



**west virginia department of environmental protection**

Division of Air Quality  
601 57<sup>th</sup> Street SE  
Charleston, WV 25304  
Phone (304) 926-0475 • FAX: (304) 926-0479

Earl Ray Tomblin, Governor  
Randy C. Huffman, Cabinet Secretary  
[www.wvdep.org](http://www.wvdep.org)

**ENGINEERING EVALUATION / FACT SHEET**

**BACKGROUND INFORMATION**

Application No.: R13-2914B  
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: Modification  
Received Date: February 3, 2014  
Engineer Assigned: Jerry Williams, P.E.  
Fee Amount: \$2,000.00  
Date Received: February 3, 2014  
Complete Date: April 25, 2014  
Due Date: July 24, 2014  
Applicant Ad Date: February 25, 2014  
Newspaper: *The Exponent Telegram*  
UTM's: Easting: 526.921 km      Northing: 4,346.885 km      Zone: 17  
Description: Expansion of the Sherwood Gas Plant to add three (3) additional processing plants to increase the processing capability of the facility from 690 million standard cubic feet per day (mmscfd) to 1,380 mmscfd.

**Promoting a healthy environment.**

## DESCRIPTION OF PROCESS

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

MarkWest currently operates the Sherwood I, II, and III plants at this location. This application is to add three (3) additional depropanizers (cryogenic plants) that will be named IV, V, and VI. This will include the installation of:

- Three (3) new Depropanizer processing trains to remove liquids from gas streams, each rated at 230 mmscfd.
- Process heaters (Three (3) 18.0 MMBTU/hr regenerators, one (1) 6.60 MMBTU/hr hot oil heater, one (1) 2.28 MMBTU/hr condensate liquid stabilizer heater) to support the depropanizers.
- Modification of component fugitives to reflect the new processes and most recent gas analysis.
- Removal of two (2) previously existing emergency generators powered by 1,115 hp Cummins diesel engines.

The Sherwood Gas Plant will be used as a processing plant and compressor station for gas wells throughout West Virginia. The low pressure 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 compression and passing through the TEG dehydration unit the natural gas will enter the gas plant where it will be processed along with the high pressure natural gas inlet. The combined stream will pass through a molecular sieve to remove any excess water in the gas stream prior to entering the 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 outlet 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. 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 currently exists 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 May 22, 2012 by James Jarrett of the DAQ Enforcement Section.

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 three (3) mole sieve regeneration heaters, one (1) hot oil heater and one (1) stabilization heater. In addition, two (2) emergency generators are being removed as a part of this modification. The component fugitives have been modified to reflect the new processes and most recent gas analysis.

The following table indicates which methodology was used in the emissions determination:

| <b>Emission Unit ID#</b>   | <b>Process Equipment</b>                      | <b>Calculation Methodology</b> |
|----------------------------|---|--------------------------------|
| H-4711<br>H-5711<br>H-6711 | 18.00 MMBTU/hr Mole Sieve Regeneration Heater | EPA AP-42 Emission Factors     |
| H-4712                     | 6.60 MMBTU/hr Hot Oil Heater                  | EPA AP-42 Emission Factors     |
| H-742                      | 2.28 MMBTU/hr Stabilization Heater            | EPA AP-42 Emission Factors     |

Fugitive emissions for the facility are based on calculation methodologies presented in EPA AP-42 Table 2.4, Oil & Gas Production Operations Average Emission Factors Protocol for Equipment Leak Emission Estimates. Emission factors are based on the average measured Total Organic Compound (TOC) from component types indicated in gas service at oil and gas production operations. The volatile organic compound (VOC) and hazardous air pollutant (HAP) weight percent is based on a representative gas analysis.

The total facility emissions after this proposed modification are shown in the following table:

| <b>Pollutant</b>           | <b>Maximum Pre-Modification Annual Facility Wide Emissions (tons/year)</b> | <b>Maximum Post-Modification Annual Facility Wide Emissions (tons/year)</b> | <b>Net Facility Wide Emissions Changes (tons/year)</b> |
|----------------------------|--|---|--|
| Nitrogen Oxides            | 98.42  | 77.97   | -20.45   |
| Carbon Monoxide            | 49.86  | 43.27   | -6.59  |
| Volatile Organic Compounds | 53.56  | 86.05   | 32.49  |
| Particulate Matter-10      | 9.43   | 9.32  | -0.11  |
| Sulfur Dioxide             | 0.41   | 0.52  | 0.11   |
| Formaldehyde               | 4.37   | 4.38  | 0.01   |
| Total HAPs                 | 15.61  | 15.53   | -0.08  |
| Carbon Dioxide Equivalent  | 91,955   | 120,736   | 28,781   |

