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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3255
Plant ID No.:	017-00155
Applicant:	Antero Resources Corporation (Antero)
Facility Name:	Hinter Heirs FWI
Location:	New Milton, Doddridge County
NAICS Code:	213112 (Support Activities for Oil and Gas Operations)
Application Type:	Construction
Received Date:	June 11, 2015
Engineer Assigned:	Roy F. Kees, P.E.
Fee Amount:	$2,000.00
Date Received:	June 12, 2015
Complete Date:	July 13, 2015
Due Date:	October 15, 2015
Applicant Ad Date	June 16, 2015
Newspaper:	*The Herald Record*
UTM's:	Easting: 525.373 km Northing: 4,337.459 km Zone: 17
Description:	Diesel engines at a freshwater impoundment (FWI)

DESCRIPTION OF PROCESS

The following process description was taken from Permit Application R13-3255:

The FWI collects and stores water for use in the nearby natural gas and oil production facilities. The FWI has two (2) diesel engines (FWIENG001-002) that drives each water pump. The pump feeds water into the water impoundment and then out into the water distribution system supplying water requirements of various natural gas and oil production facilities.

The air contaminants from the FWI are the products of diesel combustion from the engines and particulate matter emissions from unpaved roads when service vehicles enter the site. The engines use low sulfur diesel fuel oil. The engines that drive the water pumps operate only as needed based on water requirements of nearby well pads.

SITE INSPECTION

A site inspection was conducted on June 23, 2015 by James Robertson of the DAQ Enforcement Section. "The area in general is remote with only a few scattered houses nearby. The pad has been developed but there has been no drilling and no equipment was onsite. I did not see any houses or other structures that would be within 300' of the pad."

Directions to the facility are as follows:

From the intersection of WV-18S and Carder Camp Road, turn NW onto Carder Camp Road and go 0.4 miles. Head North on the unpaved road for 0.33 miles and the site will be on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this application consist of the combustion emissions from two (2) diesel fired engines (FWIENG001, FWIENG002) and fugitive road emissions. The following table indicates which methodology was used in the emissions determination:

Emission Unit ID#	Process Equipment	Calculation Methodology
FWIENG001, FWIENG002	600 hp Caterpillar C18 and John Deere 6135HF485 Diesel Fired Engine	Manufacturer's Data, EPA AP-42 Emission Factors
HR	Unpaved Haulroads	EPA AP-42 Emission Factors

The total facility PTE for the Hinter Heirs FWI is shown in the following table:

Pollutant	R13-3255 PTE (tons/year)
Nitrogen Oxides	29.14
Carbon Monoxide	13.84
Volatile Organic Compounds	13.23
Particulate Matter-10/2.5	1.02
Sulfur Dioxide	10.78
Total HAPs	0.16
Carbon Dioxide Equivalent	6,044

Maximum detailed controlled point source emissions were calculated by Antero and checked for accuracy by the writer and are summarized in the table below.

Emission Unit(s)	Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tons/year)
FWIENG001 Caterpillar C18 600 hp	Nitrogen Oxides	3.39	14.83
	Carbon Monoxide	2.57	11.24
	Volatile Organic Compounds	1.51	6.61
	Particulate Matter-10/2.5	0.13	0.56
	Sulfur Dioxide	1.23	5.39
	Total HAPs	0.02	0.08
	Carbon Dioxide Equivalent	690	3022
FWIENG002 John Deere 6135HF485 600 hp	Nitrogen Oxides	3.27	14.31
	Carbon Monoxide	0.59	2.59
	Volatile Organic Compounds	1.51	6.61
	Particulate Matter-10/2.5	0.10	0.43
	Sulfur Dioxide	1.23	5.39
	Total HAPs	0.02	0.08
	Carbon Dioxide Equivalent	690	3022

REGULATORY APPLICABILITY

The following rules apply to the facility:

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)

A 45CSR13 construction permit applies to this source due to the fact that Antero exceeds the regulatory emission threshold for criteria pollutants of 6 lbs/hr and 10 tons/year of nitrogen oxides and are subject to a substantive requirement of an emission control rule (40CFR60 Subpart IIII).

Antero paid the appropriate application fee and published the required legal advertisement for a modification permit application.

45CSR16 (Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60)

45CSR16 applies to this source by reference of 40CFR60, Subpart IIII. These requirements are discussed under those rules below.

45CSR22 (Air Quality Management Fee Program)

Antero is not subject to 45CSR30. The Hinter Heirs FWI is subject to 40CFR60 Subpart IIII, however they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided they are not required to obtain a permit for a reason other than their status as an area source.

Antero is required to pay the appropriate annual fees and keep their Certificate to Operate current.

