



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-3237C
Plant ID No.: 017-00148
Applicant: CNX Gas Company LLC (CNX)
Facility Name: Oxford 11 Well Pad
Location: New Milton, Doddridge County
NAICS Code: 211111 (Natural Gas Production)
Application Type: Modification
Received Date: February 16, 2017
Engineer Assigned: Jerry Williams, P.E.
Fee Amount: \$1,000.00
Date Received: February 16, 2017
Complete Date: March 2, 2017
Due Date: May 31, 2017
Applicant Ad Date: February 14, 2017
Newspaper: *The Herald Record*
UTM's: Easting: 520.430 km Northing: 4,335.746 km Zone: 17
Description: Reduction of condensate production resulting in the removal of flash gas and vapor recovery compressors and microturbine.

DESCRIPTION OF PROCESS

The following process description was taken from the permit application:

The proposed equipment removal reflects a reduction in condensate production and the ability to send flash gas from the site's low pressure separator (LPS) directly to a low pressure sales line. The site has removed all engines originally permitted for vapor recovery unit and flash gas compression. Additionally, due to reduced condensate production, the gas produced by the LPS has been reduced and thus the amount of bypass gas diverted to the elevated flare. Therefore, overall combustion capacity of the flare has been significantly reduced based on the LPS' potential. The maximum overall production rates are now 100 barrels per day (bbl/day) of condensate and 400 bbl/day of water.

Promoting a healthy environment.

SITE INSPECTION

A site inspection was conducted on March 1, 2017 by Doug Hammell of the DAQ Enforcement Section. According to Mr. Hammell, the facility was operating in compliance.

Latitude: 39.170698
Longitude: -80.763496

Directions to the facility are as follows:

From the intersection of WV Highway 18 and Co. Rte. 25 near New Milton: Travel south on WV Highway 18 for 3 miles. Turn right on Porto Rico Road for 0.7 miles, then continue straight onto Toms Fork Road for another 0.7 miles. Take slight right onto Co. Rte. 54/1 for 2.5 miles, then turn right and becomes Cain Run for 0.3 miles. Then take sharp left onto South Fork of Hughes River for 1 mile. Take access road to left and to the top of the hill and stay to the left to arrive at site.



ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this application consist of six (6) gas processing units (GPUs), one (1) LPS, one (1) thermoelectric generator, one (1) vapor destruction unit (VDU), one (1) emergency/maintenance flare, six (6) produced water storage tanks, six (6) condensate storage tanks, one (1) compressor rain water slop tank, truck loading and fugitive emissions. Fugitive emissions for the facility are based on calculation methodologies presented in EPA Protocol for Equipment Leak Emission Estimates. The following table indicates which methodology was used in the emissions determination:

Emission Point ID#	Process Equipment	Calculation Methodology
1E – 6E	Six (6) 1.0 MMBTU/hr GPUs	EPA AP-42 Emission Factors
8E	0.5 MMBTU/hr Low Pressure Separator	EPA AP-42 Emission Factors
11E	0.013 MMBTU/hr Thermoelectric Generator	EPA AP-42 Emission Factors
12E	18.06 MMBTU/hr VDU	EPA AP-42 Emission Factors, Engineering Estimate
13E	250 MMBTU/hr Emergency/Maintenance Flare	EPA AP-42 Emission Factors, Engineering Estimate
TL-1	182,500 bbl/yr Truck Loading	EPA AP-42 Emission Factors
T01-T06	Six (6) 400 bbl Produced Water Storage Tanks	ProMax 4.0
T07-T12	Six (6) 400 bbl Condensate Storage Tanks	ProMax 4.0
14E	100 bbl Compressor Rain Water Slop Tank	Negligible

The following table indicates the control device efficiencies that are required for this facility:

Emission Unit	Pollutant	Control Device	Control Efficiency
PW, Cond Tanks (T01-T12)	Volatile Organic Compounds	VDU	98 %
	Hazardous Air Pollutants		98 %
Truck Loading (TL-1)	Volatile Organic Compounds	VDU w/ 70% Capture	69 %
	Hazardous Air Pollutants		69 %

The total facility PTE (including fugitives) for the Oxford 11 Well Pad is shown in the following table:

Pollutant	R13-3237B PTE (tons/year)	R13-3237C PTE (tons/year)	PTE Change (tons/year)
Nitrogen Oxides	21.27	8.36	-12.91
Carbon Monoxide	80.97	27.72	-53.25
Volatile Organic Compounds	97.41	35.93	-61.48
Particulate Matter-10/2.5	0.32	0.22	-0.10
Sulfur Dioxide	2.76	0.21	-2.55
Total HAPs	8.19	0.13	-8.06
Carbon Dioxide Equivalent	33,465	13,106	-20,359

Maximum detailed controlled point source emissions were calculated by CNX and checked for accuracy by the writer and are summarized in the table on the next page.