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

## MarkWest Liberty Midstream & Resources, L.L.C – Sherwood Gas Plant (R13-2914B)

| Emission Point ID# | Source                             | NO <sub>x</sub> |              | CO          |              | VOC          |              | PM-10/2.5   |             | SO <sub>2</sub> |             | Total HAPs  |              | Formaldehyde |             | CO <sub>2e</sub> |
|--------------------|------------------------------------|-----------------|--------------|-------------|--------------|--------------|--------------|-------------|-------------|-----------------|-------------|-------------|--------------|--------------|-------------|------------------|
|                    |                                    | lb/hr           | ton/year     | lb/hr       | ton/year     | lb/hr        | ton/year     | lb/hr       | ton/year    | lb/hr           | ton/year    | lb/hr       | ton/year     | lb/hr        | ton/year    | ton/year         |
| CM-1001            | 4,735 hp Compressor Engine         | 5.22            | 22.86        | 1.46        | 6.40         | 1.67         | 7.32         | 0.35        | 1.55        | 0.02            | 0.09        | 1.10        | 4.84         | 0.42         | 1.83        | 18142            |
| CM-1002            | 4,735 hp Compressor Engine         | 5.22            | 22.86        | 1.46        | 6.40         | 1.67         | 7.32         | 0.35        | 1.55        | 0.02            | 0.09        | 1.10        | 4.84         | 0.42         | 1.83        | 18142            |
| CM-2001            | 2,370 hp Compressor Engine         | 2.61            | 11.44        | 0.73        | 3.20         | 1.46         | 6.41         | 0.16        | 0.69        | 0.01            | 0.04        | 0.46        | 2.02         | 0.16         | 0.69        | 9115             |
| H-711              | 7.86 MMBTU/hr MS Regen Heater      | 0.24            | 1.03         | 0.47        | 2.07         | 0.04         | 0.17         | 0.05        | 0.23        | <0.01           | 0.02        | 0.01        | 0.06         | <0.01        | <0.01       | 4431             |
| H-771              | 28.25 MMBTU/hr Hot Oil Heater      | 0.85            | 3.71         | 1.70        | 7.42         | 0.14         | 0.61         | 0.19        | 0.84        | 0.02            | 0.07        | 0.05        | 0.21         | <0.01        | <0.01       | 15926            |
| DH-001             | 120 mmscfd TEG Dehy Unit           | -               | -            | -           | -            | 2.07         | 8.84         | -           | -           | -               | -           | 0.34        | 1.47         | -            | -           | 3047             |
| RB-001             | 2 MMBTU/hr Dehy Reboiler           | 0.18            | 0.78         | 0.15        | 0.66         | 0.01         | 0.04         | 0.01        | 0.06        | <0.01           | <0.01       | <0.01       | 0.01         | <0.01        | <0.01       | 1128             |
| FL-991             | Emergency Flare                    | 0.11            | 0.48         | 0.09        | 0.40         | <0.01        | 0.03         | 0.01        | 0.04        | <0.01           | <0.01       | <0.01       | <0.01        | <0.01        | <0.01       | 10               |
| TNK-001            | Storage Tank Flashing Emissions    | -               | -            | -           | -            | 3.55         | 9.58         | -           | -           | -               | -           | 0.26        | 0.92         | -            | -           | 351              |
| H-2711             | 7.86 MMBTU/hr MS Regen Heater      | 0.24            | 1.03         | 0.47        | 2.07         | 0.04         | 0.17         | 0.05        | 0.23        | <0.01           | 0.02        | 0.01        | 0.06         | <0.01        | <0.01       | 4431             |
| H-3711             | 7.86 MMBTU/hr MS Regen Heater      | 0.24            | 1.03         | 0.47        | 2.07         | 0.04         | 0.17         | 0.05        | 0.23        | <0.01           | 0.02        | 0.01        | 0.06         | <0.01        | <0.01       | 4431             |
| H-4711             | 18.00 MMBTU/hr MS Regen Heater     | 0.72            | 3.15         | 0.72        | 3.15         | 0.34         | 1.50         | 0.23        | 1.02        | 0.01            | 0.04        | 0.03        | 0.13         | <0.01        | <0.01       | 10148            |
| H-5711             | 18.00 MMBTU/hr MS Regen Heater     | 0.72            | 3.15         | 0.72        | 3.15         | 0.34         | 1.50         | 0.23        | 1.02        | 0.01            | 0.04        | 0.03        | 0.13         | <0.01        | <0.01       | 10148            |
| H-6711             | 18.00 MMBTU/hr MS Regen Heater     | 0.72            | 3.15         | 0.72        | 3.15         | 0.34         | 1.50         | 0.23        | 1.02        | 0.01            | 0.04        | 0.03        | 0.13         | <0.01        | <0.01       | 10148            |
| H-4712             | 6.60 MMBTU/hr Hot Oil Heater       | 0.26            | 1.16         | 0.26        | 1.16         | 0.13         | 0.55         | 0.09        | 0.38        | <0.01           | 0.02        | 0.01        | 0.05         | <0.01        | <0.01       | 3721             |
| H-6712             | 6.60 MMBTU/hr Hot Oil Heater       | 0.26            | 1.16         | 0.26        | 1.16         | 0.13         | 0.55         | 0.09        | 0.38        | <0.01           | 0.02        | 0.01        | 0.05         | <0.01        | <0.01       | 3721             |
| H-742              | 2.28 MMBTU/hr Stabilization Heater | 0.22            | 0.96         | 0.19        | 0.81         | 0.01         | 0.05         | 0.02        | 0.07        | <0.01           | <0.01       | <0.01       | 0.02         | <0.01        | <0.01       | 1285             |
| FUG-001            | Fugitive Leaks                     | -               | -            | -           | -            | 8.72         | 38.21        | -           | -           | -               | -           | 0.10        | 0.45         | -            | -           | 138              |
| BD                 | Blowdowns                          | -               | -            | -           | -            | NA           | 1.60         | -           | -           | -               | -           | NA          | 0.07         | -            | -           | 2273             |
| <b>Total</b>       | <b>Total Facility PIE</b>          | <b>17.80</b>    | <b>77.97</b> | <b>9.88</b> | <b>43.27</b> | <b>20.65</b> | <b>86.05</b> | <b>2.13</b> | <b>9.32</b> | <b>0.12</b>     | <b>0.52</b> | <b>3.56</b> | <b>15.53</b> | <b>1.00</b>  | <b>4.38</b> | <b>120736</b>    |

