west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	G70-A185
Plant ID No.:	061-00222
Applicant:	Northeast Natural Energy, LLC
Facility Name:	Statler Pad
Location:	Pentress, Monongalia County, WV
NAICS Code:	211111
Application Type:	Construction
Received Date:	October 30, 2015
Engineer Assigned:	Caraline Griffith
Fee Amount:	$1,500
Date Received:	November 2, 2015
Complete Date:	November 25, 2015
Due Date:	January 11, 2015
Applicant Ad Date:	October 31, 2015
Newspaper:	*The Dominion Post*
UTM's:	Easting: 570.45 km Northing: 4,395.65 km Zone: 17
Description:	Construction of a new natural gas well pad.

PROCCESS DESCRIPTION

Natural gas and Produced Fluids (water) is received from seven wells on this location at approximately 400 psi and pass through Gas Processing Units (one per well) to avoid ice and methane hydrate formation during subsequent pressure drops. These materials will then pass through a separator where gas and water are separated. The gas will be routed to a gathering pipeline owned and operated by others.

The Produced Water will be accumulated in four 210 bbl tanks, pending truck transportation by others. Produced water will be re-used at subsequent wells or disposed of at a regional disposal

facility. Flash, working and breathing losses from these tanks will be allowed to vent to the atmosphere. There is no condensate generated at this facility.

Currently, emissions at the Statler Well Pad are below permitting thresholds. However, Northeast plans to install a single gas-fired engine used to drive a compressor which will boost the production gas to a pressure suitable for injection into the gathering line owned by others. The addition of this engine will raise facility-wide emissions above one or more permitting thresholds. No dehydration units are proposed for this facility at this time. It is important to note that the compressors and engines are anticipated to operate only for a limited time period (approximately 12-18 months) pending construction and operation of a compressor station by the company providing midstream services for Northeast Energy.

All natural gas fired equipment (GPU's and compressor engine) use natural gas produced at the site as fuel.

Equipment already installed:

- Two (2) 1.0 mmBTU/hr Gas Producing Units (GPU-1 – GPU-2)
- Five (5) 0.75 mmBTU/hr Gas Producing Units (GPU-3 – GPU7)
- Four (4) 210 bbl Produced Water Tanks (T01-T04)
- Produced Water Loading (TL-1)

Equipment to be installed:

- One (1) Caterpillar 3516B Compressor Engine (CE-1)

SITE INSPECTION

On November 19, 2015, Brian Tephabock of the DAQ's Compliance and Enforcement Section inspected the site. There are already pre-existing equipment onsite that was deemed to be under emission thresholds before the application for permit G70-A185. The company is waiting on a permit before any new facility equipment is brought on-site. The location of the facility is also well within the limits of the siting criteria.

Directions:

From Exit 155 on I-79 merge onto Chaplin Hill Road (CR19/24) toward US Rt. 19/Star City. After 0.8 miles, turn left onto US Rt. 19. Continue on US Rt. 19 for 1.7 miles. Turn left onto WV Rt. 7 and continue for approximately 12.7 miles. Well pad entrance road is on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The Caterpillar engine estimates were done using manufacturing data and AP 42. The GPU calculations were done using AP-42 factors: 100 lbs/mmcf NOx; 84 lbs/mmcf CO; 5.5 lbs/mmcf VOC. The totals represented are for all five GPUs combined. The tank emissions were calculated using the following formula and supporting calculations were submitted with the application showing data from similar produced water tanks at nearby sites.

$$E_{TOT} = Q\left(\frac{bbl}{yr}\right) * R\left(\frac{scf}{bbl}\right) * \frac{28.32(L)}{1(scf)} * \frac{1(mole)}{22.4(L)} * MW\left(\frac{g}{mole}\right) * \frac{1(lb)}{453.6(g)} * \frac{1(ton)}{2000(lb)}$$

Table 1: Unit Estimates PTEs

Unit ID	Unit Description	Pollutant	lb/hr	TPY
CE-1	Caterpillar 3516B	NOx	1.52	6.66
		CO	0.52	2.27
		VOC	0.73	3.20
		SO2	<0.01	0.03
		PM10	0.11	0.50
		Formaldehyde	0.13	0.57
GPU-1 through GPU-7	Seven (7) Gas Processing Units Two@ 1.0 mmBTU/hr Five @ 0.75 mmBTU/hr	NOx	0.58	2.52
		CO	0.48	2.12
		VOC	0.03	0.14
		SO2	<0.01	0.02
		PM10	0.04	0.19
		n-Hexane	0.01	0.05
T01 through T04	Four (4) Produced Water Tanks One @ 210 bbl Three @ 400 bbl	VOC	0.08	0.35
		Total HAPs	0.02	0.07

