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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2878C
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: Modification
Received Date: April 22, 2013, September 10, 2013 (Application Resubmittal)
Engineer Assigned: Jerry Williams, P.E.
Fee Amount: \$2,000.00
Date Received: April 22, 2013
Complete Date: October 16, 2013
Due Date: January 14, 2014
Applicant Ad Date: October 16, 2013
Newspaper: *The Wetzel Chronicle*
UTM's: Easting: 538.099 km Northing: 4,378.315 km Zone: 17
Description: Modification application to add a third and fourth processing plant with two (2) regeneration gas heaters, one (1) heat medium oil heater, and fugitive emissions. In addition, this permitting action will establish the existing Mobley I facility as a synthetic minor source of greenhouse gases (CO₂e).

DESCRIPTION OF PROCESS

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

Mobley Gas Plant III and IV will be used in conjunction with Mobley Gas Plant I and II as a gathering station and natural gas processing plant 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 emergency and/or upset conditions at the facility.

The Mobley Gas Plant is currently used for processing natural gas at a rate of 365 million standard cubic feet per day (mmscfd). MarkWest proposes to build a third and fourth processing plant, each capable of 200 mmscfd, that will increase the facility processing capacity to 765 mmscfd. With the addition of the additional processing plants, another three (3) heaters will be required. These include two (2) 7.69 million British Thermal Units per hour (MMBTU/hr) regeneration gas heaters (H-3741, H-4741), and one 16.07 MMBTU/hr heat medium oil heater (H-3781) to be shared by both plants. Also, the operation of both plants will result in increased fugitive emissions from component leaks.

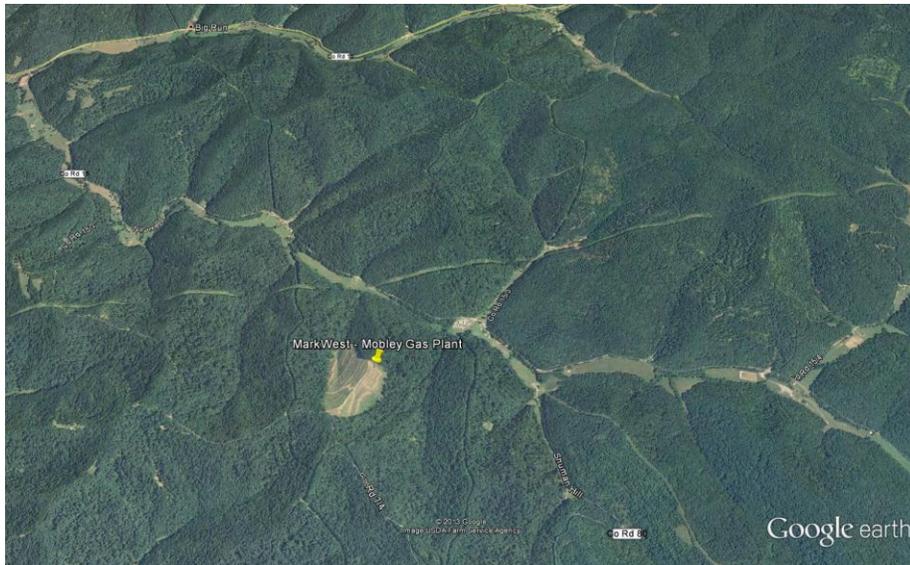
MarkWest is also requesting a limitation of fuel usage at the Mobley I facility to make this source a synthetic minor source of greenhouse gas (CO₂e) emissions. From the startup of the facility in November 2012 until September 2013, the actual CO₂e emissions total 27,486 tons, which includes the emissions from three (3) diesel generator engines which have been removed and the annual potential to emit from fugitive sources. This amount is below the 100,000 tons per year (tpy) limit for determining Prevention of Significant Deterioration (PSD) review. In order for Mobley I to remain a minor source, MarkWest is requesting a fuel usage limit of 1,550,000 MMBTU/yr for all components in the Mobley I & II facility. This limit results in annual CO₂e emissions of 90,401 tpy and when combined with fugitive emissions of 642 tpy, results in an overall emission rate of 91,043 tpy for the Mobley I & II facility.

SITE INSPECTION

A site inspection was conducted on February 29, 2012 Jamie Jarrett of the DAQ Enforcement Section. The facility had not been constructed at that time. The site was remote and there were no visible residences. Latitude: 39.553675, Longitude: -80.556542.

