



west virginia department of environmental protection

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**GENERAL PERMIT REGISTRATION APPLICATION
ENGINEERING EVALUATION / FACT SHEET**

BACKGROUND INFORMATION

Registration No.: G70-A087A
Plant ID No.: 095-00022
Applicant: Triad Hunter, LLC
Facility Name: Weese Station
Location: Alma, Tyler County
SIC Code: 1311
Application Type: Modification
Received Date: August 20, 2014
Engineer Assigned: David Keatley
Fee Amount: \$4,000 (\$500 Class II GP, \$1,000 NSPS, \$2,500 NESHAP)
Date Received: November 10, 2015
Complete Date: March 25, 2016
Due Date: May 9, 2016
Applicant Ad Date: November 18, 2015
Newspaper: *Tyler Star News*
UTM's: Easting: 516.442 km Northing: 4,363.946 km Zone: 17
Description: Permit registration G70-A087A will supersede and replace permit registration G70-A087. The applicant proposes permitting the following after-the-fact emission units: one (1) 3-mmscfd triethylene glycol (TEG) dehydration unit with associated 0.3-mmBtu/hr reboiler, three (3) 0.75-mmBtu/hr GPU heaters, one (1) 0.5-mmBtu/hr GPU heater, one (1) 2.39-mmBtu/hr enclosed combustor, four (4) 400-bbl produced liquid tanks, and two (2) 210-bbl produced liquid tanks. The applicant proposes installing and operating one (1) 225-bhp compressor engine. The applicant proposes removal of one (1) 1,380-bhp compressor engine and one (1) 46-bhp compressor engine. The applicant proposes a reduction in condensate and produced water throughputs and removal of a vapor recovery unit.

PROCESS DESCRIPTION

This facility consists of two (2) major parts. The first unpermitted part of this facility will be called R. Weese. R. Weese consists of four (4) natural gas wells. Raw natural gas from the wells will first be heated by three (3) 0.75-mmBtu/hr GPU heaters (GPU-1 through GPU-3) and one (1) 0.5 mmBtu/hr GPU heater (GPU-4). The produces liquid from the GPUs will go to four (4) 400-bbl tanks (T01-T04) and two (2) 210-bbl tanks. (T05-T06) The vapors from these tanks will be controlled by one (1) 7.7-mmBtu/hr enclosed combustor (VCU-1). The produced water will be trucked at a maximum rate of 908,000 gallons/year (TL-2) and the condensate will be trucked at a maximum rate of 154,800 gallons/year (TL-1). The vapors from truck loading will be controlled with vapor return. The gas from the GPUs will be sent to TEG dehydration unit to reduce the water content of the gas. The gas at a maximum rate of 3mmscfd will flow countercurrent to the circulating TEG in a contractor. The gas will leave the contactor and exit the facility via pipeline. The rich TEG will go to a flash tank where the volatile components will vaporize. The flash tank vapors will be sent to the produced liquid tanks. The liquid from the flash tank will go to the regenerator which is heated by one (1) 0.3-mmBtu/hr reboiler (2S) and will boil the water from the TEG which goes up the still vent (3S).

The second part of this facility will be called E. Weese (formally permitted as Weese Station). Raw natural gas will go from five (5) natural gas production wells and passed through five (5) 1.0-mmBtu/hr (HTR-1 through HTR-5) GPUs to raise the temperature of the raw natural gas and encourage separation of the: natural gas, produced water, and condensate. The gas from the E. Weese GPUs and gas from R. Weese will go to two (2) compressors to compress the natural gas stream to a higher pressure. The compressors will be powered by one (1) 1,380-bhp four-stroke lean-burn Caterpillar G3516B and one (1) 225-bhp four-stroke rich-burn Cummins GTA 855 natural gas fired compressor engines. The Cummins GTA 855 engine is equipped with a Miratech three-way catalyst. After the gas is compressed the gas will be dehydrated. The gas at a maximum rate of 40 mmscfd will go through a contactor and will flow countercurrent to circulating TEG. After dehydration the gas will exit the facility via pipeline. The rich TEG from the contactor will first go to a flash tank to allow the hydrocarbons to vaporize. The liquid from the flash tank will then go into a regenerator to remove the water. The vapors from the flash tank will be used as fuel in the reboiler with a control efficiency of 95%. Vapors from the still vent will be sent to a condenser to reduce the water content of the vapors and then sent to the reboiler for a control efficiency of 95%. The 0.5 mmBtu/hr reboiler will be used to boil the water from the TEG.

