



**west virginia** department of environmental protection

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## **ENGINEERING EVALUATION / FACT SHEET**

### **BACKGROUND INFORMATION**

Application No.: G70-A183  
Plant ID No.: 009-00109  
Applicant: SWN Production Company, LLC  
Facility Name: Mildred Mani Pad  
Location: Wellsburg, Brooke County, WV  
NAICS Code: 211111  
Application Type: Modification  
Received Date: October 22, 2015  
Engineer Assigned: Caraline Griffith  
Fee Amount: \$1,500  
Date Received: October 26, 2015  
Complete Date: November 23, 2015  
Due Date: January 3, 2016  
Applicant Ad Date: October 21, 2015; Republished on November 9, 2015  
Newspaper: *Intelligencer*  
UTM's: Easting: 534.89 km      Northing: 4,456.01 km      Zone: 17T  
Description: Removal of all previously permitted equipment. Installation of: Four compressor engines, eight heaters, six condensate tanks, four produced water tanks, and a vapor combustor will be added to the site. Fugitive emissions, condensate loading, produced water loading, and haul road emissions will also occur.

### **PROCESS DESCRIPTION:**

The subject facility is an oil and natural gas exploration and production facility, responsible for the production of condensate and natural gas. Storage of condensate and produced water will also occur on-site. A description of the facility's process is as follows: Condensate, gas and water come from the wellhead(s) to the production unit(s), where the first stage of separation occurs. Fluids (condensate and produced water) will be sent to the heater treater(s). Produced water from the heater treater(s) flows into the produced water storage

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tank(s). Condensate flows into the condensate storage tank(s). Flash gases from the heater treater(s) are routed via hard-piping (with 100% capture efficiency) to the inlet of the flash gas compressor(s) to be compressed.

The natural gas stream will exit the facility for transmission via pipeline. Condensate and produced water are transported offsite via truck. Loading emissions will be controlled with vapor return, which has at least 70% capture efficiency, and will be routed to the vapor combustor for at least 98% destruction efficiency. Working, breathing and flashing vapors from the condensate and produced water storage tanks will be controlled by the VRU with a 95% capture efficiency but are represented in the calculations as being controlled by the combustor for operational flexibility and as a conservative calculation of emissions. The vapor combustor has one (1) natural gas-fired pilot to ensure a constant flame for combustion.

The equipment to be added includes the following:

- Two (2) Caterpillar G3306 NA Compressor Engines
- One (1) Caterpillar G3406 NA Engine
- Five (5) 1.0 mmBTU/hr Gas Production Units
- Two (2) 0.5 mmBTU/hr Heater Treaters
- One (1) 1.5 mmBTU/hr Stabilizer Heater
- Six (6) 400 bbl Condensate Tanks
- Four (4) 400 bbl Produced Water Tanks
- One (1) 15 mmBtu/hr Vapor Combustor with Pilot
- One (1) NK 100 VRU with Associated Engine
- Condensate Loading
- Produced Water Loading
- Fugitive Emissions
- Fugitive Haul Road Emissions

#### SITE INSPECTION

On October 16, 2013 Michael Wade, an inspector for the DAQ compliance and enforcement section, inspected the site. At the time of the inspection site preparation had begun, but no gas processing had occurred. It was deemed that the facility was a good choice for a well pad.

#### Directions:

From intersection of Route 2 and CR 27 (10<sup>th</sup> Street, Washington Pike) in Wellsburg, travel east on CR 27 for 2.06 miles to 27/3 (Bradys Ridge) and turn right oneto CR 27/3. Travel for 1.49 miles to 27/3 to well pad on left.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions for the three Caterpillar and the Zenith engines were done using manufacture's data and AP-42. The VOC emissions for the three Caterpillar engines from the manufacture data include Formaldehyde.

The VOC emissions from the six (6) 400 bbl Condensate Tanks and the four (4) 400 bbl Produced Water Tanks are routed directly to the VRU with a 95% capture efficiency.

