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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	G70-A175
Plant ID No.:	069-00115
Applicant:	SWN Production Company, LLC (SWN)
Facility Name:	Glenn Didriksen Pad
Location:	Wheeling, Ohio County
NAICS Code:	211111
Application Type:	Construction
Received Date:	August 21, 2015
Engineer Assigned:	Jerry Williams, P.E.
Fee Amount:	$1,500.00
Date Received:	August 21, 2015
Complete Date:	September 16, 2015
Due Date:	October 31, 2015
Applicant Ad Date:	August 24, 2015
Newspaper:	*The Intelligencer*
UTM's:	Easting: 534.492 km Northing: 4,440.490 km Zone: 17
Latitude/Longitude:	40.119060 / -80.597750
Description:	This permitting action is for the addition of three (3) engines, six (6) heaters, eight (8) condensate tanks, four (4) produced water tanks, one (1) low pressure tower, and one (1) vapor combustor.

DESCRIPTION OF PROCESS

The following process description was taken from Registration Application G70-A175:

The facility is an oil and natural gas exploration and production facility, responsible for the production of natural gas. Storage of condensate and produced water will also occur on site. Condensate, gas, and water come from the wellhead(s) to the production units, where the first stage of separation occurs. Fluids (condensate and produced water) will be sent to the 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 a natural gas fired engine. Produced water from the heater treater flows into the 400-bbl produced water tanks. Condensate flows into the stabilization process. Flash gases from the heater treaters and stabilization process are routed via hard piping (with 100% capture efficiency) to the inlet of the flash gas compressor. Condensate flows to the 400-bbl condensate storage tanks. The natural gas stream will exit the facility for transmission 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, for an overall control efficiency of 69%. Working, breathing and flashing vapors from the condensate and 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.

This facility was originally constructed by Chesapeake Appalachia under Permit R13-2941C and then purchased by SWN. This permit application covers the following equipment:

- One (1) Caterpillar G3306 NA Compressor Engine
- Two (2) Caterpillar 3406 NA Compressor Engines
- One (1) 1.5 mmBtu/hr Stabilizer Heater
- Six (6) 1.0-mmBtu/hr Gas Production Units (GPU)
- Two (2) 0.5-mmBtu/hr Heater Treaters
- One (1) Low Pressure Tower (LPT)
- Eight (8) 400-bbl Condensate Tanks
- Four (4) 400-bbl Produced Water Tanks
- One (1) 20-mmBtu/hr Vapor Combustor with Pilot
- Condensate Loading
- Produced Water Loading
- Fugitive Emissions
- Fugitive Haul Road Emissions

The only equipment that will remain from the original construction are heaters GPU-1, GPU-2 and HT-1. All other equipment will be new construction. Note that other small storage tanks may be present on site (i.e., methanol, lube oil) but are considered de minimis sources per Table 45-13B and are not addressed further in this application.

SITE INSPECTION

A site inspection was conducted by Steve Sobutka of the Northern Panhandle Regional Office on May 13, 2013. The facility was operating in compliance at that time. The closest residence is more than 500 feet from the site.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this construction application consist of the emissions from three (3) natural gas fired engines, six (6) gas processing unit (GPU) heaters, two (2) heater treaters, one (1) stabilizer heater, eight (8) condensate storage tanks, four (4) produced water storage tanks, condensate truck loading, produced water truck loading, one (1) vapor combustor with pilot, and fugitive emissions. Representative samples from other wells were utilized in the emissions calculations. The George Gantzer No. 8-H hydrocarbon liquid sample was used. Both sites are located in wet gas areas within the Marcellus formation. These well pads are of the same field as the Glenn Didriksen Pad and in the same county. The API and RVP of the condensate are expected to be similar.

Each piece of equipment onsite are fitted with components such as flanges, valves, connectors, open-ended lines, and pressure relief valves to ensure a safe and efficient production process. These components are designed to have a small amount of gas vent to the atmosphere. The component counts were estimated using similar facilities. Weight fractions of specific pollutant component were used from a gas analysis of a nearby well and from the ProMax output of the flashing gas evolved from the hydrocarbon liquid.