\* Flare emissions are those emissions that exist under routine/planned activities.

## REGULATORY APPLICABILITY

The following rules apply to this modification:

### **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.

The individual heat input of the proposed hot oil heater (H-4712) and Stabilization Heater (H-742) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR2.

45CSR2 classifies the Mole Sieve Regeneration Heaters (H-4711, H-5711, H-6711) as 'type b' units. The allowable PM emission rate for these units would be the product of 0.09 and the total design heat input of the heaters.

| <b>Total Design Heat Input (MMBTU/hr)</b> | <b>45CSR2 Multiplier</b> | <b>Allowable PM Emission Rate (lb/hr)</b> | <b>Proposed PM<sub>total</sub> Emission Rate (lb/hr)</b> |
|---|--------------------------|---|--|
| 18.00                                     | 0.09                     | 1.62                                      | 0.23   |

As shown in the table above, MarkWest would meet this rule.

### **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 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 3 (weight emission standard), 6 (registration), 7 (permits), and 8 (testing, monitoring, recordkeeping, reporting). 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.

The individual heat input of the proposed hot oil heater (H-4712) and Stabilization Heater (H-742) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR10.

45CSR10 classifies the classifies the Mole Sieve Regeneration Heaters (H-4711, H-5711, H-6711) as ‘type b’ units. The allowable SO<sub>2</sub> emission rate for these units would be the product of 3.1 and the total design heat input of the heaters.

| <b>Total Design Heat Input (MMBTU/hr)</b> | <b>45CSR10 Multiplier</b> | <b>Allowable SO<sub>2</sub> Emission Rate (lb/hr)</b> | <b>Proposed SO<sub>2</sub> Emission Rate (lb/hr)</b> |
|---|---------------------------|---|--|
| 18.00                                     | 3.1                       | 55.80   | 0.01   |

As shown in the table above, 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’s proposed modification exceeds the regulatory emission threshold for criteria pollutants of 6 lb/hr and 10 ton/year.

MarkWest paid the appropriate application fee and published the required legal advertisement for this modification application.

