 11.44                          |
|                    |  | Carbon Monoxide            | 0.73                             | 3.20                           |
|                    |  | Particulate Matter-10      | 0.01                             | 0.01                           |
|                    |  | Sulfur Dioxide             | 0.01                             | 0.04                           |
|                    |  | Volatile Organic Compounds | 1.46                             | 6.41                           |
|                    |  | Formaldehyde               | 0.16                             | 0.69                           |
| G-1001             | 1,115 HP<br>Cummins QST30<br>Engine                      | Nitrogen Oxides            | 11.06                            | 16.59                          |
|                    |  | Carbon Monoxide            | 6.39                             | 9.59                           |
|                    |  | Particulate Matter-10      | 0.02                             | 0.03                           |
|                    |  | Sulfur Dioxide             | 0.02                             | 0.03                           |
|                    |  | Volatile Organic Compounds | 0.74                             | 1.11                           |
|                    |  | Formaldehyde               | 0.01                             | 0.01                           |
| G-1002             | 1,115 HP<br>Cummins QST30<br>Engine                      | Nitrogen Oxides            | 11.06                            | 16.59                          |
|                    |  | Carbon Monoxide            | 6.39                             | 9.59                           |
|                    |  | Particulate Matter-10      | 0.02                             | 0.03                           |
|                    |  | Sulfur Dioxide             | 0.02                             | 0.03                           |

|         |   |                            |      |      |
|---------|---|----------------------------|------|------|
|         |   | Volatile Organic Compounds | 0.74 | 1.11 |
|         |   | Formaldehyde               | 0.01 | 0.01 |
| H-711   | 7.86 MMBtu/hr<br>Molecular Sieve<br>Regeneration Heater | Nitrogen Oxides            | 0.24 | 1.03 |
|         |   | Carbon Monoxide            | 0.47 | 2.07 |
|         |   | Particulate Matter-10      | 0.01 | 0.06 |
|         |   | Sulfur Dioxide             | 0.01 | 0.02 |
|         |   | Volatile Organic Compounds | 0.04 | 0.17 |
| H-771   | 28.25 MMBtu/hr<br>Hot Oil<br>Heater                     | Nitrogen Oxides            | 0.85 | 3.71 |
|         |   | Carbon Monoxide            | 1.70 | 7.42 |
|         |   | Particulate Matter-10      | 0.05 | 0.21 |
|         |   | Sulfur Dioxide             | 0.02 | 0.07 |
|         |   | Volatile Organic Compounds | 0.14 | 0.61 |
| DH-001  | 120 mmscfd<br>TEG Dehydration<br>Unit Still Vent        | Volatile Organic Compounds | 2.02 | 8.84 |
|         |   | Total HAPs                 | 0.34 | 1.48 |
|         |   | Benzene                    | 0.04 | 0.18 |
|         |   | Toluene                    | 0.12 | 0.52 |
|         |   | Xylenes                    | 0.06 | 0.24 |
|         |   | n-Hexane                   | 0.13 | 0.53 |
| RB-001  | 2.00 MMBtu/hr<br>TEG Dehydration<br>Unit Reboiler       | Nitrogen Oxides            | 0.18 | 0.78 |
|         |   | Carbon Monoxide            | 0.15 | 0.66 |
|         |   | Particulate Matter-10      | 0.01 | 0.02 |
|         |   | Sulfur Dioxide             | 0.01 | 0.01 |
|         |   | Volatile Organic Compounds | 0.01 | 0.04 |
| FL-991  | Emergency<br>Flare System                               | Nitrogen Oxides            | 0.11 | 0.48 |
|         |   | Carbon Monoxide            | 0.10 | 0.40 |
|         |   | Particulate Matter-10      | 0.01 | 0.03 |
|         |   | Volatile Organic Compounds | 0.01 | 0.03 |
| TNK-001 | TANKS   | Volatile Organic Compounds | 2.19 | 9.58 |
|         |   | Total HAPs                 | 0.21 | 0.90 |
| FUG-001 | Fugitive Emissions<br>(Connections/Valves)              | Volatile Organic Compounds | 1.02 | 4.46 |
|         |   | Total HAPs                 | 0.10 | 0.43 |

