



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

**GENERAL PERMIT REGISTRATION APPLICATION
ENGINEERING EVALUATION / FACT SHEET**

BACKGROUND INFORMATION

Registration No.: G35-A119
Plant ID No.: 005-00084
Applicant: Eastern American Energy Corporation (ECA)
Facility Name: Yawkey-Freeman Compressor Station
Location: Madison, Boone County
SIC Code: 1311
NAICS Code: 211111
Application Type: Modification
Received Date: October 15, 2015
Engineer Assigned: Thornton E. Martin Jr.
Fee Amount: \$500
Date Fee Received: October 15, 2015
Complete Date: December 02, 2015
Applicant Ad Date: October 14, 2015
Newspaper: *Coal Valley News*
UTM's: Easting: 419.752 km Northing: 4204.910 km Zone: 17
Description: Applicant proposes to replace the existing NG compressor engine, add two (2) storage tanks and reduce the throughput for the facility from 10 MMscf/day to 5 MMscf/day.

PERMIT HISTORY

The Yawkey-Freeman Compressor Station was originally permitted under General Permit Registration G30-A086 on November 29, 2005. ECA's Yawkey-Freeman Compressor Station consisted of the following facilities: Gas field orifice metering, 2-phase separation vessel, natural gas powered compression, natural gas/lube oil filter separator, tri-ethylene glycol dehydration, and natural gas transmission into an 8" coated steel pipeline. The purpose of installing this compressor station was to compress and dry ECA's Yawkey-Freeman Natural Gas Field Production to a pressure that will transmit into Columbia Transmission's Line R.

On July 14, 2006, General Permit Registration G30-A086A was issued to allow ECA to increase throughput from 5MM cubic feet per day to 10 MM cubic feet per day. A thermal

oxidizer was installed on the still vent of the existing dehydration unit to minimize HAPs.

PROCESS DESCRIPTION

Natural gas (Methane, Ethane, Propane, etc.) is produced from ECA wells and are piped to the Yawkey-Freeman compressor station. This gas is compressed by the use of a compressor powered by a natural gas combustion engine (CE-1) and an electric motor. The engine drives a compressor that moves the gas to a dehydrator (RBV-1, RSV-1) which reduces the water entrained in the wet gas stream below 7.0 lbs/mmcf. The thermal oxidizer installed on the still vent minimizes hazardous air pollutants. The water and trace amounts of oil/condensate is removed and stored in one of two (2) 210 barrel (8,820 gallons) steel holding tanks. The dehydrator brings lean glycol into contact with the “wet” gas in the contactor to remove the moisture content. The “dry” natural gas exits the glycol contactor and is piped to the transmission line.

The proposed site equipment modification will entail replacing one (1) engine/compressor and adding two (2) 210 barrel tanks for unloading trucks to remove.

SITE INSPECTION

A site inspection was conducted by Roy F. Teel of DAQ Enforcement on December 10, 2014. The facility was deemed in compliance.

Directions to the facility. From US Route 19 South, turn left onto Dog Fork Road. Go 0.6 miles and turn left onto Tower Road. Access road to station is approximately 0.5 miles on the left.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this construction application are summarized in the tables below.

Table 1: Emission Units

Emission Unit ID	Emission Unit Description (Make, Model, Serial No.)	Year Installed	Design Capacity
CE-1	Caterpillar 3516 ULB	2015	1,380 bhp / 1,400 rpm
RBV-1	Reboiler Vent	2005	175,000 Btu/hr
RSV-1	Glycol Regenerator Still Vent	2005	
THOX-1	Thermal Oxidizer Burner	2006	175,000 Btu/hr
T-01	Water/Oil Condensate Tank	2015	8,820 gallons
T-02	Water/Oil Condensate Tank	2015	8,820 gallons
T-03	Lube Oil & Condensate Tank	2005	4,200 gallons

Emissions from the 1986 NATCO Re-Boiler (RBV-1) and the TEG Dehydrator Still Vent were estimated using AP-42 Section 1.4 and GRI-GLYCalc 4.0. Emissions for Engine CE-1 were estimated with engine manufacturer emission factors and AP-42 emission factors. Air emissions for the 2006 QB Johnson Manufacturing Company Thermal Oxidizer (THOX-1) were estimated using AP-42 Chapter 13.5 Emissions for Flares and AP-42 emission factors from

Table 1.4-2. Fugitive emissions from Storage vessel and tank truck loading emissions have been included for the first time with this application and were calculated using EPA Tanks 4.0.9d software.