The following table indicates which methodology was used in the emissions determination:

Emission Point ID#	Process Equipment	Calculation Methodology
EP-ENG1 – EP-ENG3	145 hp Caterpillar G3306, two (2) 215 hp Caterpillar G3406 engines	Manufacturer's Data, EPA AP-42 Emission Factors
EP-GPU1 – EP-GPU6	Six (6) 1.0 MMBTU/hr Gas Processing Units	EPA AP-42 Emission Factors
EP-HT1, EP-HT2	Two (2) 0.5 MMBTU/hr Heater Treaters	EPA AP-42 Emission Factors
EP-SH1	1.5 MMBTU/hr Stabilization Heater	EPA AP-42 Emission Factors
EP-TANKS-COND	Eight (8) 400 bbl Condensate Storage Tanks	ProMax Process Simulation, EPA Tanks 4.0.9d
EP-TANKS-PW	Four (4) 400 bbl Produced Water Storage Tanks	ProMax Process Simulation, EPA Tanks 4.0.9d
EP-LOAD-COND	30,660,000 gal/yr Condensate Truck Loading	EPA AP-42 Emission Factors
EP-LOAD-PW	12,264,000 gal/yr Produced Water Truck Loading	EPA AP-42 Emission Factors
APC-COMB-TKLD	20.0 MMBTU/hr Vapor Combustor	EPA AP-42 Emission Factors
EP-PILOT	100 scfh Vapor Combustor Pilot	EPA AP-42 Emission Factors

Fugitive emissions for the facility are based on calculation methodologies presented in EPA Emission Factors.

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

Emission Unit	Pollutant	Control Device	Control Efficiency
EU-ENG1 Compressor Engine	Nitrogen Oxides	Non Selective Catalytic Reduction (NSCR)	92.58 %
	Carbon Monoxide		85.15 %
EU-ENG2, 3 Compressor Engine	Nitrogen Oxides	Non Selective Catalytic Reduction (NSCR)	93.95 %
	Carbon Monoxide		87.89 %
EU-TANKS-COND, EU-TANKS-PW Storage Tanks	Volatile Organic Compounds	Vapor Combustor	98.00 %
	Total HAPs		98.00 %
EU-LOAD-COND, EU-LOAD-PW Loadout Racks	Volatile Organic Compounds	Vapor Return/ Combustion	69.00 %

The total facility PTE for the Glenn Didriksen Pad is shown in the following table:

Pollutant	Maximum Pre-Modification Annual Facility Wide Emissions (tons/year)	Maximum Post-Modification Annual Facility Wide Emissions (tons/year)	Net Facility Wide Emissions Changes (tons/year)
Nitrogen Oxides	11.73	21.79	10.06
Carbon Monoxide	21.92	38.68	16.76
Volatile Organic Compounds	33.68	58.20	24.52
Particulate Matter	0.40	12.49	11.88
Sulfur Dioxide	0.01	0.04	0.03
Formaldehyde	0.09	0.36	0.27
Benzene	0.03	0.07	0.04
Ethylbenzene	0.13	0.22	0.09
n-Hexane	1.86	3.14	1.28
Toluene	0.13	0.22	0.09
Xylenes	0.44	0.75	0.31
Total HAPs	2.72	4.93	2.21
Carbon Dioxide Equivalent	9,719	17,586	7,867

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

SWN Production Company, LLC – Glenn Didriksen Pad (G70-A175)

