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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3248
Plant ID No.:	017-00153
Applicant:	CNX Gas Company, LLC
Facility Name:	Oxford 13
Location:	Doddridge County
NAICS Code:	212111
Application Type:	Construction
Received Date:	May 5, 2015
Engineer Assigned:	Joe Kessler
Fee Amount:	$4,500
Date Received:	May 11, 2015
Complete Date:	June 4, 2015
Due Date:	September 2, 2015
Applicant Ad Date:	May 12, 2015
Newspaper:	*The Herald Record*
UTM's:	521.787 km Easting • 4,335.535 km Northing • Zone 17
Latitude/Longitude:	39.16876/-80.74779
Description:	Permit for construction and operation of a natural gas production facility at the Oxford 13 well-pad.

DESCRIPTION OF PROCESS

CNX Gas Company, LLC (CNX) has submitted a permit application for the construction and operation of a natural gas production facility primarily consisting of one (1) 2.5 mmBtu/hr natural gas-fired line heater (LH-1), seven (7) 1.0 mmBtu/hr natural gas-fired line heaters (LH-2 to LH-8), one (1) 0.5 mmBtu/hr natural gas-fired low pressure separator (LPS-1), six (6) 16,800-gallon produced-water storage tanks (T01 through T06), six (6) 16,800-gallon condensate storage tanks (T07 through T12), one (1) Arrow VRG 330 4-Stroke Rich Burn (4SRB) 68 horsepower (hp) vapor recovery unit (VRU) compressor engine (CE-1), one (1) Waukesha F3524GSI 4SRB 840 hp flash gas compressor engine (CE-1), an 18.34 mmBtu/hr vapor destruction unit (VDU-1), a 3 mmscf/day flare (Flare-1), and one (1) 0.013 mmBtu/hr natural gas-fired thermoelectric generator (TG-1). Additionally, truck loading of condensate/produced-water will also take place at the site.

When in production, natural gas, condensate and produced water will be collected from six horizontal wells located onsite (API numbers are provided in the permit application). The gas and liquids mixture will first flow through one of the seven (7) 1.0 mmBtu/hr line heaters/separators (LH-2 through LH-8). In the heaters/separators, the well stream is divided into sales gas, produced water, and condensate. The gas will leave the line heaters/separators and go directly into the sales gas line. The produced water removed is routed to one of six 16,800 gallon produced water storage tanks (T01 - T06). The condensate mixture will go to a separate 2.5 mmBtu/hr line heater (LH-1) where the pressure will be further reduced. This stream will then pass into a low pressure, 3-phase separator (LPS-1). From here, the separated water stream will flow to a produced water storage vessel, and the separated condensate will flow to one of six 16,800 gallon condensate storage tanks (T07 - T12). The gas separated by the low pressure separator will be sent to the Waukesha F3524GSI 4SRB 840 hp flash gas compressor engine (CE-2) for recycling into the sales gas line. In the event the flash gas compressor is down (expected not to exceed 1,000 hours under non-emergency scenarios), the flash gas stream from the low pressure separator will be diverted to an elevated process flare (Flare-1) for destruction (at an estimated minimum destruction efficiency of 98%). The flare is rated to handle 3 mmscf/day of gases at a maximum heat content of 2,000 Btu/scf. At maximum production of condensate from the large-well pad (estimated to be 1,150 bbl/day), large amounts of flash gas have been estimated to created in the flash gas separator. This flash gas is estimated to have a high heat content of 2,000 Btu/scf. For this reason, to handle the large amount of hot flash gas, a large flare was required. The emissions (NO_x - 98.7%, CO - 97.6%) from the Waukesha compressor engine are controlled by a Miratech RCS2-3024-10-EC2 catalytic converter warranted to perform at the control percentages given above.

The working, breathing, and flashing emissions from each of the storage vessels will be routed into a header system directed to the Arrow VRG 330 4SRB 68 hp VRU compressor (CE-1). The tank vapors will be compressed and recycled back into the sales gas line via the suction side of the flash gas compressor. In the event the vapor recovery unit is down, the vapor stream will be controlled by a vapor destruction unit (VDU-1).

