west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	G70-A028A
Plant ID No.:	017-00091
Applicant:	Antero Resources Corporation
Facility Name:	Primm Pad
Location:	Doddridge County
NAICS Code:	211111
Application Type:	Class II Administrative Update
Received Date:	November 24, 2014
Engineer Assigned:	David Keatley
Fee Amount:	$300
Date Fee Received:	November 25, 2015
Complete Date:	February 27, 2015
Due Date:	April 13, 2015
Applicant Ad Date:	November 25, 2014
Newspaper:	*The Herald Record*
UTM's:	Easting: 512.722 km Northing: 4,343.594 km Zone: 17S
Description:	Permit G70-A028A with supersede and replace G70-A028. Removal of a 72 hp compressor engine, VRU, and associated 98 hp compressor engine. Installation and operation of a 24 bhp compressor engine.

DESCRIPTION OF PROCESS

A mixture of condensate and entrained gas from the wells enters the facility through a number of low pressure separators where the gas phase is separated from the liquid phase. Heater treaters (H001-H008) are used in conjunction with the separators to help separate the gas from the liquid phases. These heaters are fueled by a slip stream of the separated gas. The separated gas from the low pressure separators is sent to the high pressure vapor recovery unit (VRU001). The compressed gas is then metered and sent to the sales gas pipeline. The separated condensate and water from the separators flow to their respective storage tanks (TANKCOND001-008 and TANKPW001-002).

The facility has eight tanks (TANKCOND001-008) and two produced water tanks (TANKSPW001-002). Flashing, working, and breathing losses from the tanks will be sent to a flare (FL001).

Condensate and produced water are transported off-site on an as-needed basis via tanker truck. Truck loading connections are in place to pump condensate (L001) and produced water (L002) from the storage tanks into tanker trucks. Emissions from the loading operations are vented to the atmosphere.

Emissions from the facility's emission sources were calculated using the extended analysis of the condensate and produced water from Seaborne No. 1H, one of the wells in the Vogt Pad. These extended analysis are considered representative of the materials from Hamilton, being in the same Marcellus rock formation. The flashing, working & breathing losses from the tanks are sent to vapor recovery units. The VRUs are designed to achieve a collection efficiency of 95%. The emergency flare that will be used to control emissions when the VRUs are not operational is designed to achieve a VOC destruction efficiency of 98%.

SITE INSPECTION

A site inspection was conducted on March 26, 2014 by Douglas Hammell of the enforcement section. "The site is suitable for general permit G70-A028. There are no residences within 300 ft. When I was there, rig still on site, no permanent tanks, just three Baker tanks."

From Clarksburg, head west on US-50 for 29 miles. Turn left onto C/R 50/30 and continue south for approximately 2 miles. Turn left onto C/R 21 / Oxford Road and continue south. The Primm site is on your left, approximately 1.4 miles south of the intersection of C/R 50/30 & C/R 21..

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Flash gas compressor engine (ENG001) emissions were calculated using manufacturer data as well as AP-42. Emissions from the combustor was estimated with a 98% control efficiency. The working, breathing, and flash vapors from the storage tanks were estimated using ProMax 3.2 with a liquid sample and gas sample from Vogt Pad.

Table 1: New/Modified Estimated Maximum Controlled Air Emissions

Emission Unit	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
Cimarron Combustor (FL001) Controlling Condensate and Produced Water Tanks	Volatile Organic Compounds	3.68	16.10
	Carbon Dioxide	0.22	0.93
	Nitrogen Oxides	0.26	1.11
	Total Particulate Matter	0.02	0.09
	Benzene	<0.01	0.02
	Ethylbenzene	<0.01	0.01
	Toluene	<0.01	0.03
	Xylenes	<0.01	0.02
	Hexane	0.37	1.60
	CO_2e	795	3,479
Compressor Engine (ENG001) Kubota DG97-E2 24-bhp	Nitrogen Oxides	0.32	1.39
	Carbon Monoxide	5.65	24.73
	Volatile Organic Compounds	<0.01	0.03
	Particulate Matter - 10	0.02	0.09
	Formaldehyde	<0.01	0.03
	CO_2e	28	119
L001 and L002 Condensate and Produced Water Loading	Volatile Organic Compounds	13.44	1.31
	Hexane	0.10	0.01
	CO_2e	68	295
Fugitives F001	Volatile Organic Compounds	2.90	12.69
	Benzene	<0.01	0.03
	Toluene	0.02	0.09
	Ethylbenzene	0.02	0.09