CNX Gas Company LLC – Oxford 11 Well Pad (R13-3237C)

Emission Point ID#	Source	NO _x		CO		VOC		PM-10		SO ₂		CO ₂ e	
		lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year
1E - 6E	6 Gas Processing Units	0.59	2.58	0.49	2.16	0.03	0.14	0.04	0.20	0.004	0.02	0.004	3075
8E	Low Pressure Separator	0.05	0.21	0.04	0.18	0.003	0.01	0.004	0.02	0.0003	0.001	0.0003	256
11E	Thermoelectric Generator	0.001	0.002	0.001	0.01	0.0001	0.0003	0.0001	0.0003	0.00001	0.00003	0.00001	7
12E	Vapor Destruction Unit	1.23	5.38	5.60	24.52	2.53	11.07	0.00	0.00	0.04	0.18	0.04	9215
13E	Emergency/Maintenance Flare	0.04	0.19	0.20	0.85	0.25	1.08	0.00	0.00	0.02	0.01	0.02	314
TL-1	Truck Loading	0	0	0	0	0.40	1.76	0	0	0	0	0	0
Total Point Source		1.91	8.36	6.33	27.72	3.21	14.07	0.04	0.22	0.06	0.21	0.06	12867
Fugitive	Fugitive Venting	0	0	0	0	4.99	21.87	0	0	0	0	0	239
Total Fugitive		0	0	0	0	4.99	21.87	0	0	0	0	0	239
Total Siterwide		1.91	8.36	6.33	27.72	8.20	35.93	0.04	0.22	0.06	0.21	0.06	13106

REGULATORY APPLICABILITY

The following rules apply to this modification:

45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers)

The purpose of 45CSR2 is to establish emission limitations for smoke and particulate matter which are discharged from fuel burning units. 45CSR2 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 4 (weight emission standard), 5 (control of fugitive particulate matter), 6 (registration), 8 (testing, monitoring, recordkeeping, reporting) and 9 (startups, shutdowns, malfunctions). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The individual heat input of the gas processing units (1E-6E), low pressure separator (8E) and thermoelectric generator (11E) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR2.

CNX would also be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

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.

CNX has one (1) VDU and one (1) flare at the facility. These units are subject to section 4, emission standards for incinerators. These units have negligible hourly particulate matter emissions. Therefore, these units should demonstrate compliance with this section. The facility will demonstrate compliance by maintaining records of the amount of natural gas consumed by these units and the hours of operation. The facility will also monitor the flame of these units and record any malfunctions that may cause no flame to be present during operation.

45CSR10 (To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides)

The purpose of 45CSR10 is to establish emission limitations for sulfur dioxide which are discharged from fuel burning units. 45CSR10 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 3 (weight emission standard), 6 (registration), 7 (permits), and 8 (testing, monitoring, recordkeeping, reporting). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The individual heat input of the gas processing units (1E-6E), low pressure separator (8E) and thermoelectric generator (11E) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR10.

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 modification permit applies to this source because CNX's modification results in the removal of synthetic minor limitations on the elevated flare.

CNX 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 OOOO. These requirements are discussed under 40CFR60 Subpart OOOO below.

45CSR22 (Air Quality Management Fee Program)

CNX is not subject to 45CSR30. The Oxford 11 Well Pad is subject to 40CFR60 Subpart OOOO, 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.

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

40CFR60 Subpart OOOO (Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution for which Construction, Modification or Reconstruction Commenced after August 23, 2011, and on or before September 18, 2015)

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, and on or before September 18, 2015. The following affected sources which commence construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015 are subject to the applicable provisions of this subpart:

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

The Oxford 11 well pad consists of six (6) natural gas wells. The wells were constructed after the August 23, 2011 applicability date. The construction of the facility was prior to September 18, 2015. Therefore, the gas wells located at the facility are subject to the requirements of this subpart.

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 Oxford 11 Well Pad. Therefore, all requirements regarding centrifugal compressors under 40 CFR 60 Subpart OOOO would not apply.

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 no reciprocating compressors at the Oxford 11 Well Pad. Therefore, all requirements regarding reciprocating compressors under 40 CFR 60 Subpart OOOO would not apply.

Pneumatic Controllers

- Each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh which commenced construction after August 23, 2011, and on or before September 18, 2015, and is located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment and not located at a natural gas processing plant.
- Each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller which commenced construction after August 23, 2011, and on or before September 18, 2015, and is located at a natural gas processing plant.

There are no continuous bleed pneumatic controllers at the Oxford 11 Well Pad. Therefore, all requirements regarding continuous bleed pneumatic controllers under 40 CFR 60 Subpart OOOO would not apply.

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 non-earthen 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.

The storage vessels located at the Oxford 11 Well Pad are controlled by a VDU which will reduce the potential to emit to less than 6 tpy of VOC. Therefore, CNX is not required by this section to further reduce VOC emissions by 95%.

The group of all equipment, except compressors, within a process unit is an affected facility.

