west virginia department of environmental protection

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

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-1814D
Plant ID No.:	099-00053
Applicant:	MarkWest Energy Appalachia, LLC
Facility Name:	Kenova
Location:	Kenova, Cabell County
SIC Code:	1321
Application Type:	Modification
Received Date:	July 29, 2014
Engineer Assigned:	David Keatley
Fee Amount:	$2,000
Date Received:	July 31, 2014
Complete Date:	October 17, 2014
Due Date:	January 15, 2014
Applicant Ad Date:	September 9, 2014
Newspaper:	*The Herald-Dispatch*
UTM's:	Easting: 360.966 km Northing: 4,248.386 km Zone: 17
Description:	Permit R13-1814D will supersede and replace permit R13-1814C and G60-C053. An existing 3,500 bhp compressor engine will be rebuilt and will be subject to 40CFR60 subpart JJJJ. This facility also has a 230.6 bhp emergency generator which was previously permitted in a separate G60-C.

DESCRIPTION OF PROCESS

This facility is a natural gas liquids (NGL)s extraction plant that dries natural gas and extracts liquid hydrocarbons. The natural gas needs to be dried to avoid ice formation in the cryogenic liquid recovery process. Natural gas is delivered to the facility through underground pipelines from the adjacent Columbia Gas compressor station. First two compressor engines (S-6 and S-2) compress the wet natural gas. One (1) existing engine is a 3,500 bhp four-stoke lean-burn Caterpillar G3612 LE. One (1) proposed rebuilt compressor engine is a 3,550 bhp four-stroke lean-burn Caterpillar G3612 LE with a Miratech oxidation catalyst. The percent reductions should not be less than the following: CO, 95%; VOC, 75%, and 90% formaldehyde. Then a molecular sieve dehydrator is used to absorb water in a desiccant media. This molecular sieve dehydrator has two chambers.

One of the chambers is absorbing water from the process natural gas and the other chamber is being regenerated by a flow of residual natural gas. The 3 MMBtu/hr regenerative gas heater (S-4) heats the residual natural gas to cause the evaporation of the water that is trapped in the desiccant media being regenerated. After the process gas goes through the molecular sieve dehydrator it then goes to the Cryogenic Liquid Recovery Unit to remove the NGLs. After the removal of the liquid product the residual gas is consumed as fuel for the flare (S-3), used to power the two inlet gas compressors (S-6 and S-2), and used as a medium for transferring heat to regenerate the molecular sieve dehydrators. The residual natural gas that is not consumed by this facility returns to the adjacent Columbia Gas compressor station. The mixed liquid hydrocarbons are delivered from this facility to the Mark West Siloam Fractionation Plant (in Kentucky) through an underground pipeline. This facility has a truck loadout (S-5) that loads and unloads NGLs to trucks during periods when the pipeline is out of service. An emergency generator powered by a 230.6 bhp engine will provide back up power if commerical power is unavailable.

SITE INSPECTION

Jamie Jarrett from DAQ's Compliance and Enforcement Section and the permit writer went to this facility on March 8, 2011.

Directions to the facility from Charleston are the following: take I64 W to exit 1 Kenova, take US 52 S for approximately three miles and the facility is on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Air emissions from engine S-6 for NOx, CO, VOCs, and formaldehyde were estimated with Miratech emission factors the other pollutants were estimated with AP-42 emission factors. Emergency generator EG-1 is an existing emergency generator included to show the CO_2e emissions.