Table 2: Fugitive Emission Estimates

Unit ID	Unit Description	Pollutant	lb/hr	TPY
12E	Produced Water Tanker Truck – Haul Road Emissions	PM	0.26	0.09

Table 3: Total Facility PTE

Pollutant	lb/hr	TPY
NOx	2.10	9.18
CO	1.00	4.38
VOC	0.84	3.70
SO2	0.01	0.04
PM	0.42	0.78
n-Hexane	0.01	0.05
Formaldehyde	0.13	0.57
Total HAPs	0.32	1.39
CO2e	2,573	11,291

AGGREGATION DETERMINATION

In order to be considered for aggregation the three prong test needs to be met.
The Northeast Natural Energy facility will receive and manage raw natural gas and associated produced water from the wells. After separation of the produced water, the gas will be injected into the gathering lines for transportation via pipeline owned and operated by others to a compressor station owned and operated by others, where it will be compressed, dehydrated and injected into a transmission line for transportation to customers.

The Statler Well Pad and the receiving compressor station are under the same general SIC Code. They are not under common ownership and will not have a sharing of staff. Additionally, as the gas can also flow to other compressor stations further away, there is no dependency of the Statler Well Pad on this compressor station. Additionally, operation of this compressor station is not dependent upon the Statler Well Pad as it also receives gas from other well pads. Lastly, the distance between the planned Statler Well Pad and the receiving compressor station (> 1.0 miles) does not rise to the definition of contiguous or adjacent. Thus, not all of the criteria for aggregation are met. Hence, emissions from the Statler Well Pad should not be aggregated with those of the receiving compressor station.

The closest Northeast Natural Energy facility to the Statler Well Pad is its Campbell Well Pad. This facility is under common ownership, under the same SIC Code, and may, from time to time, have sharing of staff. However, these two well pads are approximately 0.63 miles apart. Lastly, there is no interconnection or interdependency between these two facilities. Gas from one well pad does not flow to the other. Accordingly, the operation of one well pad is not dependent on the other. Thus, given the lack of dependency and the distance of separation, emissions from these two well pads should not be aggregated.

REGULATORY APPLICABILITY

The following state and federal regulations apply to sources requesting registration under the G70-A General Permit:

State 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 that are discharged from fuel burning units. Sources subject to 45CSR2 include gas producing units, in-line heaters, heater treaters, and glycol dehydration reboilers.

The heat input of all the existing and proposed fuel burning units (GPU-1 through GPU-7) is below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR2. However, Northeast would be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

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. Northeast does not believe that there will be any objectionable odor emitted from this facility.

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

45CSR6 prohibits open burning, establishes emission limitations for particulate matter, and establishes opacity requirements. Sources subject to 45CSR6 include completion combustion devices, enclosed combustion devices, and flares.

The facility-wide requirements of the general permit include the open burning limitations §§45-6-3.1 and 3.2.

All completion combustion devices, enclosed combustion devices, and flares are subject to the particulate matter weight emission standard set forth in §45-6-4.1; the opacity requirements in §§45-6-4-3 and 4-4; the visible emission standard in §45-6-4.5; the odor standard in §45-6-4.6; and the testing standard in §§45-6-7.1 and 7.2. Sections 5.0, 6.0 and 14.0 of the G70-A general permit include requirements for 45CSR6.

Enclosed combustion control devices and flares that are used to comply with emission standards of NSPS, Subpart OOOO are subject to design, operational, performance, recordkeeping and reporting requirements of the NSPS regulation that meet or exceed the requirements of 45CSR6.

45CSR10 To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

45CSR10 establishes emission limitations for SO2 emissions which are discharged from stacks of fuel burning units. A "fuel burning unit" means and includes any furnace, boiler apparatus, device, mechanism, stack or structure used in the process of burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer. Sources that meet the definition of "Fuel Burning Units" per 45CSR10-2.8 include gas producing units, in-line heaters, heater treaters, and glycol dehydration unit reboilers.

The heat input of all the existing and proposed fuel burning units (GPU-1 through GPU-7) is 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

45CSR13 applies to this source due to the fact that the changes proposed under this permitting action results in an emissions increase above permitting thresholds. Therefore, Northeast is required to submit a modification application. Statoil has published the required Class I legal advertisement in *The Dominion Post* on October 31, 2015 notifying the public of their permit application.