Hexane	0.20	0.86
Xylenes	0.06	0.23
CO_2e	68	295

Table 2: Summarized Estimated Total Facility Air Emissions

Pollutant	Maximum Annual Facility Wide Emissions (tons/year)
Nitrogen Oxides	6.81
Carbon Monoxide	29.28
Volatile Organic Compounds	30.70
Total Particulate Matter	0.60
PM_{10}	0.60
Sulfur Dioxide	0.03
Benzene	0.05
Ethylbenzene	0.09
Toluene	0.11
Xylenes	0.06
n-Hexane	2.56
Formaldehyde	0.03
Total HAP Emissions	3.08
CO_2e	9,132

REGULATORY APPLICABILITY

The following rules and regulations apply to the modification 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.

45CSR6 (To Prevent and Control Air Pollution from the Combustion of Refuse)

The purpose of this rule is to prevent and control air pollution from combustion of refuse.

Antero has one (1) combustor (FL001) at this facility. The combustor is subject to section 4, emission standards for incinerators. The combustor has a maximum capacity of 183.78 tons/yr and an allowable emission rate of 0.10 pounds of particulate matter per hour. The combustor has an hourly particulate matter emissions rate which is 0.09 lb/hr as can be seen in Table 1. Therefore, the facility's combustor should demonstrate compliance with this section. The facility will demonstrate compliance by maintaining records of the amount of natural gas consumed by the combustor and the hours of operation. The facility will also monitor the flame of the combustor and record any malfunctions that may cause no flame to be present during operation.

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 does not exceed the thresholds required to be modification (the pollutant with the most increase in emissions was CO at 4.43 lb/hr) and therefore qualifies for a Class II Administrative Update.

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 they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71. This facility has a maximum horsepower capacity less than 1,000 hp (24 hp) and is a 9M source and is required to pay a $200 annual fee. Antero is required to keep their Certificate to Operate current.

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_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 gas well affected facility, which is a single natural gas well.

The eight (8) natural gas wells were drilled principally for the production of natural gas and condensate and were done so after August 23, 2011. Therefore, these wells

would be considered affected facilities under this subpart. The compliance date for these hydraulically fractured wells is October 15, 2012. Antero is required under §60.5410 to submit an initial notification, initial annual report, maintain a log of records for each well completion, and maintain records of location and method of compliance. §60.5420 requires Antero demonstrate continuous compliance by submitting reports and maintaining records for each completion operation.

b. 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.

All storage vessels (TANKCOND and TANKPW) located at this facility would emit more than 6 tpy of VOC per tank uncontrolled (97.14 tpy each and 3.72 tpy respectively). Antero has proposed installing a combustor to control 98% of the VOC emissions from the storage tanks, which makes this facility not subject to this section of this regulation.

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.

ENG001 is subject to this subpart due to the manufacturers date of the engine. ENG001 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.

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 engine is considered new stationary RICE (§63.6590(a)(2)(iii)) due to the installation date of the engine (ENG001) 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 as seen in Table 1. 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].

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates compliance with all state and federal air quality requirements will be satisfied and this facility is expected to meet the requirements of General Permit G70-A. Therefore Antero Resources Corporation's request to update and operate Primm Wellpad natural gas production facility is recommended to the Director of Air Quality.

David Keatley
Permit Writer - NSR Permitting

February 27, 2015
Date