



west virginia department of environmental protection

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

BACKGROUND INFORMATION

Registration No.:	R13-3257
Plant ID No.:	095-00023
Applicant:	Jay-Bee Oil & Gas, Inc. (Jay-Bee)
Facility Name:	Ketel Compressor Site
Location:	Alvy, Tyler County
SIC Code:	1311
NAICS Code:	211111
Application Type:	Modification
Received Date:	June 30, 2015
Engineer Assigned:	David Keatley
Fee Amount:	\$4,500
Fees Received:	July 1, 2015
Complete Date:	April 13, 2016
Due Date:	July 12, 2016
Applicant Ad Date:	July 1, 2015
Newspaper:	<i>Tyler Star News</i>
UTM's:	Easting: 523.570 km Northing: 4,365.864 km Zone: 17
Description:	Permit R13-3257 will supersede and replace G35-A089A. Installation and operation of: one (1) 1,775-bhp compressor engine, one (1) 210-bbl produced liquid tank, and one (1) 2.39-mmBtu/hr enclosed combustor. Removal of one (1) 1,380-bhp compressor engine.

TYPE OF PROCESS

This facility compresses and dehydrates natural gas. Natural gas enters the facility via pipeline. The natural gas flows through an inlet separator. The liquids from the inlet separator go to one (1) 210-bbl produced liquid tank and will be trucked off site at a maximum rate of 140,000 gallons/year. The vapors from this produce liquid tank will be controlled by one (1) 2.39-mmBtu/hr enclosed combustor. The gas from the inlet separator is sent to three compressors to raise the pressure of the natural gas. The compressors are powered by two (2) four-stroke lean-burn Caterpillar G3516BLE (CE-1 and CE-2) reciprocating internal combustion engine (RICE) and one (1) four-stroke lean-burn 1,775-bhp Caterpillar 3606 TALE natural gas

fired RICE (CE-4). The Caterpillar G3516BLE is equipped with oxidation catalysts to reduce carbon monoxide (CO), volatile organic compounds (VOCs), and formaldehyde and are lean burn and reduce nitrogen oxides (NO_x) emissions through air to fuel ratio controllers (AFRCs). The Caterpillar 3606 TALE is equipped with an oxidation catalyst to control emissions by the following percentages: CO, 93%; VOC, 50%; and formaldehyde (CH₂O), 76%. The compressed natural gas at a maximum rate of 40 mmscfd flows countercurrent to triethylene glycol (TEG) in a contactor which utilize bubble cap trays to help reduce the water content of the natural gas to below pipeline specifications. The liquid from the contactor will flow into a regenerator which is heated to remove the water vapor from the rich TEG. The vapors from the regenerator will come out the still vent and will be controlled by one (1) 2.39-mmBtu/hr enclosed combustor. The regenerator is heated by one (1) 0.75-mmBtu/hr reboiler. After dehydration the natural gas from the contactor exits the facility via pipeline. This facility also has three (3) 300-gallon bulk oil tanks.

SITE INSPECTION

A site inspection was conducted on February 27, 2014 by Doug Hammell of the DAQ Enforcement Section. The facility was deemed to be in compliance.

Directions as given in the permit application are as follows:

From Clarksburg: Proceed west on US Route 50 for approximately 25 miles to West Union exit. Turn right onto Route 18 west and travel approximately 20 miles to Indian Creek Road (County Route 13). Turn right onto Indian Creek Road and travel 6.8 miles to a private road on the left. This is also an access road for the Eureka Hunter pipeline tap. Travel on private road approximately 0.5 miles to the proposed compressor site.

Latitude: 39.44206
Longitude: -80.726092

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

All CO_{2e} emissions were estimated with 40CFR90.

Table 1: Calculation Methodology for New/Modified Emission Units

Emission Unit ID#	Equipment	Calculation Methodology
CE-4	1,775-bhp Caterpillar 3606 TALE Compressor Engine With Oxidation Catalyst	Manufacturer's Data: NO _x , CO, VOCs, and CH ₂ O, EPA AP-42 Emission Factors for the remaining air pollutants.
T05	Produced Liquid Tank 210-bbl	Direct Measurement of a GOR using a representative sample for flash emissions. TANKS 4.0.9d using RVP 13 gasoline for working and breathing losses.
VCU-2	Enclosed Combustor (Controlling Produced Liquids Tank T05)	AP-42 with a 98% control efficiency.
TL-1	Truck Loading	AP-42, 5.1.2.1.1.; Submerged Loading: Dedicated

		Normal Service
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Table 2: Maximum Controlled Estimated Air Emissions

Source ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
CE-4	Compressor Engine Caterpillar 3606 TALE 1,775 bhp	Nitrogen Oxides	1.96	8.57
		Carbon Monoxide	0.75	3.30
		Volatile Organic Compounds	1.66	7.28
		Sulfur Dioxide	0.01	0.04
		PM	0.13	0.59
		PM ₁₀	0.13	0.59
		Formaldehyde	0.25	1.07
		CO _{2e}	2,144	9,392
VCU-2	Enclosed Combustor (Controlling Produced Liquid Tank T05)	Nitrogen Oxides	0.03	0.13
		Carbon Monoxide	0.16	0.69
		Volatile Organic Compounds	0.22	2.03
		CO _{2e}	52	224
TL-1	Truck Loading	Volatile Organic Compounds	0.05	0.20