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

| <b>Emission Point ID</b> | <b>Control Device</b> | <b>Emission Unit</b>                    | <b>Pollutant</b>               | <b>Control Efficiency</b> |
|--------------------------|-----------------------|---|--------------------------------|---------------------------|
| CM-1001                  | Oxidation Catalyst    | Caterpillar G3616 LE Compressor Engines | Carbon Monoxide                | 95 %                      |
| CM-1002                  |                       |   | Volatile Organic Compounds     | 75 %                      |
|                          |                       |   | Formaldehyde                   | 90 %                      |
| CM-2001                  | Oxidation Catalyst    | Caterpillar G3608 Compressor Engines    | Carbon Monoxide                | 95 %                      |
|                          |                       |   | Volatile Organic Compounds     | 75 %                      |
|                          |                       |   | Formaldehyde                   | 90 %                      |
| DH-001                   | Flare                 | TEG Dehydration Unit Still Vent         | Volatile Organic Compounds     | 98 %                      |
|                          |                       |   | Total Hazardous Air Pollutants | 98 %                      |
| TNK-001                  | Vapor Recovery Unit   | Tanks                                   | Volatile Organic Compounds     | 98 %                      |
|                          |                       |   | Total Hazardous Air Pollutants | 98 %                      |

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

| <b>Pollutant</b>               | <b>Annual Emissions (tons/year)</b> |
|--------------------------------|-------------------------------------|
| Nitrogen Oxides                | 96.35                               |
| Carbon Monoxide                | 45.73                               |
| Volatile Organic Compounds     | 37.39                               |
| Particulate Matter-10          | 8.96                                |
| Sulfur Dioxide                 | 0.37                                |
| Formaldehyde                   | 4.36                                |
| Total Hazardous Air Pollutants | 13.96                               |
| Carbon Dioxide Equivalent      | 76,068                              |

## REGULATORY APPLICABILITY

The following rules apply to the facility:

### **45CSR2** (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers)

The purpose of 45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers) is to establish emission limitations for smoke and particulate matter which are discharged from fuel burning units.

MarkWest would be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

Any fuel burning unit having a heat input under ten (10) million B.T.U.'s per hour will be exempt from sections 4 (weight emission standard), 5 (control of fugitive particulate matter), 6 (registration), 8 (testing, monitoring, recordkeeping, reporting) and 9 (startups, shutdowns, malfunctions). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

Therefore, the only fuel burning unit that would not meet this exemption would be the 28.25 MMBtu/hr hot oil heater (H-771). The weight emission standard for this unit would be 2.54 lb/hr of particulate matter. MarkWest has proposed a limit of 0.05 lb/hr, therefore this standard should be met. MarkWest shall perform the prescribed testing, monitoring, recordkeeping and reporting for this unit.

### **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 Air Pollution from the Combustion of Refuse)

MarkWest has a flare at the facility. The flare is subject to section 4, emission standards for incinerators. The flare has an allowable emission rate of 48.2 pounds of particulate matter per hour (assuming a natural gas density of 0.044 lb/ft<sup>3</sup>). The flare has negligible amounts of particulate matter emissions per hour. Therefore, the facility's flare should demonstrate compliance with this section. The facility will demonstrate compliance by maintaining records of the amount of natural gas consumed by the flare and the hours of operation. The facility will also monitor the flame of the flare and record any malfunctions that may cause no flame to be present during operation. In addition, the facility will also monitor visible emissions from the flare on a monthly basis.

#### **45CSR10 (To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides)**

The purpose of this rule is to establish standards for emissions of sulfur oxides from fuel burning units, manufacturing operations and gas streams.

45CSR10 classifies the mole sieve regeneration heater (H-711) and the hot oil heater (H-771) as 'type b' units. The allowable SO<sub>2</sub> emission rate for the mole sieve regeneration heater (H-711) would be the product of 3.1 and the total design heat input of the heater (7.86 MMBTU/hr). This equates to a maximum allowable SO<sub>2</sub> emission rate of 24.37 lb/hr. According to MarkWest's permit application, the proposed SO<sub>2</sub> emission rate is 0.01 lb/hr. Therefore, MarkWest would meet this rule. Furthermore, 45CSR10A exempts fuel burning units that combust natural gas from testing and monitoring requirements. The allowable SO<sub>2</sub> emission rate for the hot oil heater (H-771) would be the product of 3.1 and the total design heat input of the heater (28.25 MMBTU/hr). This equates to a maximum allowable SO<sub>2</sub> emission rate of 87.58 lb/hr. According to MarkWest's permit application, the proposed SO<sub>2</sub> emission rate is 0.02 lb/hr. Therefore, MarkWest would meet this rule. Furthermore, 45CSR10A exempts fuel burning units that combust natural gas from testing and monitoring requirements.