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

45CSR16 applies to all registrants that are subject to any of the NSPS requirements described in more detail in the Federal Regulations section. Applicable requirements of NSPS, Subpart JJJJ and OOOO are included in the G70-A general permit. Excluded from G70-A general permit eligibility are any sources that are subject to NSPS, Subparts Kb, IIII, KKK, or LLL.

45CSR22 Air Quality Management Fee Program

45CSR22 is the program to collect fees for certificates to operate and for permits to construct or modify sources of air pollution. 45CSR22 applies to all registrants. The general permit fee of $500 is defined in 45CSR13. In addition to the application fee, all applicants subject to NSPS requirements or NESHAP requirements shall pay additional fees of $1,000 and $2,500, respectively.

This facility is required to keep their Certificate to Operate current. Northeast Natural Energy, LLC paid a $500 construction application fee and $1,000 NSPS fee.

Federal Regulations:

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

40CFR60.4230 states that a source that commenced construction after June 12, 2006 whose SI ICE was greater than 500 hp (1,380 hp) and was manufactured on or after July 1, 2007 (After 1/1/2012) is subject to this regulation. CE-1, based on the manufacture date this engine is subject to this regulation.

40CFR60, Subpart OOOO (Standards of Performance for Crude oil and Natural Gas Production, Transmission and Distribution)

EPA published its new source performance standards (NSPS) and air toxics rules for the oil and gas sector on August 16, 2012. EPA published final amendments to the subpart on September 23, 2013.

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. The affected sources which commence construction, modification or reconstruction after August 23, 2011 are subject to the applicable provisions of this subpart as described below:

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

   The gas wells at this facility were drilled principally for the extraction of natural gas.

b. 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. 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 this facility.

c. 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. 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.

d. For 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.

   The pneumatic controllers at this facility will be intermittent or vent less than 6 scf/hr and therefore this facility is not subject to this section of this regulation.

e. 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, and has the potential for VOC emissions equal to or greater than 6 tpy as determined according to this section by October 15, 2013 for Group 1 storage vessels and by April 15, 2014, or 30 days after startup (whichever is later) for Group 2 storage vessels. A storage vessel affected facility that subsequently has its potential for VOC emissions decrease to less than 6 tpy shall remain an affected facility under this subpart.

   Tanks T01-T04 located at this facility will emit less than 6 tpy of VOC without controls (0.35 tons/year) and therefore this section of this regulation does not apply.

f. Processing units, sweetening units and compressor stations are outside the scope of the G70-A general permit and are excluded from applicability for the general permit. The G70-A general permit is focused on activities at the production pad facility and is not intended to be a comprehensive NSPS, Subpart OOOO general permit.

   There are no sweetening units located at this facility.

40CFR63 Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines)

CE-1 and CE-2 are "New Stationary RICE" sources at an area source of HAPs and are affected sources because construction will commence after June 12, 2006 [63.6590(a)(2)(iii)] due to the manufacture's date (DOM After January 2012) of the engines.

Engines CE-1 was manufactured after June 12, 2006 and has engine power greater than 500 hp (1,380 hp each) and is therefore subject to Subpart JJJJ. Subpart ZZZZ states engines CE-1 must meet the requirements of 40CFR60 subpart JJJJ.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Small amounts of non-criteria regulated hazardous air pollutants such as benzene, toluene, and formaldehyde may be emitted when natural gas is combusted in reciprocating engines, combusted in the fuel burning units, or combusted in one of the combustion type air pollution control devices.

All natural gas production facilities that are issued a G70-A general permit registration by the Director will be limited to those that are classified as minor sources of hazardous air pollutants. Minor sources of hazardous air pollutants are defined as those that have a potential to emit of less than 10 tons per year of any hazardous air pollutant or less than 25 tons per year of any combination of hazardous air pollutants.

Listed below is information regarding each of the possible hazardous air pollutants.

BTEX:
BTEX is the term used for benzene, toluene, ethylbenzene, and xylene. Each of these possible hazardous air pollutants are identified in this section.

Benzene:
Benzene is found in the air from emissions from burning coal and oil, gasoline service stations, and motor vehicle exhaust. Acute (short-term) inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic (long-term) inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidence of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. EPA has classified benzene as a Group A, human carcinogen.

Ethyl Benzene:
Ethyl benzene is mainly used in the manufacturing of styrene. Acute (short-term) exposure to ethyl benzene in humans results in respiratory effects, such as throat irritation and chest constriction, irritation of the eyes, and neurological effects, such as dizziness. Chronic (long-term) exposure to ethyl benzene by inhalation in humans has shown conflicting results regarding its effects on the blood. Animal studies have reported effects on the blood, liver, and kidneys from chronic inhalation exposure to ethyl benzene. Limited information is available on the carcinogenic effects of ethyl benzene in humans. In a study by the National Toxicology Program (NTP), exposure to ethyl benzene by inhalation resulted in an increased incidence of kidney and testicular tumors in rats, and lung and liver tumors in mice. EPA has classified ethyl benzene as a Group D, not classifiable as to human carcinogenicity.