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

MarkWest is a major source subject to 45CSR30 due to their greenhouse gas (CO<sub>2</sub>e) emissions exceeding major source thresholds. As a result of the granting of this permit, MarkWest is a major source subject to 45CSR30. The Title V (45CSR30) application will be due within twelve (12) months after the date of the commencement of the operation or activity (activities) authorized by this permit.

**40CFR60 Subpart OOOO** (Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution)

EPA published in the Federal Register new source performance standards (NSPS) and air toxics rules for the oil and gas sector on August 16, 2012. 40CFR60 Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO<sub>2</sub>) emissions from affected facilities that commence construction, modification or reconstruction after August 23, 2011. The following affected sources which commence construction, modification or reconstruction after August 23, 2011 are subject to the applicable provisions of this subpart:

- a. Each gas well affected facility, which is a single natural gas well.

*There are no gas wells at this facility. Therefore, all requirements regarding gas well affected facilities under 40 CFR 60 Subpart OOOO would not apply.*

- b. Each centrifugal compressor affected facility, which is a single centrifugal compressor using wet seals that is located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. For the purposes of this subpart, your centrifugal compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A centrifugal compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

*There are no centrifugal compressors at the Sherwood Gas Plant. Therefore, all requirements regarding centrifugal compressors under 40 CFR 60 Subpart OOOO would not apply.*

- c. Each reciprocating compressor affected facility, which is a single reciprocating compressor located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. For the purposes of this subpart, your reciprocating compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A reciprocating compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

*There are reciprocating internal combustion engines located at the Sherwood Gas Plant that were constructed after August 23, 2011. Therefore, the requirements regarding reciprocating compressors under 40 CFR 60 Subpart OOOO would apply. MarkWest would be required to perform the following:*

- Replace the reciprocating compressor rod packing at least every 26,000 hours of operation or 36 months..
- Demonstrate initial compliance by continuously monitoring the number of hours of operation or track the number of months since the last rod packing replacement.
- Submit the appropriate start up notifications.
- Submit the initial annual report for the reciprocating compressors.
- Maintain records of hours of operation since last rod packing replacement, records of the date and time of each rod packing replacement, and records of deviations in cases where the reciprocating compressor was not operated in compliance.

d. Pneumatic Controllers

Each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller which commenced construction after August 23, 2011, and is located at a natural gas processing plant.

*The pneumatic controllers located at the Sherwood Gas Plant are air driven. Only natural gas driven pneumatic controllers are subject to this rule. Therefore, all requirements regarding pneumatic controllers under 40 CFR 60 Subpart OOOO would not apply.*

e. Each storage vessel affected facility, which is a single storage vessel, located in the oil and natural gas production segment, natural gas processing segment or natural gas transmission and storage segment.

40CFR60 Subpart OOOO defines a storage vessel as a unit that is constructed primarily of nonearthen materials (such as wood, concrete, steel, fiberglass, or plastic) which provides structural support and is designed to contain an accumulation of liquids or other materials. The following are not considered storage vessels:

- Vessels that are skid-mounted or permanently attached to something that is mobile (such as trucks, railcars, barges or ships), and are intended to be located at a site for less than 180 consecutive days. If the source does not keep or are not able to produce records, as required by §60.5420(c)(5)(iv), showing that the vessel has been located at a site for less than 180 consecutive days, the vessel described herein is considered to be a storage vessel since the original vessel was first located at the site.
- Process vessels such as surge control vessels, bottoms receivers or knockout vessels.
- Pressure vessels designed to operate in excess of 204.9 kilopascals and without emissions to the atmosphere.

This rule requires that the permittee determine the VOC emission rate for each storage vessel affected facility utilizing a generally accepted model or calculation methodology within 30 days of startup, and minimize emissions to the extent practicable during the 30 day period using good engineering practices. For each storage vessel affected facility that emits more than 6 tpy of VOC, the permittee must reduce VOC emissions by 95% or greater within 60 days of startup. The compliance date for applicable storage vessels is October 15, 2013.

*The storage vessels located at the Sherwood Gas Plant emit less than 6 tpy of VOC. Therefore, MarkWest is not required by this section to reduce VOC emissions by 95%.*

- f. The group of all equipment, except compressors, within a process unit is an affected facility.
- Addition or replacement of equipment for the purpose of process improvement that is accomplished without a capital expenditure shall not by itself be considered a modification under this subpart.
  - Equipment associated with a compressor station, dehydration unit, sweetening unit, underground storage vessel, field gas gathering system, or liquefied natural gas unit is covered by §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart if it is located at an onshore natural gas processing plant. Equipment not located at the onshore natural gas processing plant site is exempt from the provisions of §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart.
  - The equipment within a process unit of an affected facility located at onshore natural gas processing plants and described in paragraph (f) of this section are exempt from this subpart if they are subject to and controlled according to subparts VVa, GGG or GGGa of this part.

