



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-3024
Plant ID No.: 081-00260
Applicant: CNX Gas, LLC
Facility Name: Rowland 308
Location: Raleigh County
NAICS Code: 211111
Application Type: Construction
Received Date: November 26, 2012
Engineer Assigned: Steven R. Pursley, PE
Fee Amount: \$1,000.00
Date Received: November 30, 2012
Complete Date: June 27, 2013
Due Date: September 25, 2013
Applicant Ad Date: January 24, 2013
Newspaper: *The Register Herald*
UTM's: Easting: 462.315 km Northing: 4,191.679 km Zone: 17
Description: Construction of a coal bed methane gas compressor facility.

DESCRIPTION OF PROCESS

The Rowland 308 station draws incoming gas from coal bed methane wells at a suction pressure of 2 psig. The inlet gas is then compressed in one stage to increase the pressure to 50 psig. The high pressure gas is then discharged out of the station through a pipeline connecting it to the nearby 45 psi gathering pipeline. The station will process 203,000 scf per day.

Incoming raw gas is split to both the generator and compressor. The generator provides power to the pump in the gas well. The compressor takes raw gas to power the engine.

SITE INSPECTION

The writer attempted to perform a site inspection on July 9, 2013. However, in order to get to the site, you must cross private land that has access restricted by a gate. It is possible to get within approximately 1/4 mile of the site before coming to the gate.

To get to the facility take I-77 south to exit 89. At the bottom of the ramp turn right on State Route 94. Go approximately 9.8 miles and turn left on State Route 3. Then turn left on County Route 3/6 and go about 1.1 miles and veer right when the road becomes dirt. Go approximately 1.0 mile to the gate. According to UTM coordinates provided by the company, the site should be about 0.25 miles ahead on the right.

The area is rural with several homes in the area, the nearest being at the aforementioned gate.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

CNX included in the permit application air emissions calculations for the equipment and processes at the Rowland 308 Station. The following will summarize the calculation methodologies used by CNX to calculate the potential-to-emit (PTE) of the proposed facility.

Storage Tanks

Working and breathing emissions from the single 2,100 gallon condensate storage tank were based on the TANKS 4.09d program as provided under AP-42, Section 7. Input and summary sheets for the program was included in the permit application. An annual throughput of 153,000 gallons of liquid was used in the calculations for the condensate tank.

No calculations were submitted for flashing emissions from the condensate tank. Additionally, no calculations were submitted for the two 8,820 gallon "brine" tanks. Therefore, the writer used the Vasquez Beggs equation (using conservative assumptions for each unknown) to calculate flashing emissions from all tanks. Additionally, the working and breathing losses from the condensate tank were used for each brine tank. This should result in extremely conservative results.

Compressor Engine

NO_x, CO and VOC emissions from the 33 hp compressor engine were based on manufacturer data while SO₂, PM₁₀, Formaldehyde and Benzene emissions were based on GRI-HAPCalc 3.0 (using AP-42 emission factors). All annual emission were based on

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8,760 hours of operation per year.
Generator

NO_x, CO and VOC emissions from the compressor engine were based on manufacturer data while SO₂, PM₁₀, Formaldehyde and Benzene emissions were based on GRI-HAPCalc 3.0 (using AP-42 emission factors). All annual emissions were based on 8,760 hours of operation per year.

Truck Loading

Air emissions from condensate truck loading operations occur as fugitive emissions generated by displacement of vapors when loading trucks. The applicant submitted no calculations regarding truck loading so the writer performed calculations using equation (1) of AP-42 Section 5.2 to calculate these emissions. The submerged fill saturation factor from Table 5-2.1 was used as submerged fill will be required by the permit. Values for vapor pressure and molecular weight were taken from the Tanks report submitted with the application. As no maximum hourly pumping rate was provided, hourly emissions were based on 1,000 hours of loading per year.

Hourly Emissions (lb/hr)

	Compressor Engine	Generator	Truck Loading	Tanks	Total
PM/PM ₁₀ /PM _{2.5}	0.01	0.01	--	--	0.02
SO ₂	0.01	0.01	--	--	0.02
CO	2.81	0.78	--	--	3.59
NO _x	0.60	1.34	--	--	1.94
VOC	0.09	0.07	1.29	1.44	2.89
Formaldehyde	0.01	0.02	--	--	0.03
Benzene	0.01	0.01	--	--	0.02
Total HAPs	0.02	0.03	--	--	0.05

Annual Emission (tpy)

	Compressor Engine	Generator	Truck Loading	Tanks	Total
PM/PM ₁₀ /PM _{2.5}	0.02	0.03	--	--	0.05
SO ₂	0.01	0.01	--	--	0.02

CO	12.29	3.42	--	--	15.71
NO _x	2.61	5.88	--	--	8.49
VOC	0.38	0.28	0.69	5.93	7.28
Formaldehyde	0.05	0.07	--	--	0.12
Benzene	0.01	0.02	--	--	0.03
Total HAPs	0.06	0.09	--	--	0.15

REGULATORY APPLICABILITY

The Rowland 308 facility is subject to the following substantive state and federal air quality rules and regulations: 45CSR13, 45CSR22. Each applicable rule (and those that have questionable non-applicability) and CNX's compliance therewith will be discussed in detail below.