Table 3: Total Facility Wide PTE

Pollutant	Annual Emissions (tons/year)
Nitrogen Oxides	23.90
Carbon Monoxide	10.90
Volatile Organic Compounds	20.14
Total Particulate Matter	1.78
Sulfur Dioxide	0.10
Acrolein	0.81
Acetaldehyde	1.32
Formaldehyde	3.76
n-Hexane	0.39
Benzene	0.54
n-Hexane	0.33
Toluene	0.70
Ethylbenzene	0.04
Methanol	0.40
Xylenes	0.33
Total HAPs	8.35
Carbon Dioxide Equivalent	28, 022

REGULATORY APPLICABILITY

The following rules and regulation were reviewed for this modification:

45CSR4 - *To Prevent an Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to the 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 *Control of Air Pollution from Combustion of Refuse*

This rule establishes emission standards for particulate matter and requirements for particulate matter and requirements for activities involving incineration of refuse which are not subject to, or are exempted from regulation under a federal counterpart for specific combustion sources. This rule also prohibits open burning and sets forth the registration, permitting, reporting, testing, emergency, natural disaster and exemption provisions for activities involving the combustion of refuse and land clearing debris.

The facility has proposed an enclosed combustor for controlling the working/breathing/flashing emissions from the condensate/produced water storage tanks. The enclosed combustor must meet the requirements for the emission standards set forth in section 4.1 of this rule, were the allowable particulate matter emission rate to be discharged is determined below.

Emissions (lb/hr) = F x Incinerator Capacity (tons/hr)

Where, the factor, F, is as indicated in Table I below:

Table I: Factor, F, for Determining Maximum Allowable Particulate Emissions.

Incinerator Capacity Factor F

A. Less than 15,000 lbs/hr 5.43

B. 15,000 lbs/hr or greater 2.72

Emissions to the incinerator are 116 lbs/hr.

Emissions (lb/hr) = 5.43 x 0.13 tons/hr = 0.32 lb/hr

The estimated hourly particulate matter emission rate from the enclosed combustor is negligible. The facility's proposed enclosed combustor should meet the emission requirements of this rule. The facility will demonstrate compliance by maintaining and operating the combustor properly.

The enclosed combustor must meet the visible emissions requirements of this rule, which limits the combustor to 20% opacity during operation per section 4.3 of this rule. The permittee will be required to operate the enclosed combustor according to manufacturer specifications in order to maintain a smokeless operation. The permittee will also be required to conduct Method 9 opacity checks upon request of the Director.

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 a substantive requirement (subpart JJJ) and therefore this permitting action is required to be a modification.

45CSR22 *Air Quality Management Fee Program*

This facility is a minor source as can be seen in Table 3 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 a natural gas compressor station and has a total reciprocating engine capacity greater than 1,000 hp, is an 8D source, and is required to pay a \$500 annual fee. This facility is required to keep their Certificate to Operate current.

The following rules and 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 combustor that this facility has proposed is not used to comply with one of these regulations. The purpose of the enclosed combustor is to control emissions from the tanks that are routed to it. In addition 40CFR60.18 refers to flares but makes no mention of enclosed combustion devices. Therefore this facility is not subject to this regulation.

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 proposed tank T05 at this facility is less than 75 cubic meters; therefore this tank is not subject to this regulation.

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:

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.

Produced liquid tank T05 located at this facility are estimated to emit less than 6 tpy of VOC. Therefore this facilities tanks are not subject to this section of this regulation.

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

40CFR60 Subpart JJJJ sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject spark ignition internal combustion engine. This subpart applies to engine CE-4 because it was manufactured on or after July 1, 2010 is greater than 1,350 hp non-emergency spark ignition natural gas engine. Engine CE-4 will have to meet the following emission standards in g/hp-hr: NO_x 1.0, CO 2.0, and VOC 0.7. The emissions standards will have to be met over the entire life of the engine.

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 an area 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 a new stationary RICE (§63.6590(a)(2)(iii)) due to the installation date of engine CE-4 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.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The majority of non-criteria regulated pollutants fall under the definition of Hazardous Air Pollutant (HAP)s 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. HAPs are those pollutants that are specifically identified in section 112(b) of the Clean Air Act. To be listed as a HAP, EPA must find that the chemical in question may present a threat to human health and cause adverse environmental effects. As can be seen in Table 4 this facility is an area source of HAPs (potential to emit (PTE) less than 10 tons per year of any pollutant on the HAP list, or less 25 tons per year for all HAPs)

The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Table 4: IRIS HAP Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
Formaldehyde	HAP/TAP	Yes	Category B - Probable Human Carcinogen

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.

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 Jay-Bee should be granted a modification permit.

 David Keatley
 Permit Writer – NSR Permitting

April 13, 2016

 Date