The estimates for the GPUs, Heaters, Vapor Combustor, and truck loadings were made using AP-42. The tank working and breathing emissions were calculated using the maximum throughput in EPA Tanks 4.0.9d. Flashing for the tanks was calculated using ProMax.

Fugitive emissions at this site come from haul road emissions, condensate and produced water loading operations, and equipment leaks. Emissions factors were taken from EPA-453/R-95-017 and emissions were calculated using a representative gas analysis and the weight percent of each pollutant.

**Table 1: Maximum PTE Estimates**

Emission ID	Emission Unit	Pollutant	lb/hr	TPY
EU-ENG1	Caterpillar G3306 NA	NOx	0.32	1.40
		CO	0.64	2.80
		VOC	0.24	1.05
		SO2	<0.01	<0.01
		PM10	0.01	0.04
		Formaldehyde	0.02	0.09
EU-ENG2	Caterpillar G3306 NA	NOx	0.32	1.40
		CO	0.64	2.80
		VOC	0.24	1.05
		SO2	<0.01	<0.01
		PM10	0.01	0.04
		Formaldehyde	0.02	0.09
EU-ENG3	Caterpillar G3406 TALE	NOx	0.47	2.06
		CO	0.95	4.16
		VOC	0.36	1.58
		SO2	<0.01	<0.01
		PM10	0.02	0.07
		Formaldehyde	0.03	0.13
EU-ENG4	Vapor Recovery System - NK 100 Engine Zenith ZPP-644 4.4L	NOx	0.46	2.01
		CO	0.75	3.29
		VOC	0.46	2.01
		SO2	<0.01	<0.01
		PM10	0.01	0.04
		Formaldehyde	0.01	0.06
EU-GPU1 to EU-GPU5	Five (5) 1.0 mmBTU/hr GPU Burners Each	NOx	0.11	0.48
		CO	0.09	0.39
		VOC	0.01	0.03
		SO2	<0.01	<0.01

		PM10	0.01	0.03
		Total HAPS	<0.01	0.01
EU-HT1 and EU-HT2	Two (2) 0.5 mmBTU/hr Heater Treaters	NOx	0.06	0.26
		CO	0.05	0.22
		VOC	<0.01	0.01
		SO2	<0.01	<0.01
		PM10	<0.01	0.02
		Total HAPs	<0.01	<0.01
		EU-SH1	1.5 mmBTU/hr Stabilizer Heater	NOx
CO	0.14			0.61
VOC	0.01			0.04
SO2	<0.01			<0.01
PM10	0.01			0.06
Total HAPs	<0.01			0.01
EU-LOAD- COND	Condensate Truck Loading with Vapor Return Routed to Combustor	VOC	8.45	37.02
		Total HAPs	0.68	3.00
EU-LOAD-PW	Produced Water Truck Loading with Vapor Return Routed to Combustor	VOC	0.04	0.16
		Total HAPs	<0.01	0.01
APC-COMB- TKLD	15.0 mmBTU/hr Vapor Combustor – Tank/Loading System	NOx	2.07	9.07
		CO	4.13	18.09
		VOC	5.76	37.02
		PM10	0.04	0.18
		Benzene	<0.01	0.02
		Ethylbenzene	0.02	0.16
		n-Hexane	0.33	2.14
		Toluene	0.02	0.14
		Xylenes	0.08	0.53
		Total HAPs	0.46	3.00
EU-PILOT	Vapor Combustor Pilot	NOx	0.01	0.04
		CO	<0.01	0.02
		VOC	<0.01	<0.01
		SO2	<0.01	<0.01
		PM10	<0.01	<0.01
		Total HAPs	<0.01	<0.01

**Table 2: Maximum Fugitive PTE Estimates**

Emission ID	Emission Unit	Pollutant	lb/hr	TPY
EU-FUG	Fugitive Emissions	VOC	1.07	4.70
		Benzene	<0.01	<0.01
		Ethylbenzene	<0.01	0.01
		n-Hexane	0.04	0.19
		Toluene	<0.01	0.01