From the storage tanks, condensate/produced-water is loaded into 4,200 gallon trucks for removal from the site. Emissions from the loadout (TL-1) are captured (estimated at a 70% efficiency) and sent to the VDU for destruction. The thermoelectric generators (TG-1 and TG-2) are used to provide small amounts of electricity for switching/monitoring purposes when the facility is unable to generate sufficient solar power.

SITE INSPECTION

On July 9, 2015, the writer conducted an inspection of the Oxford 13 natural gas production facility. The Oxford 13 site is located in a remote and rural area of Doddridge County approximately 5.49 miles south-southwest of New Milton, WV along a new access road created off of County Route (CR) 40. The wells were in the process of being vertically drilled at the time of the inspection. No occupied residences were visible from the site and the nearest was estimated to be approximately 0.25 miles northwest along CR 40. The following is a picture of the Oxford 13 well-pad taken on the day of the inspection:

Directions: [Latitude: 39.16876, Longitude: -80.74779] From the United States Route (USR) 50, travel south on WV State Route (SR) 18 for approximately 9.3 miles and turn right onto County Route (CR) 54 (Porto Rico Road). Proceed on CR 54 for 1.4 miles until it transitions into CR 54/1. Remain on CR 54/1 for approximately 2.3 miles and then turn left onto CR 40. After about 0.8 miles, turn left onto Oxford 13 access road. Proceed to the facility at the top of the hill.

AIR EMISSIONS AND CALCULATION METHODOLOGIES

CNX included in Attachment N of the permit application air emissions calculations for the equipment and processes at the Oxford 13 natural gas production facility. The following will summarize the calculation methodologies used by CNX to calculate the potential-to-emit (PTE) of the proposed facility.

Natural Gas-Fired Heaters/Generator

Criteria Pollutant emissions from the natural gas-fired line heaters (1e through 8e), low pressure separator combustion exhaust (9e), and thermoelectric generators (12e and 13e) were based on the emission factors provided for natural gas combustion as given in AP-42 (AP-42 is a database of emission factors maintained by USEPA) Section 1.4. Hourly emissions were based on the maximum design heat input (MDHI) of each unit and annual emissions were based on an annual operation of 8,760 hours. A heat content of the gas of 1,020 Btu/scf was used in the calculations.

Compressor Engines

Potential emissions from the Arrow VRG 330 4SRB 68 hp VRU compressor engine (10e) and the Waukesha F3524GSI 4SRB 840 hp flash gas compressor engine (11e) were based on post-control emission factors provided by the engine vendor and as given in AP-42, Section 3.2. Hourly emissions were based on the (as calculated using a fuel heat rating of 9,000 Btu/hp-hr and 8,676 Btu/hp-hr, respectively) MDHI of the engines and the maximum hp rating. Annual emissions were based on 8,760 hours of operation per year. The following tables detail the potential-to-emit (PTE) of each compressor engine:

Table 1: Arrow VRG 330 4SRB 68 hp Compressor Engine PTE

Pollutant	Emission Factor	Source	Hourly (lb/hr)	Annual (ton/yr)
CO	3.72 lb/mmBtu	Engine Vendor	2.28	9.97
NO_X	2.27 lb/mmBtu	Engine Vendor	1.39	6.08
$PM_{2.5}$ (2)	4.83×10^{-2} lb/mmBtu	AP-42, Table 3.2-3	0.03	0.13
PM_{10} (2)	4.83×10^{-2} lb/mmBtu	AP-42, Table 3.2-3	0.03	0.13
PM (2)	4.83×10^{-2} lb/mmBtu	AP-42, Table 3.2-3	0.03	0.13
SO_2	5.88×10^{-4} lb/mmBtu	AP-42, Table 3.2-3	0.00	0.00
VOCs	0.03 lb/mmBtu	Engine Vendor	0.02	0.08
Total HAPs	Various	AP-42, Table 3.2-3	0.02	0.09
Formaldehyde	0.02 lb/mmBtu	AP-42, Table 3.2-3	0.01	0.06

(1) Includes condensables.

