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.:	R13-3076A
Plant ID No.:	033-00200
Applicant:	E. Marcellus Asset Company, LLC
Facility Name:	Tichenal Station
Location:	Harrison County
NAICS Code:	486210
Application Type:	Modification
Received Date:	November 2, 2015
Engineer Assigned:	David Keatley
Fee Amount:	$2,000
Date Fees Received:	November 2, 2015
Complete Date:	July 1, 2016
Due Date:	September 9, 2016
Applicant Ad Date:	November 2, 2015
Newspaper:	*The Exponent Telegram*
UTM's:	Easting: 547.619 km Northing: 4,337.377 km Zone: 17
Description:	Permit R13-3076A will supersede and replace R13-3076. Permit five (5) 1,380-bhp engines and remove five (5) 1,680-bhp engines from the permit which were never installed. Updated emissions for TEG dehydration units.

DESCRIPTION OF PROCESS

This facility compresses and dehydrates natural gas. Natural gas enters the facility via pipeline and first goes to the inlet separator where liquids fall out of the natural gas stream and flow to the produced water tanks (T01, T02, T08, and T09). The natural gas stream which leaves the inlet separator goes to nine (9) compressors to raise the pressure of the natural gas stream. Drains from the compressors go to the produced water tanks. The compressors are powered by nine compressor engines. Five (5) of the compressor engines (CE-1 through CE-5) are natural gas fired four-stroke rich-burn 1,380-bhp Waukesha L5794GSI. Four (4) of the compressor engines (CE-6 through CE-9) are natural gas fired rich-burn four-stroke 1,680 bhp Waukesha L7044GSI. Engines (CE-1 through

CE-5) are equipped with a non-selective catalyst reduction (NSCR) device. Engine (CE-6 though CE-9) are equipped with Maxim three-way catalyst which reduces the following pollutants by the following percentages: nitrogen oxides, 96.5%; carbon monoxide (CO) 95%, volatile organic compounds (VOCs), 90%; and formaldehyde, 98%. The compressed natural gas stream flows to two (2) triethylene glycol (TEG) dehydration units to reduce the water content of the natural gas stream. Lean TEG will flow countercurrent to the natural gas stream in the contactors to remove water and other constituents. The rich TEG will then be sent to the flash tank where vapors flash and are controlled by the flame zone of the reboiler (98% control efficiency). The liquids from the flash tank then go to the regenerator to remove the water from the rich TEG. The vapors from the regenerator are piped to a condenser to remove most of the water vapor and then piped to the flash zone of the reboiler when the reboiler is not operating the vapors are sent to a Jatco igniter which has a catalyst for a 98% minimum control efficiency. The two (2) 1.5-mmBtu/hr reboilers (RBV-1 and RBV-2) combusts vapors from the flash tank and condenser and warms the regenerator to evaporate water with other pollutants from the rich TEG stream.

SITE INSPECTION

Karl Dettinger from DAQ's Compliance and Enforcment section performed a site visit on March 2, 2015. The facility was deemed in compliance at that time.

From the I-79 Jane Lew exit. Travel west on CR 7 to US 19. Turn right onto US 19 N and travel to the New Bethel United Methodist Church and Cemetary. Proceed approximately 1,000 feet to a fork in the road. Bear left onto Isaac's Creek Road. (CR 38). Travel on CR 38 for approximately 2.8 miles to CR 38/3 (Hurst Hollow Rd.). Turn left onto CR 38/3 for approximately 0.35 miles the facility is on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Table 1: Estimated Maximum Controlled Modified PTE

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
CE-1 through CE-5	Compressor Engine Waukesha L5794GSI 1,380 bhp (Emissions per Unit)	Nitrogen Oxides	1.52	6.66
		Carbon Monoxide	1.83	8.00
		Volatile Organic Compounds	0.30	1.33
		Sulfur Dioxide	0.01	0.03
		Total Particulate Matter	0.23	1.00
		PM_{10}	0.23	1.00
		Formaldehyde	0.12	0.53
		Acetaldehyde	0.04	0.15
		Acrolein	0.04	0.14
		Benzene	0.02	0.09
		Toluene	0.01	0.30
		CO_2e	1,511	6,618

RSV-1 and RSV-2	TEG Dehydration Still Vents (emissions from each)	Volatile Organic Compounds	0.33	1.46
		n-Hexane	0.01	0.04
		Benzene	0.01	0.03
		Toluene	0.02	0.09
		Ethylbenzene	0.02	0.06
		Xylenes	0.02	0.09
		CO_2e	35	152

