west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-1814G
Plant ID No.:	099-00053
Applicant:	MarkWest Energy Appalachia LLC
Facility Name:	Kenova
Location:	Kenova, Wayne County
SIC Code:	1321
Application Type:	Modification
Received Date:	November 23, 2016
Engineer Assigned:	David Keatley
Fee Amount:	$2,000
Date Fee Received:	November 28, 2016
Complete Date:	December 28, 2016
Due Date:	March 28, 2017
Applicant Ad Date:	November 25, 2016
Newspaper:	*The Herald-Dispatch*
UTM's:	Easting: 360.966 km Northing: 4,248.386 km Zone: 17
Description:	Permit R13-1814G will supersede and replace permit R13-1814F. Installation and operation of one (1) 3,550 bhp compressor engine. Removal of a 3,500 bhp compressor engine.

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-2A) compress the wet natural gas. One (1) proposed compressor engine (S-2A) is a 3,550 bhp four-stroke lean-burn Caterpillar G3612LE with a Miratech oxidation catalyst. The catalyst will have the following minimum percent reduction of the following regulated air pollutants: CO, 95%, VOC, 75%, and formaldehyde, 90%. One (1) rebuilt existing compressor engine is a 3,550 bhp four-stroke lean-burn Caterpillar G3612 LE (S-6) with a Miratech oxidation catalyst. The percent reductions for shall 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 processed 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. The residue 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 (EG-1) will provide back up power if commercial power is unavailable. Flare S-3 will be used to control an estimated 120 manual blowdowns per year and emergency events.

SITE INSPECTION

Jamie Jarrett from DAQ's Compliance and Enforcement Section and the permit writer went to this facility on March 8, 2011. The facility was determined to be in compliance.

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

All CO_2e emissions were estimated using emission factors from 40CFR98. Air emissions from engine S-2A for NOx, CO, VOCs, and formaldehyde were estimated with Miratech emission factors the remaining air pollutants were estimated with EPA AP-42 emission factors.

Table 1: Maximum Estimated Controlled New PTE

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
S-2A	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	1.03
		PM_{10}	0.24	1.03
		Sulfur Dioxide	0.01	0.06
		Formaldehyde	0.31	1.37
		CO_2e	4,210	18,440

Table 2: Summarized Estimated Maximum Total Facility PTE

Pollutant	Maximum Annual Facility Wide Emissions (tons/year)	Maximum Annual Facility Wide Increase (tons/year)
Nitrogen Oxides	35.12	0
Carbon Monoxide	11.15	-3.66
Volatile Organic Compounds	19.66	1.99
Total Particulate Matter	2.16	0.02
PM_{10}	2.16	0.02
Sulfur Dioxide	0.13	0.03
Formaldehyde	2.77	-3.02
Total HAP Emissions	9.68	-1.90
CO_2e	38,895	6,591

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*

Engine S-2A is subject to 40CFR60 subpart JJJJ which is considered a substantive requirement and therefore requires a modification permit. The applicant paid a $1,000 permit fee and $1,000 NSPS fee. The applicant published their Class I legal advertisement in a paper of general circulation.

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 therefore this facility is subject to 45CSR16.

45CSR22 (Air Quality Management Fee Program)

This facility is a minor source as can be seen in Table 2 and not subject to 45CSR30 since the regulations this facility is subject to are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71. This facility has a total reciprocating engine capacity greater than 1,000 hp and is an 8D source and is required to pay a $500 annual fee. MarkWest is required to keep their Certificate to Operate current.

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.

For engine S-2A 40CFR60.4248 Table 1 provides the allowable emission standards for a stationary spark ignition internal combustion engines. For a lean-burn natural gas fired engine with a maximum engine power greater than 1,350 bhp manufactured after July 1, 2010 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-2A 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

As a result of this application hazardous air pollutants are estimated to decrease as can be seen in Table 2.

AIR QUALITY IMPACT ANALYSIS

Changes made as part of this application will not affect the major source status as defined by 45CSR14, so no air quality impact analysis was performed.

CHANGES TO PERMIT R13-1814F

Section 4.0 has been updated to a more current format in an effort to have more consistent requirements for the same kind of facility. Flare requirements from section 4.0 have been moved to a new section 7.0. and updated to a more current format in an effort to have more consistent requirements for the same kind of facility. Natural gas throughput limit for engine S-6 in section 5.0 was removed because emissions were estimated at 8,760 hrs/year. Truck loading requirements was added to section 7.0. Blowdown limitations have been included in section 8.0.

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 R13-1814G to Mark West's natural gas liquid extraction plant.

David Keatley

David Keatley
Permit Writer - NSR Permitting

January 11, 2017

Date