



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2987C
Plant ID No.: 009-00108
Applicant: SWN Production Company (SWN)
Facility Name: WV DNR B Pad
Location: Colliers, Brooke County
NAICS Code: 211111
Application Type: Class II Administrative Update
Received Date: October 8, 2014
Engineer Assigned: David Keatley
Fee Amount: \$1,300
Date Received: October 10, 2014
Complete Date: February 24, 2015
Due Date: April 25, 2015
Applicant Ad Date: October 15, 2015
Newspaper: *The Intelligencer*
UTM's: Easting: 540.092 km Northing: 4,465.692 km Zone: 17T
Description: Permit R13-2987C will supersede and replace R13-2987B. This application proposes installing and operating one (1) 23.6-bhp flash gas compressor, removing one (1) 145-bhp flash gas compressor, and reductions in the condensate and produced water throughputs.

DESCRIPTION OF PROCESS

The facility is an oil and natural gas exploration and production facility, responsible for the production of natural gas and condensate. Condensate, gas, and water come from the wellhead(s) to two (2) gas production units (GPUs), where the first stage of separation occurs. Liquids (condensate and produced water) from the GPUs will be sent to one (1) heater treater. Heater treaters are used to treat emulsions, which are stable mixtures of condensate, solids, and water. These units use thermal, gravitational, mechanical, and sometimes chemical methods to break the emulsions and separate the condensate from water. Elevating the emulsion temperature is particularly effective in lowering condensate viscosity and promoting phase separation. The process causes hydrocarbons, including methane, to vaporize and escape. The

flash from the heater treater is captured via a flash gas compressor driven by one (1) proposed 23.4-bhp Kubota DG972-E2 natural gas fired engine. Produced water from the heater treater flows into six (6) 400-bbl produced water tanks. Condensate flows into one of two low pressure towers. Flash gases from the low pressure towers are routed directly to the vapor combustor inlet with 100% capture efficiency. Condensate flows to the six (6) 400-bbl condensate storage tanks. The natural gas stream will exit the facility via pipeline. Condensate and produced water are transported off site via truck. Loading emissions will be controlled with vapor return, which has at least 70% capture efficiency, routed to the vapor combustor for at least 98% destruction efficiency. Working, breathing and flashing vapors from the 400 bbl condensate storage tanks and 400 bbl brine/produced water storage tanks will be routed to the vapor combustors with 98% destruction efficiency. The vapor combustor has a natural gas fired pilot to ensure a constant flame for combustion. The facility also has two (2) 1.5-mmBtu/hr line heaters which will be operated when needed.

SITE INSPECTION

A site inspection was performed by DEP DAQ’s Compliance and Enforcement NPRO Michael Wade on October 16, 2013. Mr. Wade determined that the facility was in compliance.

Directions from I70W take exit 17 towards PA-18/Jefferson Avenue. Turn right onto E Wylie Street and then turn right onto Jefferson Avenue. Go 9.5 miles to continue onto PA-844W/E Main Street and continue onto WV 27W/Washington Pike. Take sharp right onto Pot Rock Road and then turn right onto Cross Creek Road. Take first left onto Putney Ridge Road and then take slight right onto CR 16/Tent Church Road. Continue 0.8 miles to arrive at site.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this class II administrative update application consist of the combustion emissions from the compressor engine (EU-ENG2), six (6) condensate tanks (EU-TANKS-COND), six (6) produced water tanks (EU-TANKS-PW), condensate truck loading (EU-LOAD-COND), produced water truck loading (EU-LOAD-PW), one (1) vapor combustor (APC-COMB-TKLD), and fugitive emissions (EU-FUG).