#### **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. MarkWest is also subject to a substantive requirement of an emission control rule promulgated by the Secretary (40CFR60 Subparts A, KKK, IIII and JJJJ).

MarkWest is seeking synthetic minor limitations to remain below major stationary source thresholds for nitrogen oxide emissions. MarkWest has published the required Class I legal advertisement notifying the public of their permit application, and paid the appropriate application fee (construction). MarkWest will be required to go through Notice Level C procedures which include publishing a commercial display advertisement and installing a sign at their facility entrance notifying the public of this permit application.

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

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

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

This permit does not affect 45CSR30 applicability, the source is a nonmajor source subject to 45CSR30. The facility is not subject to the permitting requirements of 45CSR30 and is classified as a deferred source.

**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 Sherwood 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 IIII** (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines)

40CFR60 Subpart IIII 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 IIII is applicable to owners and operators of new stationary compression ignition internal combustion engines manufactured after April 1, 2006.

The emission limits for the two (2) 1,115 hp Caterpillar G3608 LE compressor engines (G-1001, G-1002) using a worst case fuel consumption of 100% standby power (1,112 kW) are the following: NO<sub>x</sub> – 6.4 g/kW-hr (15.68 lb/hr); CO – 3.5 g/kW-hr (8.58 lb/hr); and PM – 0.2 g/kW-hr (0.49 lb/hr). The proposed emissions for these engines are NO<sub>x</sub> – 11.06 lb/hr; CO – 6.39 lb/hr; and PM – 0.02 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.

**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 emission limits for the two (2) 4,735 hp Caterpillar G3616 LE compressor engines (CM-1001, CM-1002) 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 proposed emissions for these engines are NO<sub>x</sub> – 5.22 lb/hr; CO – 1.46 lb/hr; and VOC – 1.67 lb/hr.

The emission limits for the 2,370 hp Caterpillar G3608 compressor engine (CM-2001) are the following: NO<sub>x</sub> – 2.0 g/hp-hr (10.45 lb/hr); CO – 4.0 g/hp-hr (20.89 lb/hr); and VOC – 1.0 g/hp-hr (5.22 lb/hr). The proposed emissions for this engine are NO<sub>x</sub> – 2.61 lb/hr; CO – 0.73 lb/hr; and VOC – 1.46 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 do not apply to the facility:

**40CFR60 Subpart Dc** (Standards of Performance for Small Industrial/Commercial/Institutional Steam Generating Units)

40CFR60 Subpart Dc applies to steam generating units. The rule further defines a *steam generating unit* as a device that combusts any fuel and produces steam or heats water or any other heat transfer medium. However, this term does not include process heaters as defined in this subpart. *Process heater* is defined as a device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst. Therefore this rule does not apply to the proposed process heaters.

**40CFR60 Subpart Kb** (Standards of Performance for Volatile Organic Liquid Storage Vessels)

The affected facility to which this subpart applies is each storage vessel with a capacity greater than or equal to 75 cubic meters ( $m^3$ ) (19,813 gallons) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984. This subpart does not apply to storage vessels with a capacity greater than or equal to 151  $m^3$  storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75  $m^3$  but less than 151  $m^3$  storing a liquid with a maximum true vapor pressure less than 15.0 kPa. This subpart also does not apply to pressure vessels designed to operate in excess of 204.9 kPa and without emissions to the atmosphere.

For the tanks on the gas plant side of the facility, there will be 4 – 70,000 gallon tanks. These tanks will be pressurized tanks and will not have any emissions. Under normal conditions the contents of the tanks will be unloaded via pipeline. In cases when the pipeline is not operational there will be an emergency truck rack to be able to load product into pressurized trucks. In this case the only emissions would be from the hose disconnect. Because these tanks are pressurized with no emissions they will not be subject to NSPS Subpart Kb.