Table 2: Modified Maximum Estimated Controlled Point Source Air Emissions

Source	CO	NO _x	PM ₁₀	SO ₂	VOCs	HAPs
Caterpillar 3516 ULB (CE-1)	2.610	13.326	0.429	0.026	2.786	1.064
RBV-1	0.051	0.061	0.005	0.0004	1.816	--
RSV-1 (with THOX-1)	1.77	0.387	0.034	0.003	2.610	0.905
Water/Oil Condensate Tank (T-01)	--	--	--	--	0.397	--
Water/Oil Condensate Tank (T-02)	--	--	--	--	0.397	--
Lube/Oil Condensate Tank (T-03)	--	--	--	--	0.342	--
Truck Loading (LL-01)	--	--	--	--	1.017	--
Facility-Wide Totals →	4.431	13.774	0.468	0.0294	9.365	1.969

Table 3: Previous Maximum Estimated Controlled Point Source Air Emissions

Source	CO	NO _x	PM ₁₀	SO ₂	VOCs	HAPs
CE-1	15.51	30.12	0.429	0.026	2.786	1.70
RBV-1	0.07	0.08	0.005	0.0004	1.816	0.1
RSV-1 (with THOX-1)	--	--	--	--	6.29	0.96
Lube/Oil Condensate Tank (T-03)	--	--	--	--	0.01	--
Facility-Wide Totals →	15.58	30.2	0.434	0.0264	10.902	2.76

Table 4: Proposed Difference of Emissions

Source	CO	NO _x	PM ₁₀	SO ₂	VOC	HAPs
Total Emission (ton/yr)	-11.149	-16.426	0.034	0.003	-1.537	-1.855

REGULATORY APPLICABILITY AND GENERAL PERMIT ELIGIBILITY

The proposed modification and operation of this facility should meet the eligibility, siting, limitations, and emissions controls as specified in General Permit G35-A. Based on the modification outlined, this facility is subject to the following rules and regulations:

45CSR2 *To Prevent and Control Particulate Air Pollution From Combustion of Fuel in Indirect Heat Exchangers*

45CSR2 establishes emission limitations for smoke and particulate matter which are discharged from fuel burning units. All fuel burning units will be subject to the weight emission standard for particulate matter set forth in 45CSR2. Each registrant is also subject to all applicable opacity requirements set forth in 45CSR2 Section 3.2.

Each substantive 45CSR2 requirement for the reboiler is discussed below.

45CSR2 *Opacity Standard - Section 3.1*

Pursuant to 45CSR2, Section 3.1, the reboiler and thermal oxidizer are subject to an opacity limit of 10%. Proper maintenance and operation of the reboiler and thermal oxidizer (and the primary use of natural gas) should keep the opacity of the units well below 10% during normal operations.

45CSR2 Weight Emission Standard - Section 4.1.b

The allowable particulate matter (PM) emission rate for the reboiler and thermal oxidizer each, identified as Type "b" fuel burning units, per 45CSR2, Section 4.1.a, is the product of 0.09 and the total design heat input of each in million Btu per hour. The maximum design heat input of each will be 0.175 mmBtu/Hr. Using the above equation, the 45CSR2 facility-wide PM emission limit of each unit will be 0.016 lb/hr. The maximum potential hourly PM emissions during normal operations (firing natural gas) from the reboiler is estimated to be 0.001 lb/hr and the maximum potential hourly PM emissions during normal operations (firing natural gas) from the thermal oxidizer is estimated to be 0.007 lb/hr. This emission rate is 6.25% and 43.75% of the 45CSR2 limit, respectively.

45CSR4 To Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors

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. All facilities are inspected by the DAQ Enforcement Section.

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

The Applicant has applied for a permit to modify based on the reduced daily throughput, replacement of CE-1 and emissions from the additional condensate tanks and loadout operations according to the requirements defined under §45-13-5.13

The applicant published a Class I legal advertisement in the *Coal Valley News* on October 14, 2015.

45CSR22 Air Quality Management Fee Program

45CSR22 applies to all registrants which are minor sources and no NSPS applies. The affected registrants will be subject to the fee schedule set forth in 45CSR22. They are also required to keep their Certificate to Operate status current.

45CSR30 Requirements for Operating Permits

Certain spark ignition internal combustion engines are subject to 40CFR60, Subpart JJJJ, and therefore subject to 45CSR30 as a deferred source.

40CFR60 Subpart JJJJ Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

Subpart JJJJ sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject internal combustion engine.

The proposed 1,380 hp Caterpillar 3516 RICE (CE-1) will be subject to the following emission limits: NO_x – 1.0 g/hp-hr (3.04 lb/hr); CO – 2.0 g/hp-hr (6.08 lb/hr); and VOC – 0.7 g/hp-hr (2.13 lb/hr). Based on the manufacturer's specifications for this engine, the emission standards will be met.