Table 1: Maximum Estimated Maximum Controlled Modified Air Emissions

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
S-6	Caterpillar G3612 LE DM8607-02 Natural Gas Compressor Engine	Nitrogen Oxides	3.91	17.14
		Carbon Monoxide	1.10	4.80
		Volatile Organic Compounds	1.57	6.86
		Total Particulate Matter	0.24	1.05
		PM_{10}	0.24	1.05
		Sulfur Dioxide	0.01	0.06
		CO_2e	2,823	12,367

EG-1	Generac QT150 Natural Gas Emergency Generator	Nitrogen Oxides	0.01	0.003
		Carbon Monoxide	0.77	0.19
		Volatile Organic Compounds	0.06	0.02
		Total Particulate Matter	0.04	0.01
		Formaldehyde	0.01	0.003
		CO_2e	241.4	60.3

Table 2: Summarized Estimated Maximum Total Facility Air Emissions

Pollutant	Maximum Annual Facility Wide Emissions (tons/year)
Nitrogen Oxides	35.12
Carbon Monoxide	14.58
Volatile Organic Compounds	19.66
Total Particulate Matter	2.16
PM_{10}	2.16
Sulfur Dioxide	0.10
Formaldehyde	5.76
Total HAP Emissions	9.51

REGULATORY APPLICABILITY

The rules and regulations due to this facilities modification:

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

This facility shall not cause the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public. 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.

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*

This facility is subject to 40CFR60 subpart JJJJ which is considered a substantive requirement and is therefore a modification permit.

45CSR16 (Standards of Performance for New Stationary Sources Pursuant to 40CFR60*)*

45CSR16 incorporates by reference the standards of performance for new stationary sources (40CFR60). This facility has one (1) SI engine that is subject to 40CFR60 Subpart JJJJ and is therefore this facility is subject to 45CSR16.

40CFR60 Subpart KKK- *Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plants*

This facility meets the definition of an onshore natural gas processing plant because this facility extractions natural gas liquids from field gas and is inside the outer continental shelf. This facility will follow the applicable requirements of subpart VV, but follow the exceptions of subpart KKK.

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

40CFR60 Subpart JJJJ sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the date of construction, date of manufacture, and horsepower (hp) of the spark ignition internal combustion engine. All proposed engines will commence construction after June 12, 2006.

Engine EG-1 is subject to this subpart due to the manufacturers date of the engine. EG-1 is a certified engine and the Certificate on Conformity will be available in the file. To keep the designation of certified this engine must be operated and maintained to the manufacturer's emission-related written instructions and must keep records of conducted maintenance to demonstrate compliance.

For engine (S-6) 40CFR60.4248 Table 1 provides the allowable emission standards for stationary spark ignition internal combustion engines. For an engine with a maximum engine power $\geq$500 bhp the allowable emission standards in g/hp-hr are: 1.0 for NOx, 2.0 for CO, and 0.7 for VOC. The emission factor from Miratech in g/hp-hr are: 0.5 for NOx, 0.14 for CO, and 0.16 for VOC. All controlled emission factors are below the allowable emission standards for this regulation.

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

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

The facility is a minor source of hazardous air pollutants (HAPS < 10 tpy of an individual HAP and < 25 tpy of aggregate HAPs) as can be seen in Table 2. The facility is therefore considered an area source (§63.6585(c)). The engines are considered new stationary RICE (§63.6590(a)(2)(iii)) due to the installation date of the engine (S-6 and EG-1) being after June 12, 2006.

Stationary RICE subject to Regulations under 40 CFR Part 60 must meet the requirements of those subparts that apply (40 CFR 60 Subpart JJJJ, for spark ignition engines) if the engine is a new stationary RICE located at an area source (§63.6590(c)(1)). No additional requirements apply for this engine under this subpart.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There will be small amounts of various regulated hazardous air pollutants emitted from the operation of this facility. The facility is a minor source of HAPs as can be seen in Table 2. If you want to obtain additional information about certain hazardous air pollutants feel free to visit [http://www.epa.gov/ttn/atw/hlthef/hapindex.html].

AIR QUALITY IMPACT ANALYSIS

Based on the annual emissions rates this facility will not be a major source as defined by 45CSR14, so no air quality impact analysis was performed.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates compliance with all state and federal air quality requirements will be satisfied. Therefore, it is recommended to the Director of Air Quality the issuance of permit R13-1814D to Mark West's natural gas liquid extraction plant.

David Keatley
Permit Writer - NSR Permitting

October 17, 2014
Date