A variety of other tanks with negligible emissions are located at the E. Weese part of this facility:

- One 500 gallon double-walled lube oil tank
- One 300 gallon double-walled EG tank
- One 500 gallon double-walled used oil tank
- One 300 gallon double-walled TEG tank

SITE INSPECTION

Douglas Hammell of DEP DAQ Compliance and Enforcement Section performed a site visit on March 10, 2015 and the facility was deemed in compliance.

Directions as given in the permit application are as follows:

From Clarksburg in Harrison County, travel west on US Route 50 approximately 29 miles to State Route 18 in West Union. Proceed north on State Route 18 approximately 15 miles to the community of Alma. Just north of Alma on Route 18, turn right onto State Route 23 (McElroy Creek Road). The site is at 1190 McElroy Creek Road approximately 1.5 miles from this intersection.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions for the GPU Heaters and Reboiler were estimated with AP-42 emission factors. Emissions for 3ER from the still vent and flash tank were estimated using a gas analysis from this facility in GRI-GLYCalc 4.0. Emissions for engine S5A were estimated with manufacture data for NO_x, CO, and VOCs; the remainder of emissions were estimated using AP-42 emissions factors. The emissions reductions from the catalyst for engine S5A are: 75%, NO_x; 50%, CO; VOC, 50%. Truck loading emissions were estimated using equation from AP-42 Chapter 5.2.2.1.1 for submerged loading with dedicated normal service with a 70% capture efficiency and a 98% control efficiency for the enclosed combustor. Emissions from the produced liquid tanks were estimated using a gas sample from this facility in Promax.

Table 1: Estimated Maximum Controlled PTE which are New or Modified

Emission Unit ID	Emission Point ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
1S-A	1E-A	GPU Heater 0.75 mmBtu/hr	Nitrogen Oxides	0.08	0.33
			Carbon Monoxide	0.07	0.28
			Volatile Organic Compounds	<0.01	0.02
			PM ₁₀	<0.01	0.03
			CO _{2e}	91	397
1S-B	1E-B	GPU Heater 0.75 mmBtu/hr	Nitrogen Oxides	0.08	0.33
			Carbon Monoxide	0.07	0.28
			Volatile Organic Compounds	<0.01	0.02
			PM ₁₀	<0.01	0.03
			CO _{2e}	91	397
1S-C	1E-C	GPU Heater 0.75 mmBtu/hr	Nitrogen Oxides	0.08	0.33
			Carbon Monoxide	0.07	0.28
			Volatile Organic Compounds	<0.01	0.02
			PM ₁₀	<0.01	0.03
			CO _{2e}	91	397
1S-D	1E-D	GPU Heater	Nitrogen Oxides	0.05	0.22

		0.5 mmBtu/hr	Carbon Monoxide	0.04	0.18
			Volatile Organic Compounds	<0.01	0.01
			PM ₁₀	<0.01	0.01
			CO _{2e}	60	265
2S	2ER	Dehydration Reboiler 0.3 mmBtu/hr	Nitrogen Oxides	0.03	0.13
			Carbon Monoxide	0.03	0.11
			Volatile Organic Compounds	<0.01	0.01
			PM ₁₀	<0.01	0.01
			CO _{2e}	36	159
3S	3ER	Dehydration Unit Still Vent 3 mmscfd	Volatile Organic Compounds	1.23	5.38
			Benzene	0.04	0.17
			Toluene	0.19	0.82
			Xylenes	0.20	0.86
			n-Hexane	0.03	0.11
			CO _{2e}	<0.01	2
S5A	5E-A	Cummins GTA855 Compressor Engine 225 bhp	Nitrogen Oxides	1.50	6.56
			Carbon Monoxide	0.72	3.15
			Volatile Organic Compounds	0.15	0.65
			PM ₁₀	0.41	0.18
			Formaldehyde	0.05	0.22
			CO _{2e}	261	1,145
VCU-1	4E	Enclosed Combustor Abutec-20 2.39 mmBtu/hr (Controlling Produced Liquid Tanks and Truck Loading)	Nitrogen Oxides	0.04	0.20
			Carbon Monoxide	0.24	1.07
			Volatile Organic Compounds	0.26	1.16
			CO _{2e}	77	337

Table 2: Proposed Estimated Maximum Controlled Facility Wide PTE

Pollutant	Maximum Annual Facility Wide Emissions (tons/year)
Nitrogen Oxides	18.79
Carbon Monoxide	54.15
Volatile Organic Compounds	21.19
Total Particulate Matter	3.63
PM ₁₀	3.63
Sulfur Dioxide	0.07
Formaldehyde	6.67
n-Hexane	0.07
Benzene	0.03
Total HAPs	8.24

REGULATORY APPLICABILITY

The following rules and regulations apply to the facility:

45CSR2 To Prevent and Control 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 (1S-A through 1S-D and 2S) are below 10 MMBTU/hr. Therefore, these fuel burning units are exempt from the aforementioned sections of 45CSR2. However this facilities fuel burning units are 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. This facility will be inspected by the DAQ Enforcement Section.