Table 2: Waukesha F3524GSI 4SRB 840 hp Compressor Engine PTE

Pollutant	Emission Factor	Source	Hourly (lb/hr)	Annual (ton/yr)
CO	0.30 g/hp-hr	Catalyst Vendor	0.56	2.43
NO_X	0.20 g/hp-hr	Catalyst Vendor	0.37	1.62
$PM_{2.5}$ (1)	19.41×10^{-3} lb/mmBtu	AP-42, Table 3.2-2	0.14	0.62
PM_{10} (1)	19.41×10^{-3} lb/mmBtu	AP-42, Table 3.2-2	0.14	0.62
PM (1)	19.41×10^{-3} lb/mmBtu	AP-42, Table 3.2-2	0.14	0.62
SO_2	5.88×10^{-4} lb/mmBtu	AP-42, Table 3.2-2	0.00	0.02
VOCs	0.19 g/hp-hr	Engine Vendor	0.35	1.54
Total HAPs	Various	AP-42, Table 3.2-2	0.18	0.81
Formaldehyde	0.05 g/hp-hr	Engine Vendor	0.09	0.41

(1) Includes condensables.

Low Pressure Separator Flash Gas Vapors

Uncontrolled flash gas from the low pressure separator was based on ProMax Simulation Software. ProMax software is a chemical process simulator for design and modeling of amine gas treating, glycol dehydration units, and other natural gas components. Based on a detailed input gas analysis and the components of the facility, the software can simulate and model the inputs and outputs of the system. The ProMax stream of "To LPS Booster Compressor" was used as the source of the uncontrolled hourly emissions of the low pressure separator flash gas. The inlet gas stream and condensate characteristics were based on tests performed at the Oxford 1 well-pad (in July and August 2014) that CNX considers representative. An electronic copy (Excel File) of the ProMax run was submitted to the DAQ to verify the accuracy of the separator emissions. Annual emissions were based on 8,760 hours of operation per year with a worst-case of 1,000 hours of venting flash gas emissions to the flare.

As noted above, the uncontrolled emissions from the low pressure separator flash gas are captured by the VRU and sent to the flash gas compressor engine for recycling into the sales gas line. When in operation, the VRU is considered to capture 100% of the flash gas vapors. When this system goes down (and the normal expectation is for the system to be down approximately 5% of the time), the flash gas will be routed to the flare (with a minimum control efficiency of 98%) for control. Therefore, for determining the worst-case hourly controlled emissions, CNX multiplied the uncontrolled emissions by 2%. However, in determining the worst-case annual controlled emissions, CNX assumed that the VRU would be down a maximum of 1,000 hours. Additionally, to account for the quick fall-off of gas that occurs after startup, the annual emissions were based on a 25% decrease in controlled hourly emissions. A table detailing the emissions from the low pressure separator flash gas is in Attachment A: Table A1.

Storage Tanks

Uncontrolled working, breathing, and flashing emissions from the ten condensate/produced-water storage tanks were based on the ProMax software (streams labeling self-explanatory). Maximum hourly throughputs of 4,830 gallons and 2,013 gallons of produced water and condensate, respectively were used in the calculations. Annual throughputs of 31,733,100 gallons of produced water and 13,222,125 gallons of produced water and condensate, respectively (representing 75% of the annualized maximum hourly flow) were used.

As noted above, the uncontrolled emissions from the storage tanks are captured by the VRU and sent to the VRU compressor engine for recycling into the sales gas line. When this system goes down (and the normal expectation is for the system to be down approximately 5% of the time), the storage tanks emissions will be routed to the VDU (with a minimum control efficiency of 98%) for control. Therefore, the expected overall capture efficiency of the system will be 99.90% (95% + (5% * 0.98)). However, to be conservative, the controlled flash gas emissions from the storage tanks were estimated using an overall control efficiency of 98% - i.e., as if the VRU was not used (a very conservative estimate). A table detailing the emissions from the storage tanks is in Attachment A: Table A2.

Truck Loading

Air emissions from condensate truck loading operations occur as fugitive emissions generated by displacement of vapors when loading trucks. The emission factor used to generate the VOC emissions is based on Equation (1) of AP-42 Section 5.2-1. In this equation, CNX used variables specific to the liquids loaded and to the method of loading - in this case "submerged filling - dedicated normal service." Based on the use of the VRU compressor, and according to guidance in AP-42, Section 5.2-1, a control efficiency of 70% was applied to the uncontrolled condensate loading emissions. Additionally, worst-case annual emissions were based on a maximum loading of 31,733,100 gallons of produced water and 13,222,125 gallons of produced water and condensate, respectively. Maximum hourly emission rates were based on loading a maximum of ~5,000 gallons of produced water and ~2,000 gallons of condensate per hour.