For the tanks on the compressor station side of the facility, there will be five (5) tanks. One tank will be a 500 bbl gunbarrel tank and the other four will be 400 bbl and used for water or condensate. For these tanks the uncontrolled emission factor will be greater than 6 tpy per tank. Therefore, MarkWest is installing a VRU to control emissions from these tanks that is expected to get 98% control efficiency. These tanks are not subject to NSPS Subpart Kb because they contain a naturally occurring condensate mixture prior to custody transfer and will be less than 1589.874  $m^3$  in volume [40 CFR 60.110b(d)(4)]. These tanks will be subject to NSPS Subpart OOOO as recently published in the federal register. As such, monitoring requirements as found in the NSPS Subpart VVa (40 CFR 60.482-489) will be applicable for the tanks and VRU.

**40CFR60 Subpart 60.18** (General Control Device and Work Practice Requirements)

40CFR60 Subpart 60.18 contains requirements for control devices when they are used to comply with applicable subparts of 40CFR60 and 40CFR61. The flare is not used to comply with any NSPS or NESHAP. Therefore, MarkWest is not subject to this standard.

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

**40CFR63 Subpart HHH** (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 HHH 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.

**45CSR14** (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants)

**45CSR19** (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment)

The Sherwood Gas Plant is located in Doddridge County which is an attainment county for all regulated pollutants. Because Doddridge County is an attainment county, 45CSR19 does not apply to this facility.

As shown in the table below, MarkWest is not subject to 45CSR14 or 45CSR19 review.

| <b>Pollutant</b>                   | <b>PSD (45CSR14) Threshold (tpy)</b> | <b>NANSR (45CSR19) Threshold (tpy)</b> | <b>Sherwood PTE (tpy)</b> | <b>45CSR14 or 45CSR19 Review Required?</b> |
|------------------------------------|--------------------------------------|--|---------------------------|--|
| Carbon Monoxide                    | 250                                  | NA                                     | 45.73                     | No   |
| Nitrogen Oxides                    | 250                                  | NA                                     | 96.35                     | No   |
| Sulfur Dioxide                     | 250                                  | NA                                     | 0.37                      | No   |
| Particulate Matter 2.5             | 250                                  | NA                                     | 8.96                      | No   |
| Ozone (VOC)                        | 250                                  | NA                                     | 37.39                     | No   |
| Greenhouse Gas (CO <sub>2</sub> e) | 100,000                              | NA                                     | 76,068                    | No   |

## 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 shown in the table listed in the Regulatory Discussion Section.

## SOURCE AGGREGATION

“Building, structure, facility, or installation” is defined as all the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous and adjacent properties, and are under the control of the same person.

The Sherwood Gas Plant is located in Doddridge County and has an estimated production rate of 230 million standard cubic feet of gas per day (mmscfd).

1. The Sherwood Gas Plant will operate under SIC code 1321 (Natural Gas Liquids Extraction). MarkWest does not own or operate any gas wells. There are other gas plants and proposed compressor stations operated by MarkWest that share the same two-digit major SIC code of 13 for oil and gas exploration and production. Therefore, the Sherwood Gas Plant does share the same SIC code as surrounding facilities.
2. “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 a plant. 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 closest MarkWest facility is the Mobley Gas Plant which is located approximately 20.5 miles from the Sherwood facility. MarkWest is planning to apply for a permit for a compressor station that would be located approximately 7.9 miles from the Sherwood facility. Operations separated by these distances do not meet the common sense notion of a plant. Therefore, the properties in question are not considered to be on contiguous or adjacent property.

3. MarkWest does operate and control other gas plants and compressor stations in the area. From this analysis, MarkWest is under common control with other facilities in the area.

Because the facilities are not considered to be on contiguous or adjacent properties the emissions from the Sherwood Gas Plant should not be aggregated with other facilities in determining major source or PSD status.

### 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.
2. Monitor all applicable requirements of 40CFR60 Subparts KKK, IIII and JJJJ.
3. Monitor and record the operating hours of the flare.
4. Monitor the presence of the flare pilot flame using a thermocouple or any other equivalent device to detect the presence of a flame at the flare.

MarkWest will be required to perform the following recordkeeping:

1. Maintain records of the amount of natural gas consumed in each combustion source.
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.
7. Maintain records of all applicable requirements of 40CFR60 Subparts KKK, IIII and JJJJ.

### 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 Doddridge 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