		Xylenes	0.01	0.04
		Total HAPs	0.06	0.26
EU-HR	Fugitive Haul Road Emissions	PM10	5.74	18.84

**Table 3: Total Facility PTE**

Pollutant	TPY
NOx	19.65
CO	34.16
VOC	73.06
SO2	0.11
PM	0.08
Acetaldehyde	0.06
Acrolein	0.06
Bezene	0.08
Ethylbenzene	0.27
Formaldehyde	0.38
Methanol	0.06
n-Hexane	3.86
Toluene	0.27
Xylenes	0.93
Total HAPs	5.96
CO2e	13,158.79

### AGGREGATION DETERMINATION

The aggregation of facilities is appropriate only if separate emissions sources meet the following three-prong test:

1. The sources belong to a single major industrial grouping (same two-digit major SIC code);
2. The sources are under common control of the same person (or persons under common control); and
3. The sources are located on one or more "contiguous or adjacent" properties.

Under the third prong, SWN determined that there were no other facilities contiguous with or adjacent to Mildred to be permitted. Neither the WV DEP nor EPA have established a distance under which source aggregations are required, but the terms "contiguous" or "adjacent" require analyzing distances between operations. To be considered contiguous, two operations must share a common fence line. As for adjacent, operations located more than a quarter mile apart are clearly not adjacent, but operations within a quarter mile require an analysis to determine if they meet the common sense notion of a plant. No other facilities are located within a quarter mile of Mildred to be permitted; therefore, no additional facilities are contiguous or adjacent.

## 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 applicant is not subject to the weight emission standard for particulate matter set forth in 45CSR2-4.1 because the two (2) Heater Treaters [EU-HTR1 and EU-HTR2], Stabilizer Heater [EU-SH1], and the five (5) gas production units [EU-GPU1 to EU-GPU5] are less than 10 MMBtu/hr; however, they are subject to the 10% opacity based on a six minute block average. Compliance will be demonstrated by complying with permit requirements. The applicant is using natural gas as fuel; therefore, meeting the 10% opacity requirements should not be a problem.

#### **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. The applicant does not see any objectionable odors being present at this sit now or in the future.

#### **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.

SWN will have a combustor pilot that will be used to comply with emissions standards of Subpart OOOO, being the control device for the Condensate Tank Loading and the Produced Water Tank Loading.

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

The two (2) Heater Treaters [EU-HTR1 and EU-HTR2], Stabilizer Heater [EU-SH1], and the five (5) gas production units [EU-GPU1 to EU-GPU5] have a maximum design heat input of less than 10 MMBtu/hr and are therefore exempt from sections 3, 6, and 8.

**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**

SWN has demonstrated compliance with 45CSR13 by submitting a complete construction permit registration application, placing a legal advertisement in *The Intelligencer* on November 9, 2015, and paying the applicable fees.

**45CSR22 Air Quality Management Fee Program**

The applicant has paid the \$500 application fee and the \$1,000 NSPS fee as required by section 3.4.b of this rule because they are subject to NSPS requirements as described in this regulatory review section.

Additionally, the source is required to maintain their certificate to operate

**Federal Regulations:**

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

Subpart JJJJ sets forth nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and volatile organic compound (VOC) emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject internal combustion engine.

The two 145 hp Caterpillar G3306 NA engines, the 215 hp Caterpillar G3406 TALE engine, and the VRU 103.3 hp Zenith engine all commenced construction after June 12, 2006 and were manufactured after July 1, 2008, therefore they are subject to this rule.

The Zenith engine is certified and must maintain compliance by keeping records of conducted maintenance. The three Caterpillar engines are non-certified, so they must show compliance by keeping a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution

control practice for minimizing emissions. In addition, SWN must conduct an initial performance test within 1 year of engine startup to demonstrate compliance.

#### **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 (SO<sub>2</sub>) 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.

Gas well affected facilities are included in the G70-A general permit in Section 5.0. This facility is a gas well affected facility because the wells located at the site were principally drilled to produce 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 located 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.