Flare and VDU Combustor Combustion Exhaust

Criteria Pollutant emissions from the combustion exhaust of the Flare and VDU (both combustion of the waste gases and the combustion of natural gas in the pilot lights) are based on emission factors as given in AP-42 Section 13.5. Hourly emissions from each unit were based on the MDHI of the units (VDU - 18.33 mmBtu/hr, Flare - 250 mmBtu/hr). Annual emissions of the VDU were based on operating 8,760 at MDHI. Annual emissions of the flare were based on the flare operating at 1,000 hours. All pilot light emissions (nominal) were calculated at MDHI and 8,760 hours per year.

Fugitives

CNX based their fugitive equipment leak calculations on emission factors taken from the document EPA-453/R-95-017 - "Protocol for Equipment Leak Emission Estimates" and on default conservative component counts given under 40 CFR Part 98. Emission factors were taken from Table 2-4 (OIL AND GAS PRODUCTION OPERATIONS AVERAGE EMISSION FACTORS (kg/hr/source)) and no control efficiency, as based on a Leak Detection and Repair (LDAR) protocol, was applied. VOC emissions from components in gas service were based on 22% (by weight) VOC content of gas (pursuant to ProMax inlet gas composition). VOC emissions of components in light liquid service were based on 100% of all emissions (HAP emissions from light liquid service were calculated by the writer and based on the HAP concentration of condensate as given by ProMax). For these fugitive emission factors, the annual emissions are considered more accurate as the factors are designed for longer time periods. However, hourly emissions were based on the annual emissions divided by 8,760 hours.

Emissions Summary

Based on the above estimation methodology, which is determined to be appropriate, the PTE of the proposed Oxford 13 natural gas production facility is given in Attachment B.

REGULATORY APPLICABILITY

The proposed CNX natural gas production facility is subject to applicable requirements in the following state and federal air quality rules and regulations: 45CSR2, 45CSR6, 45CSR13, 40 CFR 60 Subpart OOOO, and 40 CFR 63, Subpart ZZZZ. Each applicable rule (and ones that have reasoned 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

The line heaters and low pressure separator each have been determined to meet the definition of a "fuel burning unit" under 45CSR2 and are, therefore, subject to the applicable requirements therein. However, pursuant to the exemption given under §45-2-11, as the MDHI of the units are each less than 10 mmBtu/hr, they are not subject to sections 4, 5, 6, 8 and 9 of 45CSR2. The only remaining substantive requirement is under Section 3.1 - Visible Emissions Standards.

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

45CSR6: To Prevent and Control Particulate Air Pollution from Combustion of Refuse

CNX has proposed a flare and VDU for controlling the flash gas and storage tank emissions, respectively. Both of these units meet the definition of an "incinerator" under 45CSR6 and are, therefore, subject to the requirements therein. The substantive requirements applicable to the units are discussed below.

45CSR6 Emission Standards for Incinerators - Section 4.1

Section 4.1 limits PM emissions from incinerators to a value determined by the following formula:

Emissions (lb/hr) = F x Incinerator Capacity (tons/hr)

Where, the factor, F, is as indicated in Table I below:

Table I: Factor, F, for Determining Maximum Allowable Particulate Emissions

Incinerator Capacity	Factor F
A. Less than 15,000 lbs/hr	5.43
B. 15,000 lbs/hr or greater	2.72

Based on information taken from the ProMax simulation, the weight rate of waste gas going to the VDU is 283.2 lb/hr (0.14 tons/hr). Using this amount as the capacity of the VDU, it has a particulate matter limit of 0.76 lbs/hour. Again based on information taken from the ProMax simulation, the weight rate of waste gas going to the flare is 17,273 lb/hr (8.64 tons/hr). Using this amount as the capacity of the flare, it has a particulate matter limit of 23.49 lbs/hour. Based on the design of the units and the nature of the gas being combusted, particulate matter emissions from both the VDU and the flare are expected to be nominal and far below these limits.

45CSR6 Opacity Limits for - Section 4.3, 4.4

Pursuant to Section 4.3, and subject to the exemptions under 4.4, the VDU and the flare have a 20% limit on opacity during operation. As a primary constituent in the vapors combusted in the unit shall be clean burning methane/ethane, particulate matter emissions from both units are expected to be nominal. Therefore, the units should easily meet this requirement.