Emission Point ID#	Source	NO_x		CO		VOC		PM		SO_2		Formaldehyde		Total HAPs		CO2e
		lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	lb/hr	ton/year	ton/year
EP-ENG1	Cat G3306 Engine	0.32	1.40	0.64	2.80	0.24	1.05	0.01	0.04	<0.01	<0.01	0.02	0.09	0.03	0.15	680
EP-ENG2	Cat G3406 Engine	0.47	2.06	0.95	4.16	0.36	1.58	0.02	0.09	<0.01	<0.01	0.03	0.13	0.05	0.21	1062
EP-ENG3	Cat G3406 Engine	0.47	2.06	0.95	4.16	0.36	1.58	0.02	0.09	<0.01	<0.01	0.03	0.13	0.05	0.21	1062
EP-GPU1	GPU Burner	0.11	0.48	0.09	0.39	0.01	0.03	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	513
EP-GPU2	GPU Burner	0.11	0.48	0.09	0.39	0.01	0.03	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	513
EP-GPU3	GPU Burner	0.11	0.48	0.09	0.39	0.01	0.03	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	513
EP-GPU4	GPU Burner	0.11	0.48	0.09	0.39	0.01	0.03	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	513
EP-GPU5	GPU Burner	0.11	0.48	0.09	0.39	0.01	0.03	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	513
EP-GPU6	GPU Burner	0.11	0.48	0.09	0.39	0.01	0.03	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	513
EP-HT1	Heater Treater	0.06	0.26	0.05	0.22	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	256
EP-HT2	Heater Treater	0.06	0.26	0.05	0.22	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	256
EP-SH1	Stabilization Heater	0.17	0.74	0.14	0.61	0.01	0.04	0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	769
APC-COMB-TKLD	Vapor Combustor	2.76	12.09	5.51	24.13	7.39	32.37	0.06	0.26	<0.01	<0.01	<0.01	<0.01	0.60	2.63	10283
EP-PILOT	Vapor Combustor Pilot	0.01	0.04	0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	46
EP-LOAD-COND	Cond. Truck Loading w/VR & Comb	0.00	0.00	0.00	0.00	3.74	16.37	0.00	0.00	0.00	0.00	0.00	0.00	0.30	1.33	0
EP-LOAD-PW	PW Truck Loading w/VR & Comb	0.00	0.00	0.00	0.00	0.03	0.11	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	0.01	0
Total Point Source		**4.98**	**21.79**	**8.84**	**38.68**	**12.17**	**53.30**	**0.21**	**0.93**	**0.01**	**0.04**	**0.08**	**0.36**	**1.06**	**4.62**	**17492**
Fugitive	Venting	0.00	0.00	0.00	0.00	1.12	4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.31	94
Fugitive	Dust	0.00	0.00	0.00	0.00	0.00	0.00	3.52	11.56	0.00	0.00	0.00	0.00	0.00	0.00	0
Total Fugitive		**0.00**	**0.00**	**0.00**	**0.00**	**1.12**	**4.90**	**3.52**	**11.56**	**0.00**	**0.00**	**0.00**	**0.00**	**0.07**	**0.31**	**94**
Total Sitewide		**4.98**	**21.79**	**8.84**	**38.68**	**13.29**	**58.20**	**3.73**	**12.49**	**0.01**	**0.04**	**0.08**	**0.36**	**1.13**	**4.93**	**17586**

REGULATORY APPLICABILITY

The following rules apply to the facility:

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

The purpose of 45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers) is to establish emission limitations for smoke and particulate matter which are discharged from fuel burning units.

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

The individual heat input of all of the proposed fuel burning units (EP-GPU1 – EP-GPU6, EP-HT1, EP-HT2, EP-SH1) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR2. However, SWN would be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

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

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 has one (1) combustor at the Glenn Didriksen Pad. The combustor has minimal particulate matter emissions. Therefore, the facility's combustor should demonstrate compliance with this section. The facility will demonstrate compliance by maintaining records of the amount of natural gas consumed by the combustor and the hours of

operation. The facility will also monitor the flame of the combustor and record any malfunctions that may cause no flame to be present during operation.

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

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

The individual heat input of all of the proposed fuel burning units (EP-GPU1 – EP-GPU6, EP-HT1, EP-HT2, EP-SH1) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR10.

45CSR13 (Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation)

45CSR13 applies to this source due to the fact that SWN is defined as a "stationary source" under 45CSR13 Section 2.24.b, which states that an owner or operator discharges or has the potential to discharge more than six (6) pounds per hour and ten (10) tons per year, or has the potential to discharge more than 144 pounds per calendar day of any regulated air pollutant. SWN's volatile organic compounds (VOC) emissions exceed 45CSR13 permit thresholds. SWN has published the required Class I legal advertisement notifying the public of their permit application, and paid the appropriate application fee (construction).

45CSR22 (Air Quality Management Fee Program)

This facility is a minor source and not subject to 45CSR30. 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 Subpart JJJJ establishes emission standards for applicable SI ICE.

The 145 hp Caterpillar G3306 NA RICE (EP-ENG1) was manufactured January 1, 2011 for engines greater than or equal to 100 and less than 500 hp.

The 145 hp Caterpillar G3306 NA RICE (EP-ENG1) will be subject to the following emission limits: NOx – 1.0 g/hp-hr (0.32 lb/hr); CO – 2.0 g/hp-hr (0.64 lb/hr); and VOC – 0.7 g/hp-hr (0.24 lb/hr). Based on the manufacturer's specifications for these engines, the emission standards will be met.

The 215 hp Caterpillar G3406 NA RICE (EP-ENG1) was manufactured January 1, 2011 for engines greater than or equal to 100 and less than 500 hp.

The 215 hp Caterpillar G3406 NA RICE (EP-ENG1) will be subject to the following emission limits: NOx – 1.0 g/hp-hr (0.47 lb/hr); CO – 2.0 g/hp-hr (0.95 lb/hr); and VOC – 0.7 g/hp-hr (0.33 lb/hr). Based on the manufacturer's specifications for these engines, the emission standards will be met.