- 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 Oxford 11 Well Pad 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 located at onshore natural gas processing plants that process natural gas produced from either onshore or offshore wells.

- 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 Oxford 11 Well Pad. Therefore, all requirements regarding sweetening units under 40 CFR 60 Subpart OOOO would not apply.

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 Oxford 11 Well Pad is located in Doddridge County, which is an unclassified county for all criteria pollutants, therefore the Oxford 11 Well Pad is not applicable to 45CSR19.

As shown in the following table, CNX 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)	Oxford 11 PTE (tpy)	45CSR14 or 45CSR19 Review Required?
Carbon Monoxide	250	NA	27.72	No
Nitrogen Oxides	250	NA	8.36	No
Sulfur Dioxide	250	NA	0.21	No
Particulate Matter 2.5	250	NA	0.22	No
Ozone (VOC)	250	NA	14.07	No

45CSR30 (Requirements for Operating Permits)

CNX is not subject to 45CSR30. The Oxford 11 Well Pad is subject to 40CFR60 Subpart OOOO, 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.

40CFR60 Subpart Kb (Standards of Performance for VOC Liquid Storage Vessels)

40CFR60 Subpart Kb does not apply to storage vessels with a capacity less than 75 cubic meters. The largest tanks that CNX has installed are 63.60 cubic meters each. Therefore, CNX would not be subject to this rule.

40CFR60 Subpart KKK (Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants)

40CFR60 Subpart KKK applies to onshore natural gas processing plants that commenced construction after January 20, 1984, and on or Before August 23, 2011. The Oxford 11 Well Pad is not a natural gas processing facility, therefore, CNX is not subject to this rule.

40CFR60 Subpart OOOOa (Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution for which Construction, Modification or Reconstruction Commenced after September 18, 2015)

EPA published its New Source Performance Standards (NSPS) and air toxics rules for the oil and gas sector on August 16, 2012. EPA published amendments to the Subpart on September 23, 2013 and June 3, 2016. 40CFR60 Subpart OOOOa establishes emission standards and compliance schedules for the control of the pollutant greenhouse gases (GHG). The greenhouse gas standard in this subpart is in the form of a limitation on emissions of methane from affected facilities in the crude oil and natural gas source category that commence construction, modification or reconstruction after September 18, 2015. This subpart also 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 September 18, 2015. The effective date of this rule is August 2, 2016.

For the purposes of 60.5397a (LDAR), a “modification” to a well site occurs when a new well is drilled at an existing well site, a well at an existing well site is hydraulically fractured or refractured. This has not occurred, therefore, for the purposes of LDAR, a “modification” has not occurred.

No modifications occurred in regards to this rule.

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

“Building, structure, facility, or installation” is defined as all the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous and adjacent properties, and are under the control of the same person.

The Source Determination Rule for the oil and gas industry was published in the Federal Register on June 3, 2016 and became effective on August 2, 2016. EPA defined the term “adjacent” and stated that equipment and activities in the oil and gas sector that are under common control will be considered part of the same source if they are located on the same site or on sites that share equipment and are within ¼ mile of each other.

The Oxford 11 Well Pad will operate under SIC code 1311 (Natural Gas Production). Cone’s co-located Cain Station has an SIC code of 4922 that has been filed with the SEC. CNX is the sole operator of the Oxford 11 Well Pad. Cone is the operator of the Cain Station. However, CNX and CONE both own a significant partnership interest in CONE MLP. Therefore, the partnership that exists between these facilities lends itself to common control.

The Oxford 11 Well Pad is located on contiguous or adjacent properties with other facilities under common control, however, they do not share the same two digit major SIC code. Therefore, the emissions from these two (2) facilities should not be aggregated in determining major source or PSD status.

MONITORING OF OPERATIONS

CNX will be required to perform the following monitoring and recordkeeping:

- Monitor and record quarterly records of the temperature and pressure upstream of any storage vessel containing condensate and/or produced water at the appropriate separation unit based on the calculation methodology or model being used by the permittee to calculate their VOC flash emissions.
- Maintain a record of the aggregate throughput for the storage vessels (T01-T12) and truck loading that contains condensate and/or produced water on a monthly and rolling twelve (12) month total. Said records shall be maintained in accordance with section 3.5.1 of this permit.
- Monitor all applicable requirements of 40CFR60 Subpart OOOO.
- Monitor the presence of the vapor destruction unit and emergency/maintenance flare pilot flames with a thermocouple or equivalent.
- Monitor the closed vent systems.
- Maintain records of the visible emission opacity tests conducted per the permit. CNX will be required to perform the following recordkeeping.
- 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 the vapor destruction unit and emergency/maintenance flare design evaluation.
- The records shall be maintained on site or in a readily available off-site location maintained by CNX for a period of five (5) years.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that CNX meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Oxford 11 Well Pad should be granted a 45CSR13 modification permit for their facility.



Jerry Williams, P.E.
Engineer

May 13, 2017

Date