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

45CSR10 has requirements limiting SO_2 emissions from "fuel burning units," limiting in-stack SO_2 concentrations of "manufacturing processes," and limiting H_2S concentrations in process gas streams. The only potential applicability of 45CSR10 to the Oxford 13 natural gas production facility is the limitations on fuel burning units. Pursuant to the exemption given under §45-10-10.1, as the MDHI of the line heaters and low pressure separator - each of which have been determined to meet the definition of a "fuel burning unit" under 45CSR10 - are less than 10 mmBtu/hr, the units are not subject to the limitations on fuel burning units under 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

The proposed construction of the Oxford 13 natural gas production facility has a potential to emit a regulated pollutant in excess of six (6) lbs/hour and ten (10) TPY (see Attachment B) and, therefore, pursuant to §45-13-2.24, the facility is defined as a "stationary source" under 45CSR13. Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the construction . . . and operation of any stationary source to be commenced without . . . obtaining a permit to construct." Therefore, CNX is required to obtain a permit under 45CSR13 for the construction of Oxford 13.

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 May 12, 2015 in *The Herald Record* and the affidavit of publication for this legal advertisement was submitted on May 21, 2015.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration - (NON APPLICABILITY)

The facility-wide potential-to-emit of the Oxford 13 natural gas production facility (see Attachment B) is below the levels that would define the source as "major" under 45CSR14 (as a "non-listed" source, the major stationary source threshold is a PTE of 250 TPY of any criteria pollutant) and, therefore, the construction evaluated herein is not subject to the provisions of 45CSR14.

Potential 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 proposed Oxford 13 natural gas production facility will be located approximately 0.80 miles from the known nearest other CNX facility (Oxford 11 well-pad and production facility). Oxford 13 shares the same SIC code as Oxford 11 and is owned by CNX. Therefore, the potential classification of the Oxford 13 facility as one stationary source with Oxford 11 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 and whether or not it meets the common sense notion of one stationary source. 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; *having a common endpoint or border*.

The Oxford 13 natural gas production facility is not located contiguous with, or *directly* adjacent to the Oxford 11 facility. As noted above, the facilities are 0.80 miles apart. Facilities separated by this distance do not meet the common sense notion of a single plant. Therefore, the Oxford 13 and Oxford 11 facilities are not considered to be on contiguous or adjacent property.

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 (see Attachment B and footnotes). However, as the facility is subject to a New Source Performance Standard (NSPS) - 40 CFR 60, Subpart OOOO (existing gas wells only) and a Maximum Achievable Control Technology (MACT) rule - 40 CFR 63, Subpart ZZZZ - the facility would, in most cases, be subject to Title V as a “deferred source.” However, pursuant to §60.5370(c) and §63.6585(d), as a non-major source, CNX is not required to obtain a Title V permit for the proposed facility. Therefore, the Oxford 13 natural gas production facility is not subject to 45CSR30.

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 (m^3) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984." The storage tanks located at the Oxford 13 facility are each 16,800 gallons, or 34 m^3. Therefore, Subpart Kb does not apply to the storage tanks.

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

CNX's two (2) proposed compressor engines proposed for the Oxford 13 facility are defined under 40 CFR 60, Subpart JJJJ as stationary spark-ignition internal combustion engines (SI ICE) and are each, pursuant to §60.4230, potentially subject to the applicable provisions of the rule. However, pursuant to §60.4230(a)(4)(i), rich burn engines ≥500 hp manufactured prior to July 1, 2007 are not subject to Subpart JJJJ. The proposed CNX Waukesha F3524GSI 4SRB 840 hp flash gas compressor engine was, according to information provided by CNX, manufactured on November 27, 2006. Additionally, rich burn engines ≤ 500 hp manufactured prior to July 1, 2008 are not subject to Subpart JJJJ. The proposed CNX Arrow VRG 330 4SRB 68 hp VRU compressor engine was, according to information provided by CNX, manufactured on June 1, 1998.

40 CFR 60, Subpart OOOO: Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution

On April 27, 2012, the USEPA issued a final rule (with amendments finalized on August 16, 2012, September 23, 2013, and December 31, 2014) that consists of federal air quality 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 previously not regulated at the federal level. Each potentially applicable section of Subpart OOOO is discussed below.