Formaldehyde:
Formaldehyde is used mainly to produce resins used in particle board products and as an intermediate in the synthesis of other chemicals. Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute (short-term) and chronic (long-term) inhalation exposure to formaldehyde in humans can result in respiratory

symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. EPA considers formaldehyde a probable human carcinogen (Group B1).

n-Hexane:
n-Hexane is a solvent that has many uses in the chemical and food industries, either in pure form or as a component of commercial hexane. The latter is a mixture that contains approximately 52% n-hexane; the balance is made up of structural analogs and related chemicals such as methylpentane and methylcyclopentane. Highly purified n-hexane is used as a reagent for chemical or chromatographic separations. Other grades of n-hexane are used as solvents for extracting edible fats and oils in the food industry and as a cleaning agent in the textile, furniture, and printing manufacturing industries. Hexane is the solvent base for many commercial products, such as glues, cements, paint thinners, and degreasers. n-Hexane is a minor constituent of crude oil and natural gas and occurs in different petroleum distillates. No data are available regarding the potential toxicity of n-hexane in humans orally exposed to n-hexane. However, as might be expected for a chemical with such wide application, the potential exists for persons to be environmentally and/or occupationally exposed to n-hexane via other routes of exposure.

Toluene:
The acute toxicity of toluene is low. Toluene may cause eye, skin, and respiratory tract irritation. Short-term exposure to high concentrations of toluene (e.g., 600 ppm) may produce fatigue, dizziness, headaches, loss of coordination, nausea, and stupor; 10,000 ppm may cause death from respiratory failure. Ingestion of toluene may cause nausea and vomiting and central nervous system depression. `Contact of liquid toluene with the eyes causes temporary irritation. Toluene is a skin irritant and may cause redness and pain when trapped beneath clothing or shoes; prolonged or repeated contact with toluene may result in dry and cracked skin. Because of its odor and irritant effects, toluene is regarded as having good warning properties. The chronic effects of exposure to toluene are much less severe than those of benzene. No carcinogenic effects were reported in animal studies. Equivocal results were obtained in studies to determine developmental effects in animals. Toluene was not observed to be mutagenic in standard studies.

2,2,4-Trimethylpentane
2,2,4-Trimethylpentane is released to the environment through the manufacture, use, and disposal of products associated with the petroleum and gasoline industry. During an accident, 2,2,4-trimethylpentane penetrated the skin of a human which caused necrosis of the skin and tissue in the hand and required surgery. No other information is available on the acute (short-term) effects in humans. Irritation of the lungs, edema, and hemorrhage have been reported in rodents acutely exposed by inhalation and injection. No information is available on the chronic (long-term), reproductive, developmental, or carcinogenic effects of 2,2,4-trimethylpentane in humans. Kidney and liver effects have been observed in rats chronically exposed via gavage (experimentally placing the chemical in the stomach) and inhalation. EPA has not classified 2,2,4-trimethylpentane with respect to potential carcinogenicity.

Xylene:
Commercial or mixed xylene usually contains about 40-65% *m*-xylene and up to 20% each of *o*-xylene and *p*-xylene and ethyl benzene. Xylenes are released into the atmosphere as fugitive emissions from industrial sources, from auto exhaust, and through volatilization from their use as

solvents. Acute (short-term) inhalation exposure to mixed xylenes in humans results in irritation of the eyes, nose, and throat, gastrointestinal effects, eye irritation, and neurological effects. Chronic (long-term) inhalation exposure of humans to mixed xylenes results primarily in central nervous system (CNS) effects, such as headache, dizziness, fatigue, tremors, and incoordination; respiratory, cardiovascular, and kidney effects have also been reported. EPA has classified mixed xylenes as a Group D, not classifiable as to human carcinogenicity. Mixed xylenes are used in the production of ethylbenzene, as solvents in products such as paints and coatings, and are blended into gasoline.

AIR QUALITY IMPACT ANALYSIS

This facility is not subject to 45CSR14 and therefore no air modeling needs to be done.

RECOMMENDATION TO DIRECTOR

General permit G70-A185 meets all requirements of applicable state and federal regulations. Therefore, it is recommended that General Permit G70-A185 should be issued to Northeast Natural Energy, LLC.

Caraline Griffith
Permit Engineer

11/30/15
Date