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 modification application consist of the emissions from two (2) regeneration gas heaters, one (1) heat medium oil heater, and fugitive emissions. Fugitive emissions for the facility are based on calculation methodologies presented in EPA Protocol for Equipment Leak Emission Estimates. The following table indicates which methodology was used in the emissions determination:

Emission Unit ID#	Emission Point ID#	Process Equipment	Calculation Methodology
H-3741	H-3741	7.69 MMBTU/hr Regeneration Gas Heater	EPA AP-42 Emission Factors
H-4741	H-4741	7.69 MMBTU/hr Regeneration Gas Heater	EPA AP-42 Emission Factors
H-3781	H-3781	16.07 MMBTU/hr Heat Medium Oil Heater	EPA AP-42 Emission Factors
FUG-004	FUG-004	Fugitive Equipment Leaks	EPA AP-42 Emission Factors

The total facility PTE for the Moblely Gas Plant is shown in the following table:

Pollutant	Facility Wide PTE (tons/year)
Nitrogen Oxides	100.29
Carbon Monoxide	68.59
Volatile Organic Compounds	49.97
Particulate Matter-10	13.75
Sulfur Dioxide	0.63
Total HAPs	14.92
Carbon Dioxide Equivalent	146,486

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

MarkWest Liberty Midstream & Resources, L.L.C. – Mobley Gas Plant (R13-2878C)

Emission Point ID#	Source	NO _x		CO		VOC		PM		SO ₂		Total HAPs		CO ₂ e	
		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
CM-1001	1,980 hp Waukesha SI ICE	0.87	3.83	1.14	4.99	0.52	2.29	0.30	1.31	0.01	0.04	0.21	0.92	1986	8697
CM-1002	1,980 hp Waukesha SI ICE	0.87	3.83	1.14	4.99	0.52	2.29	0.30	1.31	0.01	0.04	0.21	0.92	1986	8697
CM-1003	1,980 hp Waukesha SI ICE	0.87	3.83	1.14	4.99	0.52	2.29	0.30	1.31	0.01	0.04	0.21	0.92	1986	8697
CM-1004	1,980 hp Waukesha SI ICE	0.87	3.83	1.14	4.99	0.52	2.29	0.30	1.31	0.01	0.04	0.21	0.92	1986	8697
CM-1005	1,980 hp Waukesha SI ICE	0.87	3.83	1.14	4.99	0.52	2.29	0.30	1.31	0.01	0.04	0.21	0.92	1986	8697
CM-1006	1,980 hp Waukesha SI ICE	0.87	3.83	1.14	4.99	0.52	2.29	0.30	1.31	0.01	0.04	0.21	0.92	1986	8697
C-102	4,735 hp CAT SI ICE	5.22	22.86	1.44	6.29	2.63	11.52	0.35	1.55	0.02	0.09	0.88	3.84	4517	19785
C-103	4,735 hp CAT SI ICE	5.22	22.86	1.44	6.29	2.63	11.52	0.35	1.55	0.02	0.09	0.88	3.84	4517	19785
H-741	6.84 MMBTU/hr Regen. Gas Heater	0.36	1.59	0.28	1.23	0.03	0.15	0.05	0.21	<0.01	0.02	0.01	0.05	880	3856
H-781	26.0 MMBTU/hr Heat Med Oil Heater	2.31	10.13	1.94	8.51	0.13	0.56	0.18	0.77	0.01	0.06	0.04	0.19	3385	14825
H-1741	8.12 MMBTU/hr Regen. Gas Heater	0.43	1.88	0.33	1.46	0.04	0.18	0.05	0.22	<0.01	<0.01	<0.01	0.01	1045	4577
H-1781	18.05 MMBTU/hr Heat Med Oil Heater	1.61	7.03	1.35	5.91	0.09	0.39	0.12	0.53	0.01	0.04	0.03	0.13	2323	10174
H-3741	7.69 MMBTU/hr Regen. Gas Heater	0.41	1.79	0.32	1.38	0.04	0.18	0.06	0.25	<0.01	0.02	0.02	0.06	1091	4777
H-4741	7.69 MMBTU/hr Regen. Gas Heater	0.41	1.79	0.32	1.38	0.04	0.18	0.06	0.25	<0.01	0.02	0.02	0.06	1091	4777
H-3781	16.07 MMBTU/hr Heat Med Oil Heater	1.58	6.90	1.32	5.80	0.09	0.38	0.12	0.52	0.01	0.04	0.03	0.13	2279	9983
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	170	746
FUG-004	Fugitive Equipment Leaks	0.00	0.00	0.00	0.00	2.54	11.14	0.00	0.00	0.00	0.00	0.25	1.08	232	1017
Total	Total Facility PTE	22.88	100.29	15.67	68.59	11.39	49.97	3.15	13.75	0.14	0.63	3.43	14.92	33444	146486