Compressor Engines (NON APPLICABILITY)

Pursuant to §60.5365(c), "[e]ach 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. 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." that commenced construction, modification or reconstruction after August 23, 2011 is subject to the applicable provisions of Subpart OOOO. As the compressor engines proposed for Oxford 13 were manufactured prior to August 23, 2011 and are located at a well-site, the engines are not subject to the requirements of OOOO.

Gas Wells - §60.5370

CNX has drilled six (6) gas wells (API numbers are located in the permit application) at the Oxford 13 well-pad (after August 23, 2011) and, therefore, these are defined as "affected facilities" under Subpart OOOO and are subject to applicable provisions. The primary requirements for gas wells hydraulically fractured after January 1, 2015 are given under §60.5375(a)(1) through (4) of the rule. It primarily requires that flowback emissions (gas produced from the well after fracturing) must be directed to the flow line, collected and stored, reinjected back into the well, or otherwise not emitted..

Storage Tanks - §60.5395 (NON APPLICABILITY)

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 Instituted dated September 28, 2012, the *applicability* of storage vessels to Subpart OOOO is based on individual tank PTE - which includes federally enforceable control devices.

The six (6) condensate and six (6) produced-water storage tanks are each calculated to have a federally enforceable PTE (including use of a VRU system and a VDU backup with a combined control percentage of 98%) of less than 6 TPY of VOCs and, therefore, are not considered applicable affected sources under Subpart OOOO.

Pneumatic Controllers (NON APPLICABILITY)

Pursuant to §60.5365(d)(2), "[f]or the natural gas production segment (between the wellhead and the point of custody transfer to the natural gas transmission and storage segment and not including natural gas processing plants), 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" that is constructed after August 23, 2011 is subject to the applicable provisions of Subpart OOOO. The substantive requirements for pneumatic controllers are given under §60.5390. CNX has stated that "[t]he site was evaluated and found to contain only intermittent venting pneumatic control valves rated at less than 6 scf/hr. Therefore the site is not proposing to install or operate any affected continuous bleed pneumatic devices defined by [Subpart OOOO] for control valves."

40 CFR 63 Subpart ZZZZ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart ZZZZ. As the Oxford 13 facility is defined as an areas source of HAPs (see Attachment B), the facility is subject to applicable requirements of Subpart ZZZZ. Pursuant to §63.6603(a), "an existing stationary RICE located at an area source of HAP emissions . . . must comply with the requirements in Table 2d to this subpart and the operating limitations in Table 2b." Pursuant to §63.6590(a)(1)(iii), for a "stationary RICE located at an area source of HAP emissions, a stationary RICE is existing if [the owner or operator] commenced construction or reconstruction of the stationary RICE before June 12, 2006." Under §63.2, the definition of construction explicitly excludes the relocation of an affected source. Therefore, based on the above, the proposed Arrow VRG 330 4SRB 68 hp VRU compressor engine is defined as an existing engine (as it was manufactured on May 7, 1998) and must meet the applicable requirements under Tables 2b and 2d.

As Table 2b only includes requirements for existing diesel engines, the requirements applicable to the engine proposed for the Arrow VRG 330 are located in Table 2d. Specifically, under Requirement 7, CNX will be required to:

- Change oil and filter every 1,440 hours of operation or annually, whichever comes first;
- Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and
- Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary.

Pursuant to §63.6590(a)(2)(iii), a "stationary RICE located at an area source of HAP emissions is new if [the applicant] commenced construction of the stationary RICE on or after June 12, 2006." As the Waukesha F3524GSI 4SRB 840 hp flash gas compressor engine commenced construction after June 12, 2006 (CNX has provided information indicating the engine was ordered on January 1, 2007) it is defined as a "new" engine under Subpart ZZZZ and, therefore, will show compliance with Subpart ZZZZ by meeting the requirements of 40 CFR 60, Subpart JJJJ. Compliance with Subpart JJJJ is discussed above.

TOXICITY ANALYSIS OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the Oxford 13 natural gas production facility and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM), Particulate Matter less than 10 microns (PM_{10}), Particulate Matter less than 2.5 microns ($PM_{2.5}$), and Sulfur Dioxide (SO_2). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) standards promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs were discussed above under REGULATORY APPLICABILITY.