These engines are not certified by the manufacturer to meet the emission standards listed in 40CFR60 Subpart JJJJ. Therefore, SWN will be required to conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or three (3) years, whichever comes first, to demonstrate compliance.

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

EPA published in the Federal Register new source performance standards (NSPS) and air toxics rules for the oil and gas sector on August 16, 2012. 40CFR60 Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO_2) 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 gas wells that are proposed at the Glenn Didriksen 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. The compliance date for these hydraulically fractured wells is October 15, 2012. SWN is required under §60.5410 to submit an initial notification, initial annual report, maintain a log of records for each well completion, and maintain records of location and method of compliance. §60.5420 requires SWN demonstrate continuous compliance by submitting reports and maintaining records for each completion operation.

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. For the purposes of this subpart, your centrifugal compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A centrifugal compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

There are no centrifugal compressors at the Glenn Didriksen Pad. Therefore, all requirements regarding centrifugal compressors under 40 CFR 60 Subpart OOOO would not apply.

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. For the purposes of this subpart, your reciprocating compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A reciprocating compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

There are three (3) reciprocating internal combustion engines proposed at the Glenn Didriksen Pad. These engines will be delivered after the effective date of this rule. However, §60.5365(c) states that 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. Therefore, all requirements regarding reciprocating compressors under 40 CFR 60 Subpart OOOO would not apply.

d. Pneumatic Controllers

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

- Each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller which commenced construction after August 23, 2011, and is located at a natural gas processing plant.

There are no continuous bleed gas-driven pneumatic controllers with bleed rates greater than 6 standard cubic feet per hour (scfh) at the Glenn Didriksen Pad. Therefore, there are no applicable requirements regarding pneumatic controllers under 40 CFR 60 Subpart OOOO that would apply.

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.

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:

- Vessels that are skid-mounted or permanently attached to something that is mobile (such as trucks, railcars, barges or ships), and are intended to be located at a site for less than 180 consecutive days. If the source does not keep or are not able to produce records, as required by §60.5420(c)(5)(iv),

showing that the vessel has been located at a site for less than 180 consecutive days, the vessel described herein is considered to be a storage vessel since the original vessel was first located at the site.

- Process vessels such as surge control vessels, bottoms receivers or knockout vessels.

- Pressure vessels designed to operate in excess of 204.9 kilopascals and without emissions to the atmosphere.

This rule requires that the permittee determine the VOC emission rate for each storage vessel affected facility utilizing a generally accepted model or calculation methodology within 30 days of startup, and minimize emissions to the extent practicable during the 30 day period using good engineering practices. For each storage vessel affected facility that emits more than 6 tpy of VOC, the permittee must reduce VOC emissions by 95% or greater within 60 days of startup. The compliance date for applicable storage vessels is October 15, 2013.

The storage vessels located at the Glenn Didriksen Pad are controlled by a combustor and emit less than 6 tpy of VOC. Therefore, SWN is not required by this section to reduce VOC emissions by 95%.

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

- Addition or replacement of equipment for the purpose of process improvement that is accomplished without a capital expenditure shall not by itself be considered a modification under this subpart.

- Equipment associated with a compressor station, dehydration unit, sweetening unit, underground storage vessel, field gas gathering system, or liquefied natural gas unit is covered by §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart if it is located at an onshore natural gas processing plant. Equipment not located at the onshore natural gas processing plant site is exempt from the provisions of §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart.

- The equipment within a process unit of an affected facility located at onshore natural gas processing plants and described in paragraph (f) of this section are exempt from this subpart if they are subject to and controlled according to subparts VVa, GGG or GGGa of this part.

The Glenn Didriksen Pad is not a natural gas processing plant. Therefore, Leak Detection and Repair (LDAR) requirements for onshore natural gas processing plants would not apply.

g. Sweetening units located at onshore natural gas processing plants that process natural gas produced from either onshore or offshore wells.

- Each sweetening unit that processes natural gas is an affected facility; and
- Each sweetening unit that processes natural gas followed by a sulfur recovery unit is an affected facility.
- Facilities that have a design capacity less than 2 long tons per day (LT/D) of hydrogen sulfide (H_2S) in the acid gas (expressed as sulfur) are required to comply with recordkeeping and reporting requirements specified in §60.5423(c) but are not required to comply with §§60.5405 through 60.5407 and paragraphs 60.5410(g) and 60.5415(g) of this subpart.
- Sweetening facilities producing acid gas that is completely reinjected into oil-or-gas-bearing geologic strata or that is otherwise not released to the atmosphere are not subject to §§60.5405 through 60.5407, 60.5410(g), 60.5415(g), and 60.5423 of this subpart.