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.

This facility is proposing installing and operating one (1) additional 2.39-mmBtu/hr Abutec-20 enclosed combustor. This enclosed combustor are subject to section 4, emission standards for incinerators. The enclosed combustor has a capacity of 82.5 lb/hr which yields an allowable emission rate of 0.23 pounds of particulate matter per hour. The enclosed combustor has an estimated hourly particulate matter emissions rate which is negligible. Therefore, the facility's vapor combustors should demonstrate compliance with this allowable emission rate.

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 (1S-A through 1S-D and 2S) 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

This facility is subject to 45CSR6 which are substantive requirements and this permitting action will be a modification.

45CSR22 Air Quality Management Fee Program

This facility is a minor source as can be seen in Table 2 and not subject to 45CSR30 since they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71. This facility is not a natural gas compressor station is a 9M source and is required to pay the \$200 annual fee. Triad Hunter, LLC is required to keep their Certificate to Operate current for this facility.

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 (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 three (3) natural gas wells that currently exist at this facility 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. Stone 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 Triad Hunter, LLC demonstrate continuous compliance by submitting reports and maintaining records for each completion operation.

- 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) proposed reciprocating compressor located which will be located at this facility associated with engine S5A. This compressor 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.

- 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:

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 regulation 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 produced liquid tanks located at this facility being controlled by an enclosed combustor will emit less than 6tpy. Therefore these tanks are not subject to this section of this regulation.

40 CFR 63 Subpart HH National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart HH. This facility is a natural gas production facility that processes, upgrades, or stores natural gas prior to transmission. This facility is an area source of HAPs refer to the previous facility wide emissions table.

Pursuant to §63.760(b)(2), each glycol dehydration unit (GDU) located at an area source that meets the requirements under §63.760(a)(3) is defined as an affected facility under Subpart HH. The requirements for affected sources at area sources are given under §63.764(d). However, for a GDU, exemptions to these requirements are given under §63.764(e)(2) “actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram [1 TPY] per year.”

As can be seen above in Table 1, the maximum PTE of benzene emissions from the GDU process vent is 0.17 tons/yr. Therefore, the GDU is exempt from the Subpart HH requirements given under §63.764(d).

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 2. 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 dates of the engines (S5A) 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 these engines under this subpart.

The following regulations do not apply to the facility:

40CFR60 Subpart A §60.18 General Control Device and Work Practice Requirements

40CFR60 Subpart A §60.18 contains requirements for control devices when they are used to comply with applicable subparts of 40CFR60 and 40CFR61. The enclosed combustors that Triad Hunter, LLC has proposed are not used to comply with one of these regulations. The purpose of the vapor combustors is to control emissions from the tanks that are routed to it. However, these tanks are not subject to 40CFR60 Subpart Kb due to their size. In addition 40CFR60 Subpart A §60.18 refers to flares but makes no mention of enclosed combustors, which are essentially enclosed combustion devices. Therefore this facility is not subject to this regulation.

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

40CFR60 Subpart JJJJ sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the date of construction, date of manufacture, and horsepower (hp) of the spark ignition internal combustion engine. All proposed engines will commence construction after June 12, 2006.

Engine S5A is not subject to this regulation because the engine is a non-emergency SI natural gas with a maximum engine power $100 \leq \text{hp} < 500$ and manufactured before July 1, 2008 (manufacture date December 1, 2007).

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from this facility and that are not classified as “criteria pollutants.” Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM), Particulate Matter less than 10 microns (PM₁₀), Particulate Matter less than 2.5 microns (PM_{2.5}), and Sulfur Dioxide (SO₂). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) standards promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs were discussed above under REGULATORY APPLICABILITY.

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. Antero included the following HAPs as emitted in substantive amounts in their emissions estimate: Benzene, n-Hexane, Toluene, Xylene, and Ethylbenzene. The following table lists each HAP’s carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
n-Hexane	HAP	No	Inadequate Data
Benzene	TAP	Yes	Category A - Known Human Carcinogen
Toluene	HAP	No	Inadequate Data
Xylene	HAP	No	Inadequate Data
Ethylbenzene	HAP	No	Category D - Not classifiable as to human carcinogenicity

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

RECOMMENDATION TO DIRECTOR

The information provided in this facility's permit application indicates that compliance with all state and federal air quality requirements will be achieved. It is recommended that Triad Hunter, LLC should be granted a modification oG70-A permit registration for Weese Station.



David Keatley
Permit Writer – NSR Permitting

March 25, 2016

Date