Table 1: Calculation Methodology

Emission Unit ID#	Process Equipment	Calculation Methodology
EU-ENG2	23.6 bhp Kubota DG972-E2 Flash Gas Compressor Engine	Manufacturer’s Data/ AP-42 Emission Factors
EU-TANKS-COND	Six (6) Condensate Tanks 400 bbl each	EPA TANKS 4.0.9d, ProMax Process Simulation
EU-TANKS-PW	Six (6) Produced Water Tanks 400 bbl each	EPA TANKS 4.0.9d, ProMax Process Simulation
EU-LOAD-COND	Condensate Truck Loading	EPA AP-42 Emission Factors
EU-LOAD-PW	Produced Water Truck Loading	EPA AP-42 Emission Factors
APC-COMB-TKLD	One (1) 15.0-mmBtu/hr Vapor Combustor	EPA AP-42 Emission Factors

Fugitive emissions for the facility are based on calculation methodologies presented in the 2009 American Petroleum Institute Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry. The factors presented in the API Compendium are for methane emissions. Therefore, the fugitive VOC and HAP emissions were calculated using a representative gas analysis and the weight percent of each respective pollutant.

Table 2: New/Modified Maximum Estimated Air Emissions

Emission Point ID	Emission Unit ID	Process Unit	Pollutant	Maximum Controlled Emission Rate	
				Hourly (lb/hr)	Annual (ton/year)
EP-ENG2	EU-ENG2	Kubota DG972-E2	Nitrogen Oxides	0.31	1.36
			Carbon Monoxide	5.55	24.31
			Particulate Matter-10	<0.01	0.02
			Volatile Organic Compounds	0.31	1.36
			Carbon Dioxide Equivalent	29	126
EP-TANKS-COND	EU-TANKS-COND	Six (6) Condensate Tanks 400 bbl each	Volatile Organic Compounds	0.53	2.34
			Ethylbenzene	<0.01	0.01
			n-Hexane	0.03	0.13
			Toluene	<0.01	0.01
			Xylenes	0.01	0.04
EP-TANKS-PW	EU-TANKS-PW	Six (6) Produced Water Tanks 400 bbl each	Volatile Organic Compounds	<0.01	0.02
EU-LOAD-COND	EP-LOAD-COND	Condensate Truck Loading	Volatile Organic Compounds	0.61	2.67
			Ethylbenzene	<0.01	0.01
			n-Hexane	0.03	0.15
			Toluene	<0.01	0.01
			Xylenes	0.01	0.04
			Carbon Dioxide Equivalent	0.01	0.04
EU-LOAD-PW	EP-LOAD-PW	Produced Water Truck Loading	Volatile Organic Compounds	<0.01	0.02
			Carbon Dioxide Equivalent	0.25	1.10
			Nitrogen Oxides	2.07	9.07

APC-COMB-TKLD	APC-COMB-TKLD	MRW Vapor Combustor	Carbon Monoxide	4.13	18.09
			Particulate Matter	0.05	0.22
			Volatile Organic Compounds	0.55	2.41
			n-Hexane	0.03	0.13
			Toluene	<0.01	0.01
			Ethylbenzene	<0.01	0.01
			Xylenes	0.01	0.04
			Carbon Dioxide Equivalent	1,757	7,694
EU-FUG	EP-FUG	Fugitive Emissions	Volatile Organic Compounds	0.75	3.28
			Ethylbenzene	<0.01	0.01
			n-Hexane	0.03	0.14
			Toluene	<0.01	0.01
			Xylenes	0.01	0.04
			Carbon Dioxide Equivalent	13	54

Table 3: Summarized Total Facility Wide Air Emissions

Pollutant	Maximum Annual Facility Wide Emissions (tons/year)
Nitrogen Oxides	13.17
Carbon Monoxide	44.64
Volatile Organic Compounds	12.23
Particulate Matter	1.55
Sulfur Dioxide	0.02
Formaldehyde	0.02
Ethylbenzene	0.03
n-Hexane	0.60
Toluene	0.04
Xylenes	0.16
Carbon Dioxide Equivalent	10,718

Table 4: Control Device Efficiencies

Emission Unit	Pollutant	Control Device	Control Efficiency
EU-TANKS-COND, EU-TANKS-PW Storage Tanks	Volatile Organic Compounds	APC-COMB-TKLD	98.00 %
	Total HAPs		98.00 %
EU-LOAD-COND, EU-LOAD-PW Loadout Racks	Volatile Organic Compounds	Vapor Return/ APC-COMB-TKLD	69.00 %

REGULATORY APPLICABILITY

The following rules and regulations apply to this facility:

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

This facility shall not cause the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public. 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.

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.