Pneumatic controllers affected facilities are included in the G70-A General Permit, Section 8.0. There are no pneumatic controllers at this facility with a continuous bleed rate of more than 6 scfh.

- 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.

Requirements for storage vessel affected facilities are included in the G70-A General Permit, Section 12.0. Determination of storage vessel affected facility status is included in Section 6.0 of the G70-A General Permit.

The storage vessels located at this facility do have VOC emissions greater than 6 TPY. The storage vessels at this facility are classified as Group 2, meaning the storage vessels were constructed after April 12, 2013. SWN must reduce VOC emissions of storage vessels by 95% within 60 days after startup. SWN must also follow all compliance, control requirements, notification, recording keeping, and reporting requirements as laid defined in §60.5395. However, SWN has already stated they will be using a VRU with 95% capture efficiency for the storage vessels, so the VOC emissions limitations will be met.

- 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.

Other general permits exist for natural gas compressor stations. The existing general permits for natural gas compressor stations are the Class II General Permit G30-D, the Class I General Permit G33-A (stationary spark ignition internal combustion engines  $\geq$  25 HP and  $\leq$  500 HP), and the Class II General Permit G35-A (natural gas compressor stations with glycol dehydration units, flares, or other specified control devices).

This facility does not have any sweetening units.

#### **40CFR63 Subpart ZZZZ (National Emission 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. Only the area source requirements for non-emergency spark ignition engines are included in the G70-A general permit, Section 15.0. Requirements for engines that combust landfill or combustor gas are not included in the G70-A general permit. This section reflects EPA's final amendments to 40 CFR part 63, Subpart ZZZZ that were issued on January 15, 2013 and published in the Federal Register on January 30, 2013.

Owners and operators of new or reconstructed engines at area sources must meet the requirements of Subpart ZZZZ by complying with either 40CFR60 Subpart IIII or Subpart JJJJ.

Because the engines located at this site are subject to Subpart JJJJ, they meet the requirements of Subpart ZZZZ.

### TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Small amounts of non-criteria regulated hazardous air pollutants such as benzene, toluene, and formaldehyde will be emitted from this site, and is considered a minor source of HAPs as seen in Table 3 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.

More information about certain hazardous air pollutants can be found at [<http://www.epa.gov/ttn/atw/hlthef/hapindex.html>].

### AIR QUALITY IMPACT ANALYSIS

Because this source is not subject to 45CSR14, no air modeling was deemed necessary.

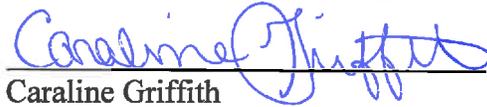
### MONITORING OF OPERATIONS

SWN will be required to perform the following monitoring and recordkeeping associated with this permit application:

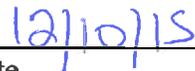
- Monitor and record quantity of natural gas consumed for all engines, and combustion sources.
- Monitor all applicable requirements of 40CFR60 Subparts JJJJ and OOOO.
- Monitor on a monthly and yearly basis the natural gas consumed in the heaters and the hours of operations.
- Monitor on a monthly and yearly basis the actual emissions from the storage tanks.
- Monitor on a monthly and yearly basis the emissions from each storage tank to ensure they are below 6 TPY.
- Monitor and record the operating hours of the vapor combustor.
- Maintain records of testing conducted in accordance with the permit.
- Maintain records of the visible emission opacity tests conducted per the permit.
- Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the natural gas compressor engines and ancillary equipment.
- Monitor the tanks to ensure that the tanks vapors will be sent to the VRU.
- Monitor the condensate and produced water truck loading and throughput on a monthly and yearly basis.
- The records shall be maintained on site or in a readily available off-site location maintained by SWN for a period of five (5) years.

RECOMMENDATION TO DIRECTOR

General permit registration G70-A183 meets all requirements of applicable state and federal regulations. Therefore, it is recommended that General Permit Registration G70-A183 should be issued to SWN Production Company, LLC.



Caraline Griffith  
Permit Engineer

  
Date