



west virginia department of environmental protection

Division of Air Quality
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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: G70-A004A
Plant ID No.: 017-00077
Applicant: Antero Resources Corporation
Facility Name: RJ Smith Well 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 Received: November 15, 2014
Complete Date: January 20, 2015
Due Date: March 6, 2015
Applicant Ad Date: November 25, 2014
Newspaper: *The Herald Record*
UTM's: Easting: 523.003 km Northing: 4,357.402 km Zone: 17S
Description: Permit G70-A004A with supersede and replace G70-A004. Removal of a 72 hp compressor engine, VRU and associated 98 hp compressor engine. Installation of a 24 bhp compressor engine.

DESCRIPTION OF PROCESS

Raw natural gas from the eight (8) natural gas wells enters the facility through a number of separators where the gas phase is separated from the liquid phase. GPU heaters (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 a proposed 24-bhp Kubota compressor engine (ENG001). 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 (8) 400-bbl tanks (TANKCOND001-008) on site to store condensate

and two (2) 400-bbl tanks (TANKSPW001-002) to store produced water prior to removal from the site. Flashing, working, and breathing losses from the tanks will be controlled by a 18.4 mmBtu/hr combustor.

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.

SITE INSPECTION

A site inspection was conducted on December 5, 2013 by Douglas Hammell of the enforcement section. *"Drilling ops were still ongoing while I was there. The closest residence is the one due west, straight down the hill, ~660 ft, from center point of coordinates below. Site is appropriate for proposed construction."*

From the intersection of C/R 3 / Big Flint Road and WV-23E, turn right on C/R 3 / Big Flint Road for 1.1 miles. Turn right onto C/R 14 / Little Flint Road and go 1.7 miles. Entrance to the facility will be on the left.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Combustor emissions were calculated using AP-42 emission factors using a 98% control efficiency. VRU engine emissions were calculated using manufacturer data as well as AP-42. Fugitive emissions were estimated using the EPA's *Protocol for Equipment Leak Emission Estimates*.

Flashing, working, and standing loss emissions from storage tanks and loading emissions were calculated using a representative liquid and gas analysis from Jonathan Davis Pad in ProMax 3.2. These extended analysis are considered representative of the materials from RJ Smith, being in the same Marcellus rock formation.

Table 1: Modified/New Estimated Maximum Controlled Air Emissions

Emission Unit	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
F001 Condensate and Produced Water Tanks being controlled by a Combustor	Volatile Organic Compounds	2.11	9.23
	Carbon Dioxide	0.14	0.60
	Nitrogen Oxides	0.17	0.72
	Total Particulate Matter	0.02	0.06
	Benzene	<0.01	0.01
	Ethylbenzene	<0.01	0.01
	Toluene	<0.01	0.02
	Xylenes	<0.01	0.02
	Hexane	0.09	0.40
	CO ₂ e	483	2,116
ENG001 VRU Engine Kubota 24-bhp	Nitrogen Oxides	0.32	1.39
	Carbon Monoxide	5.65	24.73
	Volatile Organic Compounds	0.01	0.03
	Particulate Matter - 10	<0.01	0.01
	Formaldehyde	<0.01	0.03
	CO ₂ e	28	120
L001 and L002 (Condensate and Produced Water Truck Loading Emissions)	Volatile Organic Compounds	6.32	0.58
	CO ₂ e	8	2
Fugitives F001	Volatile Organic Compounds	2.92	12.76
	Benzene	<0.01	0.01
	Toluene	0.02	0.07
	Ethylbenzene	0.03	0.11
	Hexane	0.11	0.46

	Xylenes	0.06	0.26
	CO ₂ e	67	294

Table 2: Summarized Estimated Total Facility Air Emissions

Pollutant	Maximum Annual Facility Wide Emissions (tons/year)
Nitrogen Oxides	6.40
Carbon Monoxide	28.94
Volatile Organic Compounds	23.16
Total Particulate Matter	0.74
PM ₁₀	0.74
Sulfur Dioxide	0.03
Benzene	0.02
Ethylbenzene	0.12
Toluene	0.03
Xylenes	0.28
n-Hexane	0.96
Total HAP Emissions	1.46
CO ₂ e	7,754

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 at this facility. The combustor is subject to section 4, emission standards for incinerators. The combustor has a maximum capacity of 105.3 lb/hr and an allowable emission rate of 0.06 pounds of particulate matter per hour. The

combustor has an hourly particulate matter emissions rate which is 0.02 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 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 (SO₂) 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 (54.52 tpy each and 2.98 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.

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>].

Fact Sheet G70-A004A
Antero Resources Corporation
RJ Smith Well Pad

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 modify and operate RJ Smith Wellpad natural gas production facility is recommended to the Director of Air Quality.



David Keatley
Permit Writer - NSR Permitting

January 22, 2015

Date