SWN has one (1) vapor combustor at the facility. The vapor combustors are subject to section 4, emission standards for incinerators. The vapor combustors have an allowable emission rate of 1.01 pounds of particulate matter per hour (assuming a natural gas density of 0.044 lb/ft³). The vapor combustor has an estimated amount of particulate matter emissions per hour of 0.05. Therefore, the facility's vapor combustors should demonstrate compliance with this section. The facility will demonstrate compliance by maintaining records of the amount of natural gas consumed by the vapor combustors and the hours of operation. The facility will also monitor the flame of the vapor combustors and record any malfunctions that may cause no flame to be present during operation.

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 only pollutant which increases with the changes in this application is carbon monoxide. The increase of this pollutant will be 4.91 lb/hr and 21.51 tons/yr is less than the modification thresholds of 6 lb/hr and 10 tons/yr and is therefore eligible to be a Class II administrative update.

45CSR22 (Air Quality Management Fee Program)

This facility is a minor source of air pollution as can be seen in Table 3 and not subject to 45CSR30. This facility has a maximum horsepower capacity less than 1,000 hp and is a 9M source and is required to pay a \$200 annual fee. SWN is required to keep their Certificate to Operate current.

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

40CFR60.4230 states that a source that commenced construction after June 12, 2006 whose SI ICE was less than 500 hp and was manufactured on or after July 1, 2008 is subject to this rule. SWN has proposed to install one (1) 23.6-HP SI ICE. Since the SI ICE that SWN will install was manufactured after January 1, 2011, SWN is subject to this rule.

EU-ENG2 is subject to this subpart due to the manufacturer's date of the engine. ENG001 is a certified engine and the Certificate on Conformity will be available in the file. To keep the designation of certified this engine must be operated and maintained to the manufacturer's emission-related written instructions and must keep records of conducted maintenance to demonstrate compliance.

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

EPA issued its new source performance standards (NSPS) and air toxics rules for the oil and gas sector on April 17, 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. The following affected sources which commence construction, modification or reconstruction after August 23, 2011 are subject to the applicable provisions of this subpart:

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

The two (2) natural gas wells that currently exist at the WV DNR B Pad were drilled principally for the production of natural gas and were done so after August 23, 2011. Therefore, these wells would be considered affected facilities under this subpart.

- b. 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 is one (1) 23.4 hp reciprocating internal combustion engine located at the WV DNR B Pad. This engine will be delivered after the effective date of this rule. However, the rule specifically states that any reciprocating compressor located at a well site is not an affected facility under this subpart. Therefore, this section would not apply.

- c. 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 nonearthen 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:

1. 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.
2. Process vessels such as surge control vessels, bottoms receivers or knockout vessels.
3. 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.

All six (3) EU-TANKS-COND tanks located at the State of WV DNR B Pad emit more than 6 tpy of VOC without controls (19.47 tpy each). SWN has proposed using a vapor combustor to reduce emissions below 6 tpy and is therefore not subject to this section.

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

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.

The facility is a minor source of hazardous air pollutants (HAPS < 10 tpy of an individual HAP and < 25 tpy of aggregate HAPs) as can be seen in Table 3. The facility is therefore considered an area source (§63.6585(c)). The engine is considered new stationary RICE (§63.6590(a)(2)(iii)) due to the installation date of the engine (EU-ENG2) being after June 12, 2006.

Stationary RICE subject to Regulations under 40 CFR Part 60 must meet the requirements of those subparts that apply (40 CFR 60 Subpart JJJJ, for spark ignition engines) if the engine is a new stationary RICE located at an area source (§63.6590(c)(1)). No additional requirements apply for this engine under this subpart.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There will be small amounts of various regulated hazardous air pollutants emitted from the operation of this facility as seen in Table 2. The facility is a minor source of HAPs as can be seen in Table 2. If you want to obtain additional information about certain hazardous air pollutants feel free to visit [<http://www.epa.gov/ttn/atw/hlthef/hapindex.html>].

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) as seen in Table 3.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates SWN's WV DNR B Pad meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Brooke County location should be granted a 45CSR13 construction permit for their facility.



David Keatley
Permit Writer – NSR Permitting

February 25, 2015

Date