45CSR2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers (NON-APPLICABILITY)

Pursuant to the definition of "fuel burning unit" under 45CSR2 ("producing heat or power by indirect heat transfer"), 45CSR2 does not apply to the compressor engines.

45CSR10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides (NON-APPLICABILITY)

Pursuant to the definition of "fuel burning unit" under 45CSR10 ("producing heat or power by indirect heat transfer"), the limitations on fuel burning units under 45CSR10 do not apply to the compressor engine.

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

Since the Rowland 308 facility has a potential to emit in excess of six (6) lbs/hour and ten (10) TPY of a regulated pollutant it is considered a stationary source.

As required under §45-13-8.3 ("Notice Level A"), CNX placed a Class I legal advertisement in a "newspaper of general circulation in the area where the source is . . . located." The ad ran on January 24, 2013 in *The Register Herald* and the affidavit of

publication for this legal advertisement was submitted on January 30, 2013.

45CSR22 *Air Quality Management Fee Program*

As shown below (45CSR30 non-applicability), the facility is not subject to 45CSR 30 and, therefore, will pay its annual fees through the Rule 22 program.

45CSR30: *Requirements for Operating Permits - (NON-APPLICABILITY)*

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The proposed facility does not meet the definition of a "major source under § 112 of the Clean Air Act" as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b. However, as the facility is subject to a National Emission Standard for Hazardous Air Pollutant - 40 CFR 63, Subpart ZZZZ - the facility would, in most cases, be subject to Title V as a "deferred source." However, pursuant to §63.6585(d), as a non-major "area source," CNX is not required to obtain a Title V permit for the proposed facility. Therefore, the Rowland 308 facility is not subject to 45CSR30.

40 CFR 60 Subpart JJJJ: *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (NON-APPLICABILITY).*

Per §40.4230(a)(4), Subpart JJJJ does not apply to engines that "commenced construction" before June 12, 2006 unless that engine is reconstructed or modified per §40.4230(a)(5). CNX submitted documentation that both the compressor engine and generator were constructed before June 12, 2006. Specifically, the compressor was ordered in August of 1998 and shipped on September 10, 1998. The generator engine was built April 18, 2006. Additionally, per §60.14(e)(6), the relocation of an existing unit does not meet the definition of "modification".

40 CFR 60, Subpart OOOO *Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution (NON-APPLICABILITY)*

On April 27, 2012 the USEPA issued a final rule (published in the Federal Register on August 16, 2012) that consists of federal air standards for natural gas wells that are hydraulically fractured, along with requirements for several other sources of pollution in the oil and gas industry that were not regulated at the federal level. Pursuant to §60.5365(a) each "gas well affected facility, which is a single natural gas well" that is constructed after August 23, 2011 is subject to the applicable provisions of Subpart OOOO as well as "[e]ach 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

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transmission and storage segment.”

Gas Wells - *(non applicability)*

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

The gas well serviced by the Rowland 308-site were drilled before August 23, 2011. Specifically, the WVDEP-OOG website indicates that the well permit was issued on August 14, 2007 and actual gas production from the well began in December of 2007. Therefore, no requirements of 40 CFR 60 Subpart OOOO would apply.

Centrifugal Compressors - *(non applicability)*

Each centrifugal compressor affected facility, which is a single centrifugal compressor using wet seals that is 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 centrifugal compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A centrifugal 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 are no centrifugal compressors at the Rowland 308 Facility. Therefore, all requirements regarding centrifugal compressors under 40 CFR 60 Subpart OOOO would not apply.

Reciprocating Compressors - *(non applicability)*

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 are two (2) reciprocating internal combustion engines located at the facility. However they were both constructed before the applicability date. Specifically, the compressor was ordered in August of 1998 and shipped on September 10, 1998. The generator engine was built April 18, 2006.

Storage Tanks - §60.5395 - *(non applicability)*

Under §60.5395, the requirements for storage tanks take effect on October 15, 2013.

The substantive requirement for storage tanks is given under §60.5395(a) of the rule. It requires that for each storage vessel “emitting more than 6 tpy VOC, [the permittee] must reduce VOC emissions by 95.0 percent of greater. . .” Based on a letter from USEPA to the American Petroleum Institute dated September 28, 2012, applicability of storage vessels to Subpart OOOO is based on individual tank PTE - which includes federally enforceable control devices.