The proposed 1,380 hp Caterpillar 3516 RICE (CE-1) is not certified by the manufacturer to meet the emission standards listed in 40CFR60 Subpart JJJJ. Therefore, ECA will be required to conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or three (3) years, whichever comes first, to demonstrate compliance.

Engine CE-1 will be required to comply with the following subparts.

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

The facility will be subject to the requirements of this rule. The new engine will be subject to the requirements under this rule. The facility's engine is subject to the requirements listed in §60.5385 of this regulation. These requirements are not listed in the general permit, but they are still subject to the requirements of this regulation.

40 CFR 63 Subpart HH National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart HH. This facility is a natural gas production facility that processes, upgrades, or stores natural gas prior to transmission. This facility is an area source of HAPs refer to the previous facility wide emissions table.

Pursuant to §63.760(b)(2), each glycol dehydration unit (GDU) located at an area source that meets the requirements under §63.760(a)(3) is defined as an affected facility under Subpart HH. The requirements for affected sources at area sources are given under §63.764(d). However, for a GDU, exemptions to these requirements are given under §63.764(e)(2) "actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram [1 TPY] per year."

The maximum PTE of benzene emissions from the GDU process vent (RSV-1) is 0.026 TPY. Therefore, the GDU is exempt from the Subpart HH requirements given under §63.764(d).

*40CFR63 Subpart HHH National Emission Standards for Hazardous Air Pollutants:
Natural Gas Transmission and Storage*

These promulgated national emission standards for hazardous air pollutants (NESHAP) limit emissions of hazardous air pollutants (HAP) from oil and natural gas production and natural gas transmission and storage facilities.

The Yawkey-Freeman Station is exempt from the requirements of this Subpart because of the annual average flow of gas exemption of 10 mmscf/day.

*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 a non-emergency spark ignition engine.

Engine CE-1 is a 1,380 hp, four-stroke, lean-burn stationary RICE constructed after the June 12, 2006 effective date for new stationary RICE at area sources and are subject to this subpart. The engine meets the requirements of this subpart by compliance with Subpart JJJJ.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Small amounts of non-criteria regulated hazardous or toxic air pollutants such as benzene, ethylbenzene, toluene, xylenes and formaldehyde may be emitted when natural gas is combusted in reciprocating engines. Total non-criteria regulated hazardous/toxic air pollutant emissions are tabulated for each registered natural gas compressor station in the Class II General Permit Registration Application. A toxicity analysis will be performed when the Director finds existing circumstances and/or submitted data provide cause for an assessment to be made concerning whether a specific natural gas compressor station may interfere with attainment or maintenance of an applicable ambient air quality standard or cause or contribute to degradation of public health and welfare. Any natural gas compressor station granted Class II General Permit registration by the Director shall not have a potential to emit of 10 tons per year of any hazardous/toxic pollutant or 25 tons per year of any combination of hazardous/toxic pollutants.

AIR QUALITY IMPACT ANALYSIS

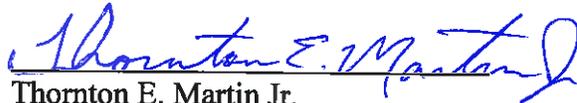
Air dispersion modeling will be performed when the Director finds existing circumstances and/or submitted data provide cause for an assessment to be made concerning whether a specific natural gas compressor station may interfere with attainment or maintenance of an applicable ambient air quality standard or cause or contribute to a violation of an applicable air quality increment from any proposed Class II General Permit registration action. Factors to be considered when determining whether an ambient air assessment would be made include:

- a. Existing air quality of the area
- b. Topographic or meteorological factors
- c. Maximum emissions
- d. Siting criteria

Air dispersion modeling was not performed due to the size and location of this facility. This facility will be located in Boone County, WV, which is currently in attainment for PM (particulate matter), PM₁₀ (particulate matter less than 10 microns in diameter) and PM_{2.5} (particulate matter less than 2.5 microns in diameter).

RECOMMENDATION TO DIRECTOR

The information contained in this General Permit Registration Application indicates that compliance with all applicable regulations should be achieved when all of the proposed particulate matter control methods are in operation. Due to the location, nature of the process, and control methods proposed, adverse impacts on the surrounding area should be minimized. Therefore, the granting of a permit to Eastern American Energy Corporation (ECA) for the modification of the Yawkey-Freeman Station located near Madison, Boone County, WV, is hereby recommended.



Thornton E. Martin Jr.
Permit Engineer

December 02, 2015

Date