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 in their emissions estimate: Formaldehyde, n-Hexane, Benzene, Toluene, Ethylbenzene, and Xylenes. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Table 3: Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
n-Hexane	VOC	No	Inadequate Data
Formaldehyde	VOC	Yes	B1 - Probable Human Carcinogen
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Toluene	VOC	No	Inadequate Data
Ethyl-benzene	VOC	No	Category D - Not Classifiable
Xylenes	VOC	No	Inadequate Data

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health affects 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

The estimated maximum emissions from the proposed Oxford 13 natural gas production facility are less than applicability thresholds that would define the proposed facility as a "major stationary source" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature of the proposed construction, modeling was not required under 45CSR13, Section 7.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

The draft permit primarily incorporates the monitoring, compliance demonstration, reporting, and record-keeping requirements (MRR) as given in the G70-A General Permit. However, specific non-general MRR requirements are included in the draft permit. Thess requirements are given in the following:

- The permittee shall be required to continuously monitor the volume of waste gases (does not include pilot gas) that are sent to the Flare and VDU for destruction (on an individual basis);

- For the purposes of demonstrating compliance with the maximum VOC and speciated HAP limits set forth in 4.1.4(b) and 4.1.5(b) of the draft permit, CNX shall be required to calculate and record the monthly and rolling twelve month amount of VOC and speciated HAP emissions from the LPS and the Storage Tanks. This calculation shall be based on the volume of gases sent to the flare (for calculating emissions from the LPS Flash Gases) and the VDU (for calculating emissions from the Storage Tanks) and on a site-specific analysis of the waste gas to determine the by-weight percentages of VOCs and speciated HAPs. The site specific gas analysis shall be performed at least once per quarter or, after approval by the Director, a less frequent rate if it is determined that the by-weight percentages of VOCs and speciated HAPs of the waste gases are stable and that a reasonably conservative value can be used in lieu of quarterly testing. During each sampling event, two samples shall be taken at appropriate locations: after the applicable emission units (storage tank vent header and low pressure separator gas stream) and prior to the control devices. In the calculation of actual emissions, a control efficiency of 98% may be used for the flare and the VDU. At all times the waste gases from the LPS and the storage tanks are captured by plant suction and recycled back into the process (according to 4.1.4(a) and 4.1.5(a) of the draft permit), emissions from the LPS and storage tanks can be estimated at zero;

- For the purposes of demonstrating compliance with the maximum truck loadout limits set forth in 4.1.6(b) of the draft permit, CNX shall be required to monitor and record the monthly and rolling twelve month amount of produced water and condensate loaded into trucks; and

- For the purposes of demonstrating compliance with the maximum combustion limits set forth in 4.1.7(b) and 4.1.8(b) of the draft permit, CNX shall be required to calculate and record the monthly (in mmBtu/month) and rolling twelve month (in mmBtu/year) waste gases combustion rate (not including pilot gas) that are sent to the Flare and VDU for destruction (on an individual basis). The combustion rate (in mmBtu/month) shall be calculated by multiplying the heat content of the waste gases (Btu/scf) as based on a site-specific analysis of the gas streams by the continuous volumetric flow measurement (scf/month) as specified by 4.2.2 and 4.2.3. of the draft permit.

As stated above, extensive MRR from the G70-A is incorporated in the draft permit; specifically the MRR relevant to control devices not subject to Subpart OOOO, visibility monitoring/testing, and closed vent requirements.

PERFORMANCE TESTING OF OPERATIONS

As with MRR above, the draft permit primarily incorporates the performance testing requirements as given in the G70-A General Permit. However, specific non-general performance testing requirements are included in the draft permit. These requirements are given in the following:

- At such reasonable time(s) as the Secretary may designate, in accordance with the provisions of 3.3 of the draft permit, CNX shall be required to conduct or have conducted test(s) to determine compliance with the emission limitations or minimum control device efficiencies established in this permit and/or applicable regulations.

RECOMMENDATION TO DIRECTOR

The information provided in permit application R13-3248 indicates that compliance with all applicable federal and state air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of Permit Number R13-3248 to CNX Gas Company, LLC for the construction and operation of the Oxford 13 natural gas production facility located near New Milton, Doddridge County, WV.

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Joe Kessler, PE
Engineer

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Date