There are no sweetening units at the Glenn Didriksen Pad. Therefore, all requirements regarding sweetening units under 40 CFR 60 Subpart OOOO would not apply.

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

Subpart ZZZZ establishes national emission limitations and operating limitations for HAPs emitted from stationary 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 engines at the Glenn Didriksen Pad are subject to the area source requirements for non-emergency spark ignition engines.

The applicability requirements for new stationary RICEs located at an area source of HAPs, is the requirement to meet the standards of 40CFR60 Subpart JJJ. These requirements were outlined above. The proposed engines meet these standards.

The following rules do not apply to the facility:

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

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

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

40CFR60 Subpart KKK applies to onshore natural gas processing plants that commenced construction after January 20, 1984, and on or Before August 23, 2011. The Glenn Didriksen Pad was constructed after August 23, 2011 and is not a natural gas processing plant, therefore, SWN would not be subject to this rule.

40CFR63 Subpart HH (National Emission Standards for Hazardous Air Pollutants for Oil and Natural Gas Production Facilities)

Subpart HH establishes national emission limitations and operating limitations for HAPs emitted from oil and natural gas production facilities located at major and area sources of HAP emissions. There are no glycol dehydration units at this facility, therefore, this rule does not apply.

45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants)

45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment)

The Glenn Didriksen Pad is located in Ohio County which is a non-attainment county for Particulate Matter 2.5. Because Ohio County is a non-attainment county, 45CSR19 possibly applies to this facility.

As shown in the table below, CHK is not subject to 45CSR14 or 45CSR19 review. According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, the fugitive emissions are not included in the PTE below.

Pollutant	PSD (45CSR14) Threshold (tpy)	NANSR (45CSR19) Threshold (tpy)	Glenn Didriksen Pad PTE (tpy)	45CSR14 or 45CSR19 Review Required?
Carbon Monoxide	250	NA	38.68	No
Nitrogen Oxides	250	100	21.79	No
Sulfur Dioxide	250	100	0.04	No
Particulate Matter 2.5	250	100	0.72	No
Ozone (VOC)	250	NA	53.30	No

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The following table lists common HAP's emitted from these types of facilities and each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

HAPs	Type	Known/Suspected Carcinogen	Classification
Formaldehyde	VOC	Yes	Category B1 - Probable Human Carcinogen
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Ethylbenzene	VOC	No	Inadequate Data
Toluene	VOC	No	Inadequate Data
Xylenes	VOC	No	Inadequate Data

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health effects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals*. For a complete discussion of the known health effects of each compound refer to the IRIS database located at *www.epa.gov/iris*.

AIR QUALITY IMPACT ANALYSIS

Modeling was not required of this source due to the fact that the facility is not subject to 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants) as seen in the table listed in the Regulatory Discussion Section.

SOURCE AGGREGATION

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

1. The Glenn Didriksen Pad will operate under SIC code 1311 (Crude Petroleum and Natural Gas Extraction). There are surrounding wells and compressor stations operated by SWN that share the same two-digit major SIC code of 13 for oil and gas exploration and production. Therefore, the Glenn Didriksen Pad does share the same SIC code as the wells and surrounding compressor stations.

2. "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 a plant. 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.

   There are no SWN facilities that are contiguous or adjacent with the Glenn Didriksen Pad. Additionally, there are no co-located facilities with the Glenn Didriksen Pad.

3. There are other wells and compressor stations that are under common control of SWN.

Because the facilities are not considered to be on contiguous or adjacent properties, the emissions from the Glenn Didriksen Pad should not be aggregated with other facilities in determining major source or PSD status.

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 combustion sources
- Monitor the presence of the combustor pilot flame with a thermocouple or equivalent
- Monitor opacity from all fuel burning units
- Monitor the storage tanks to ensure that all vapors are sent to the combustor
- Monitor all applicable requirements of 40CFR60 Subparts JJJJ and OOOO.
- Monitor and record the operating hours of the combustor
- Maintain records of testing conducted in accordance with 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 condensate and produced water truck loading
- 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

The information provided in the permit application indicates SWN's Glenn Didriksen Pad meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Ohio County location should be granted registration under General Permit G70-A.

Jerry Williams, P.E.
Engineer

10-19-2015
Date