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

Pollutant	Maximum Pre-Modification Annual Facility Wide Emissions (tons/year)	Maximum Post-Modification Annual Facility Wide Emissions (tons/year)	Net Facility Wide Emissions Changes (tons/year)
Nitrogen Oxides	89.45	100.29	10.84
Carbon Monoxide	59.72	68.59	8.87
Volatile Organic Compounds	45.35	49.97	4.62
Particulate Matter	12.53	13.75	1.22
Sulfur Dioxide	0.55	0.63	0.08
Formaldehyde	3.54	3.55	0.01
Total HAPs	14.67	14.92	0.25
Carbon Dioxide Equivalent	126,575	146,486	19,911

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. 45CSR2 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 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 Regeneration Gas Heaters (H-3741, H-4741) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR2.

45CSR2 classifies the Heat Medium Oil Heater (H-3781) as a 'type b' unit. The allowable PM emission rate for this unit would be the product of 0.09 and the total design heat input of the heater.

Emission Unit	Total Design Heat Input (MMBTU/hr)	45CSR2 Multiplier	Allowable PM Emission Rate (lb/hr)	Proposed PM Emission Rate (lb/hr)
H-3741	16.07	0.09	1.45	0.12

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

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

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 Regeneration Gas Heaters (H-3741, H-4741) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR10.

45CSR10 classifies the Heat Medium Oil Heater (H-3781) as a 'type b' unit. The allowable SO₂ emission rate for this unit would be the product of 3.1 and the total design heat input of the heater.

Emission Unit	Total Design Heat Input (MMBTU/hr)	45CSR2 Multiplier	Allowable SO ₂ Emission Rate (lb/hr)	Proposed SO ₂ Emission Rate (lb/hr)
H-3741	16.07	3.1	49.82	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, and they are also subject to a substantive requirement of an emission control rule promulgated by the Secretary (40CFR60 Subparts Dc, JJJJ, and OOOO).

MarkWest paid the appropriate application fee and published the required legal advertisement for a Class II administrative update.

In addition, because a limitation was placed on fuel usage at the Mobley I facility to make this source a synthetic minor source of greenhouse gas (CO₂e) emissions, MarkWest is subject to Notice Level C (45CSR13 Section 8.5) and will be required to publish a commercial display ad (45CSR13 Section 8.4.a) and post a visible sign at their facility (45CSR13 Section 8.5.a).

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

45CSR16 applies to this source by reference of 40CFR60, Subpart OOOO. These requirements are discussed under that rule below.

45CSR30 (Requirements for Operating Permits)

MarkWest is a major source subject to 45CSR30 due to their greenhouse gas (CO₂e) and nitrogen oxides (NO_x) emissions exceeding major source thresholds. They are also subject to 40CFR60 Subpart OOOO.

The following rules do not apply to this modification:

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. The process heaters at the Mobley facility are dedicated to the removal and separation of NGLs from the gas stream. They do not serve any other purpose such as providing steam for the heating of buildings or for co-generation of electric power. Therefore this rule does not apply to the proposed process heaters.

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. The Mobley Gas Plant was constructed after August 23, 2011 therefore, MarkWest would not be subject to this rule. MarkWest is subject to the requirements of 40CFR60 Subpart OOOO.

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 Mobley Gas Plant is located in Wetzel County, whose attainment status is unclassified. Because Wetzel County is not classified as a non-attainment county, 45CSR19 does not apply to this facility.

The Mobley Gas Plant currently has annual CO₂e emissions of 126,575 tpy. The proposed changes in this application results in a CO₂e emissions increase of 19,911 tpy.