40CFR60 Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE))

Subpart IIII sets forth non-methane hydrocarbon (NMHC), hydrocarbon (HC), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM) emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject internal combustion engine. The 600 HP (448 kW) diesel fired engines (FWIENG001, FWIENG002) are subject to this subpart. The emission standards for these units are listed in 40 CFR 89.112. The Tier 3 standards are 4.0 g/kw-hr for NMHC+NO_x, 3.5 g/kw-hr for CO and 0.20 g/kw-hr for PM. Antero provided the EPA Certificate of Conformity for these engines. Therefore, performance testing is not required unless the engines are not operated per manufacturer's specifications.

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.

There are no affected sources located within the Hinter Heirs FWI. However, there are affected facilities located at the Lockhart Heirs Pad and Yolanda Pad. The regulatory applicability for these facilities were discussed in their respective Engineering Evaluation /Fact Sheet.

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. The engines (FWIENG001, FWIENG002) at the Hinter Heirs FWI are subject to the area source requirements for non-emergency compression ignition engines.

The applicability requirements for new stationary RICEs located at an area source of HAPs, is the requirement to meet the standards of 40CFR60 Subpart IIII. These requirements were outlined above. The proposed engines meet these standards.

The following rules do not apply to the facility:

45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants)

45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment)

The Hinter Heirs FWI is located in Doddridge County, which is an unclassified county for all criteria pollutants, therefore it is not applicable to 45CSR19.

As shown in the following table, Antero is not a major source subject to 45CSR14 or 45CSR19 review. According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, the fugitive emissions are not included in the PTE below.

Pollutant	**PSD (45CSR14) Threshold (tpy)**	**NANSR (45CSR19) Threshold (tpy)**	**Hinter Heirs FWI PTE (tpy)**	**45CSR14 or 45CSR19 Review Required?**
Carbon Monoxide	250	NA	13.84	No
Nitrogen Oxides	250	NA	29.14	No
Sulfur Dioxide	250	NA	10.78	No
Particulate Matter 2.5	250	NA	1.02	No
Ozone (VOC)	250	NA	13.23	No
Greenhouse Gas (CO_2e)	100,000	NA	6,044	No

45CSR30 (Requirements for Operating Permits)

Antero is not subject to 45CSR30. The Hinter Heirs FWI is subject to 40CFR60 Subpart IIII, however they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided they are not required to obtain a permit for a reason other than their status as an area source.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The majority of non-criteria regulated pollutants fall under the definition of HAPs 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. The following HAPs are common to this industry. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

HAPs	Type	Known/Suspected Carcinogen	Classification
Formaldehyde	VOC	Yes	Category B1 - Probable Human Carcinogen
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Ethylbenzene	VOC	No	Inadequate Data
Toluene	VOC	No	Inadequate Data
Xylenes	VOC	No	Inadequate Data

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

Modeling was not required of this source due to the fact that the facility is not subject to 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants) or 45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment) as shown in the table listed in the Regulatory Discussion section under 45CSR14/45CSR19.

SOURCE AGGREGATION

Classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of "Building, structure, facility, or installation" as given in §45-14-2.13 and §45-19-2.12. The definition states:

"Building, Structure, Facility, or Installation" means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

The Hinter Heirs FWI shares the same SIC code as several other well pads owned by Antero in the area. Therefore, the potential classification of the Hinter Heirs FWI as one stationary source with any other facility depends on the determination if these stations are considered "contiguous or adjacent properties." "Contiguous or Adjacent" determinations are made on a case by case basis. These determinations are proximity based, and it is important to focus on this. The terms "contiguous" or "adjacent" are not defined by USEPA. Contiguous has a dictionary definition of being in actual contact; touching along a boundary or at a point. Adjacent has a dictionary definition of not distant; nearby; or having a common endpoint or border. The Cline Pad and Hinter Heirs FWI are located approximately 0.36 miles from each other. It is the opinion of the writer that these facilities are not located on 'adjacent' properties.

Upon review of these two facilities at this time, the Cline Pad and Hinter Heirs FWI do not meet all three (3) prongs to be considered the same "Building, structure, facility, or installation". Therefore, the emissions from these facilities do not need to be aggregated in determining major source and/or PSD status.

MONITORING OF OPERATIONS

Antero will be required to perform the following monitoring:

- Monitor and record the hours of operation of the engines.
- Monitor all applicable requirements of 40CFR60 Subpart IIII.

Antero will be required to perform the following recordkeeping:

- Maintain records of the hours of operation for all engines.
- Maintain records of testing conducted in accordance with the permit. Said records shall be maintained on-site or in a readily accessible off-site location
- Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
- Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility.
- Maintain records of all applicable requirements of 40CFR60 Subpart IIII.
- The records shall be maintained on site or in a readily available off-site location maintained by Antero for a period of five (5) years.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that Antero meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Hinter Heirs FWI should be granted a 45CSR13 construction permit for their facility.

Roy F. Kees, P.E.
Engineer

8/31/15
Date