The three condensate/produced water storage tanks are each calculated to have a PTE of less than 6 TPY of VOCs and, therefore, these storage tanks are not subject requirements under §60.5395. Additionally, the tanks were very likely constructed before the August 23, 2011 applicability date (although no documentation was given by the applicant to support that).

Group of all Equipment, except Compressors.- *(non applicability)*

Addition or replacement of equipment for the purpose of process improvement that is accomplished without a capital expenditure shall not by itself be considered a modification under this subpart.

Equipment associated with a compressor station, dehydration unit, sweetening unit, underground storage vessel, field gas gathering system, or liquefied natural gas unit is covered by §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart if it is located at an onshore natural gas processing plant. Equipment not located at the onshore natural gas processing plant site is exempt from the provisions of §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart.

The equipment within a process unit of an affected facility located at onshore natural gas processing plants and described in paragraph (f) of this section are exempt from this subpart if they are subject to and controlled according to subparts VVa, GGG or GGGa of this part.

The Rowland 308 facility is not a natural gas processing plant. Therefore, Leak Detection and Repair (LDAR) requirements for onshore natural gas processing plants would not apply.

Sweetening Units - *(non applicability)*

Each sweetening unit that processes natural gas is an affected facility; and

Each sweetening unit that processes natural gas followed by a sulfur recovery unit is an affected facility.

Facilities that have a design capacity less than 2 long tons per day (LT/D) of hydrogen sulfide (H₂S) in the acid gas (expressed as sulfur) are required to comply with recordkeeping and reporting requirements specified in §60.5423(c) but are not required to comply with §§60.5405 through 60.5407 and paragraphs 60.5410(g) and 60.5415(g) of this subpart.

Sweetening facilities producing acid gas that is completely reinjected into oil-or-gas-bearing geologic strata or that is otherwise not released to the atmosphere are not subject to §§60.5405 through 60.5407, 60.5410(g), 60.5415(g), and 60.5423 of this subpart.

There are no sweetening units at the Rowland 308 Facility. Therefore, all requirements regarding sweetening units under 40 CFR 60 Subpart OOOO would not apply.

Subpart Kb—Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 - (NON APPLICABILITY)

Pursuant to §60.110b, 40 CFR 60, Subpart Kb applies to “each storage vessel with a capacity greater than or equal to 75 cubic meters (m³) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984.” All storage tanks located at the Rowland facility are 8,820 gallons (about 33.39 m³) or less. Therefore, Subpart Kb does not apply to the storage tanks.

40 CFR 63 Subpart HH: National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities - (non-applicability)

The Rowland 308 facility is a minor (or area) source of HAPs. Subpart HH contains requirements for both area and major sources, however, the only affected source at area sources are triethylene glycol (TEG) dehydration units. The Rowland 308 facility does not have a dehydration unit.

40 CFR63, Subpart ZZZZ: NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES FROM STATIONARY RECIPROCATING INTERNAL

COMBUSTION ENGINES - AREA SOURCE

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.

Since the two engines are both less than 500 hp and were built before June 12, 2006, they are considered existing engines. Both engines are four stroke rich burn engines (see natural gas compressor/generator engine data sheet (page 16 of 21) included in the permit application). Therefore, the main requirements of the rule are found in Table 2d, number 10. They are as follows:

<p>10. Non-emergency, non-black start 4SRB stationary RICE ≤500 HP</p>	<p>a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;1</p>
	<p>b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and</p>
	<p>c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary.</p>

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. CNX included the following HAPs as emitted in substantive amounts (at least 0.01 lb/hr or 0.01 tpy) in their emissions estimate: Benzene and Formaldehyde. 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

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

Since the facility will be a minor source as defined in 45CSR14, no modeling was performed.

MONITORING OF OPERATIONS

The following substantive monitoring, compliance demonstration, and record-keeping requirements (MRR) shall be required:

- * Records of maintenance work performed on the engines must be kept in accordance with §63.6655(d) and (e).
- * For the purposes of demonstrating compliance with maximum limit for the aggregate production of condensate/liquids from the wells set forth in the draft permit, CNX shall be required to monitor and record the monthly and rolling twelve month total of condensate/produced-water (in gallons) produced in the wells. Monitoring and recording the monthly and rolling twelve month total of condensate/liquids (in gallons) unloaded from the storage tanks can be used to show compliance with this requirement.

RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that permit R13-3024 for the construction of the Rowland 308 coal bed methane compressor station near, Dry Creek, Raleigh County, be granted to CNX Gas, LLC.

Steven R. Pursley, PE
Engineer

July 10, 2013

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