*The Sherwood Gas Plant is a natural gas processing plant that was modified after August 23, 2011. Therefore, Leak Detection and Repair (LDAR) requirements for onshore natural gas processing plants would apply.*

- g. Sweetening units located at onshore natural gas processing plants that process natural gas produced from either onshore or offshore wells.
- Each sweetening unit that processes natural gas is an affected facility; and
  - Each sweetening unit that processes natural gas followed by a sulfur recovery unit is an affected facility.
  - Facilities that have a design capacity less than 2 long tons per day (LT/D) of hydrogen sulfide (H<sub>2</sub>S) in the acid gas (expressed as sulfur) are required to comply with recordkeeping and reporting requirements specified in §60.5423(c) but are not required to comply with §§60.5405 through 60.5407 and paragraphs 60.5410(g) and 60.5415(g) of this subpart.
  - Sweetening facilities producing acid gas that is completely reinjected into oil-or-gas-bearing geologic strata or that is otherwise not released to the atmosphere are not subject to §§60.5405 through 60.5407, 60.5410(g), 60.5415(g), and 60.5423 of this subpart.

*There are no sweetening units at the Sherwood Gas Plant. Therefore, all requirements regarding sweetening units under 40 CFR 60 Subpart OOOO would not apply.*

The following regulations do not apply to the facility:

**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 and on or before August 23, 2011. This modification to the Sherwood Plant occurred after August 23, 2011. MarkWest will be required to meet the LDAR requirements of Subpart OOOO for natural gas processing facilities. Therefore, MarkWest is not subject to 40CFR60 Subpart KKK and will be subject to 40CFR60 Subpart OOOO.

**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.

**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 unclassified county for all regulated pollutants. Because Doddridge County is an unclassified county, 45CSR19 does not apply to this facility.

Following this modification, the Sherwood Gas Plant will have an annual CO<sub>2</sub>e emissions rate above 100,000 tpy. Therefore, all future modifications to this facility will need to be analyzed to determine whether the changes would exceed any of the PSD Significant Emission Rates (SER).

MarkWest provides services to natural gas producers. Each plant construction project undertaken by MarkWest is a complete and independent project. Plants are built solely upon a producer's request and commitment to supply natural gas for the plant under negotiated processing and fractionation agreements. MarkWest designs, builds and permits a plant based upon contractual capacity commitments. If, in the future, one or more producer customers develop new or additional production, those producers may enter into a separate contractual commitment to deliver additional quantities of gas, and depending on those quantities, another plant may be necessary. In such a circumstance, the producer will negotiate with MarkWest for the construction an additional plant, and MarkWest will apply for a corresponding permit. Plant construction and permitting is

contingent upon producer customer's operations and business plans, which are variable and unpredictable. According to MarkWest the current modification that is being requested was unknown at the time of prior permit submissions, and therefore, could not have been included in any prior permits.

### 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 will have an estimated production rate of 1,380 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 proposed Zinnia Compressor Station which will 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:

- Monitor and record quantity of natural gas consumed for all engines and combustion sources.
- Monitor all applicable requirements of 40CFR60 Subparts OOOO, IIII and JJJJ.
- Monitor and record the operating hours of the flare.
- 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:

- Maintain records of the amount of natural gas consumed in each combustion source.
- 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
- Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
- Maintain records of the visible emission opacity tests conducted per the permit.
- 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.
- 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.
- Maintain records of all applicable requirements of 40CFR60 Subparts OOOO, IIII and JJJJ.

CHANGES TO PERMIT R13-2914A

The Sherwood Gas Plant is currently permitted to process up to 690 mmscfd of natural gas. The expansion would include three (3) additional processing plants with the ability to process a maximum of 690 mmscfd of natural gas for a total of 1,380 mmscfd throughput for the facility. Some of the equipment at the current facility can be used to support multiple gas plants. Three (3) additional depropanizers and associated process heaters will be installed. Additionally, fugitive emissions will increase as the number of components will also increase.

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 modification permit for their facility.

---

Jerry Williams, P.E.  
Engineer

---

Date