Table 2: Proposed Summarized Estimated Maximum Controlled Facility-Wide PTE

Pollutant	Facility Wide PTE (tons/year)
Nitrogen Oxides	66.95
Carbon Monoxide	79.91
Volatile Organic Compounds	26.22
Sulfur Dioxide	0.31
Total Particulate Matter	10.18
Formaldehyde	5.26
Total HAPs	12.25
CO_2e	82652

REGULATORY APPLICABILITY

The following rules and regulations apply to the facility:

45CSR4 - *To Prevent and Control the Discharge of Air Pollutants Into the Open Air Which Causes or Contributes to an 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 required to get a Modification permit because it is subject to 40CFR60 subpart JJJJ which is a substantive requirement.

45CSR22 - *Air Quality Management Fee Program*

This facility is a minor source, not subject to 45CSR30, and the NSPS are Title V exempt. This facility is required to keep their Certificate to Operate current. E. Marcellus paid a $1,000 construction application fee and $1,000 NSPS fee. Since this facility has a total reciprocating engine capacity of greater than 1,000 hp (15,120 hp) this facility is subject to 8D with an annual fee of $500.

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

Subpart ZZZZ establishes national emission limitations and operating limitations for HAPs emitted from stationary 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. This facility is subject to the area source requirements and has non-emergency spark ignition engines.

Engine CE-1 throught CE-5 are "New Stationary RICE" sources at an area source of HAPs and are affected source because construction will commenced after June 12, 2006 [63.6590(a)(2)(iii)] due to the manufacture's dates of the engines.

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 these engines under this subpart.

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

Engines (CE-2, CE-4, and CE-5) are subject to 40CFR60 Subpart JJJJ because construction was after June 12, 2006, the engines were manufactured after July 1, 2007, and are greater than 500 hp.
[40CFR60.4230(4)(i)]

40CFR60.4248 Table 1 provides the allowable emission standards for stationary spark ignition internal combustion engines. Engines (CE-2, CE-4 and CE-5) are non-emergency hp≥500 manufacturer date after July 1, 2007 the allowable emission standards in g/hp-hr are: 2.0, NO_x; 4.0, CO; and 1.0, VOC. The engines will also have operating limits, performance tests, notification requirements, and recordkeeping requirements.

The following rules and regulations do not apply to the facility:

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

EPA issued it new source performance standards (NSPS) and air toxics rules for the oil and gas sector on April 17, 2012. 40CFR60 Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO_2) 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 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 will be five (5) reciprocating compressor associated with CE-1 through CE-5 at this facility. The compressors associated with CE-1 through CE-5 were constructed before the effective date of this regulation and therefore this regulation is not applicable.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The majority of non-criteria regulated pollutants fall under the definition of Hazardous Air Pollutant (HAP)s which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. HAPs are those pollutants that are specifically identified in section 112(b) of the Clean Air Act. To be listed as a HAP, EPA must find that the chemical in question may present a threat to human health and cause adverse environmental effects. As can be seen in Table 4 this facility is an area source of HAPs (potential to emit (PTE) less than 10 tons per year of any pollutant on the HAP list, or less 25 tons per year for all HAPs)

The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Table 4: IRIS HAP Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
Formaldehyde	HAP/TAP	Yes	Category B - Probable Human Carcinogen

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health effects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals*. For a complete discussion of the known health effects of each compound refer to the IRIS database located at ***www.epa.gov/iris***.

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.

CHANGES TO PERMIT R13-3076

Permit five (5) 1,380-bhp engines and remove five (5) 1,680-bhp engines from the permit which were never installed. Reboilers (RBV-1 and RBV-2) in the previous application were listed as 0.2 mmBtu/hr, however the units are actually 1.5 mmBtu/hr units. For the TEG dehydration units (RSV-1 and RSV-2) a more recent extended gas analysis was used with a higher pressure 1,150 psig, TEG flowrate was increased to 15 gpm, stripping gas was used in the analysis, and a 20% factor was used for variation in the gas composition.

RECOMMENDATION TO DIRECTOR

The information provided in this facility's permit application indicates that compliance with all state and federal air quality requirements will be achieved. It is recommended that E. Marcellus Asset Company, LLC should be granted a 45CSR13 Modification permit for Tichenal Station.

David Keatley
Permit Writer - NSR Permitting

July 7, 2016

Date