Because MarkWest is an existing major source for CO₂e emissions, the emissions increase must be analyzed. If the annual CO₂e emissions increase exceeds 75,000 tpy, a PSD significant modification occurs. However, MarkWest is not subject to PSD review because the CO₂e emissions increase associated with this permit application is below the significant threshold.

PSD Applicability Determination

The Mobley Gas Plant is an existing Major Stationary Source with respect to PSD because they have potential emissions of greenhouse gases (CO₂e) in excess of 100,000 tons per year. In order for a project to become subject to PSD review, the major stationary source must have a significant emissions increase from the project and a significant net emissions increase as calculated over the 5 year contemporaneous period. The first step is to determine if the proposed project results in a significant emissions increase utilizing the calculation procedures in 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources for the Prevention of Significant Deterioration of Air Quality) Section 3.4. The procedure for calculating whether a significant emissions increase will occur depends on the type of emissions units being modified. The procedure for calculating whether a significant net emissions increase will occur at the major stationary source, which is the second step in the process, is contained in 45CSR14 Section 2.46. Regardless of any such preconstruction projections, a major modification results if the project causes a significant emissions increase and a significant net emissions increase.

In determining whether a significant emissions increase occurs, 45CSR14 provides two (2) ways to make that determination. These calculations are based on whether or not it is an existing emissions unit or a new emissions unit.

45CSR14 Section 2.27 defines an ‘emissions unit’ as any part of a stationary source that emits or would have the potential to emit any regulated NSR pollutant and includes an electric utility steam generating unit as defined in subsection 2.25. For the purposes of this rule, there are two types of emissions units as described in subdivisions 2.27.a and 2.27.b.

2.27.a. A new emissions unit is any emissions unit that is (or will be) newly constructed and that has existed for less than 2 years from the date such emissions unit first operated.

2.27.b. An existing emissions unit is any emissions unit that does not meet the requirements in subdivision 2.27.a. A replacement unit, as defined in subsection 2.68, is an existing emissions unit.

Because Mobley Gas Plant is a new source they will fall under 2.27.a.

Therefore, since emissions units at the Mobley Gas Plant would be considered new units, 45CSR14 Section 3.4.d states that an Actual-to-Potential test would be utilized. A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the potential to emit (as defined in subsection 2.58) and the baseline actual emissions (as defined in subdivisions 2.8.a and 2.8.b), for each existing emissions unit, equals or exceeds the significant amount of that pollutant (as defined in subsection 2.74).

The first step is to determine whether or not the proposed project results in a significant emissions increase utilizing the Actual-to-Potential test. The result of that test will be compared to PSD Significant Emission Rates (SER) to determine PSD applicability. If the resultant emissions are below the PSD SER then the project is not subject to PSD review. If the project's emissions are greater than the PSD SER then all contemporaneous increases and decreases must be examined to determine if the project is subject to PSD Review.

The potential to emit from the emissions units associated with this project were based on the proposed heaters and the increased associated fugitive equipment leaks.

The following table indicates what Mobley Gas Plant's potential emissions increase would be from the proposed modifications:

Pollutant	Emissions increase associated with this modification (tpy)	PSD SER (tpy)	Subject to PSD Review (Y or N)
NO _x	10.84	40	N
CO	8.87	100	N
SO ₂	0.08	40	N
PM ₁₀	1.22	15	N
VOC	4.62	100	N
GHG (CO ₂ e)	19,911	75,000	N

As shown in the table above, none of the pollutants exceeded the SER. Because a SER did not occur, it is not necessary to determine if a SER over a 5 year contemporaneous period occurred.

Final Conclusion

Because there was no emissions increase over the SER, PSD review is not required.

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 seen in the table listed in the Regulatory Discussion Section.

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. 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 and recordkeeping:

1. Maintain records of the amount of natural gas consumed and hours of operation for all engines and combustion sources.
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.

CHANGES TO PERMIT R13-2878B

This permit application is for MarkWest to install and operate a third and fourth processing plant that will raise the capacity of 765 mmscfd (million standard cubic feet per day) of gas throughput. This proposed change will add two (2) regeneration gas heaters, one (1) heat medium oil heater, and increase fugitive emissions. In addition, this permitting action will establish the existing Mobley I facility as a synthetic minor source of greenhouse gases (CO₂e).

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 Mobley Gas Plant should be granted a 45CSR13 modification for their facility.

Jerry Williams, P.E.
Engineer

Date