



**west virginia department of environmental protection**

Division of Air Quality  
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**ENGINEERING EVALUATION / FACT SHEET**

**BACKGROUND INFORMATION**

Application No.:	R13-3225
Plant ID No.:	095-00027
Applicant:	Jay-Bee Oil & Gas Inc. (Jay-Bee)
Facility Name:	Big Moses Site
Location:	near Alma, Tyler County
NAICS Code:	211111
Application Type:	Modification
Received Date:	November 12, 2014
Engineer Assigned:	David Keatley
Fee Amount:	\$4,000 (\$1,000 Fee + \$1,000 NSPS Fee + 2,500 NESHAP Fee)
Date Received:	June 12, 2014 and November 13, 2014
Complete Date:	February 17, 2015
Due Date:	May 18, 2015
Applicant Ad Date:	November 19, 2014
Newspaper:	<i>Tyler Star News</i>
UTM's:	Easting: 518.180 km    Northing: 4,364.529 km    Zone: 17
Description:	Permit R13-3225 will supersede and replace permit registration G35-A102A. Installation of two (2) 2,370 bhp compressor engines and two (2) 60 mmSCF/day TEG dehydration units with two (2) associated 1.0 mmBtu/hr reboilers. Modification of engine CE-1, CE-2, and VCU-1. Removal of one (1) 1,380 bhp compressor engine.

**DESCRIPTION OF PROCESS**

Natural gas will enter the facility via pipeline. The facility will have five (5) compressors to increase the pressure of the natural gas stream. The compressors are powered by four (4) 2,370 bhp four-stroke lean burn Caterpillar G3608LE, one (1) 1,380 bhp four-stroke lean-burn Caterpillar G3516BLE, and one (1) 1,380 bhp Caterpillar G3516 LE natural gas fired compressor engines. Compressor engines CE-1 and CE-2 a DCL oxidation catalyst to reduce carbon dioxide by 93%, VOCs by 50%, and formaldehyde by 50%. Compressor engines CE-3 has an EMIT oxidation

catalyst to reduce carbon monoxide by 93%, VOCs by 50%, and formaldehyde by 76%.

After compression the natural gas stream is sent to TEG dehydration units to reduce the water content of the natural gas stream. 60 mmscf/day of natural gas is sent to a contactor where TEG flows countercurrent to the natural gas stream to reduce the water vapor content of the natural gas stream. The compressed dryer natural gas leaves the facility via natural gas pipeline. The rich TEG (water entrained) leaves the contactor and enters the regenerator. The regenerator is heated by a natural gas fired reboiler to liberate water and other entrained hydrocarbons. The reboiler has a 1.0 MMBTU/hr capacity. This facility will have a total of five (5) tanks, four (4) 300-gallon oil tanks, and one (1) 210-bbl produced fluids tank.

Produced water from the facility will be sent to one (1) 210-bbl tank (T02). The vapors from the produced water tank will be controlled by a enclosed combustor. The maximum throughput for truck loading is 336,000 gallons/year.

## SITE INSPECTION

Douglas Hammell from DAQ's Compliance and Enforcement section performed a site visit on August 6, 2013. The day of the site visit, top soil had been removed by a bulldozer, however no operations equipment had arrived yet. The closest residence was approximately 1,000 feet away. The site seemed appropriate for the proposed facility.

From Clarksburg travel west on US 50 for approximately 25 miles to CR 18. Travel north on CR 18 (Sisterville Pike) for approximately 21 miles to CR 13 (Indian Creek Road). Turn right onto CR 13 and travel for approximately 2.9 miles until CR55/2 (Big Moses Rd.). Travel on CR 55/2 for approximately 400 feet, the access road is a slight right. The facility is approximately 1,200 ft. at the end of the access road.

## ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions from the tanks (T01, T03, T04, and T05) will be considered negligible due to the combination of tank contents and tank throughputs. Engine emissions were estimated with AP-42 and manufacturers data and have a mark up of 10%. The combustor (VCU-4) which controls the produced water tank T02 will have a control efficiency of 98%. The combustors (VCU-1 through VCU-3) which control the TEG dehydration still vents will have a 98% control efficiency.

Table 1: Maximum Controlled Estimated Air Emissions

Sour ce ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
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CE-1	Compressor Engine Caterpillar G3608LE 2,370 bhp	Nitrogen Oxides	2.87	12.59
		Carbon Monoxide	1.11	4.85
		Volatile Organic Compounds	2.87	12.59
		Sulfur Dioxide	0.01	0.05
		PM	0.18	0.80
		PM <sub>10</sub>	0.18	0.80
		Formaldehyde	0.29	1.26
		CO <sub>2</sub> e	2,820	12,352
CE-2	Compressor Engine Caterpillar G3608LE 2,370 bhp	Nitrogen Oxides	2.87	12.59
		Carbon Monoxide	1.11	4.85
		Volatile Organic Compounds	2.87	12.59
		Sulfur Dioxide	0.01	0.05
		PM	0.18	0.80
		PM <sub>10</sub>	0.18	0.80
		Formaldehyde	0.29	1.26
		CO <sub>2</sub> e	2,820	12,352
CE-3	Compressor Engine Caterpillar G3516BLE 1,380 bhp	Nitrogen Oxides	1.52	6.66
		Carbon Monoxide	0.61	2.67
		Volatile Organic Compounds	0.88	3.86
		Sulfur Dioxide	0.01	0.03
		PM	0.12	0.05
		PM <sub>10</sub>	0.12	0.05
		Formaldehyde	0.31	1.34
		CO <sub>2</sub> e	1,513	6,622
CE-5	Compressor Engine Caterpillar G3608LE 2,370 bhp	Nitrogen Oxides	2.87	12.59
		Carbon Monoxide	1.11	4.85
		Volatile Organic Compounds	2.87	12.59
		Sulfur Dioxide	0.01	0.05
		PM	0.18	0.80
		PM <sub>10</sub>	0.18	0.80
		Formaldehyde	0.29	1.26
		CO <sub>2</sub> e	2,820	12,352
CE-6	Compressor Engine Caterpillar G3608LE 2,370 bhp	Nitrogen Oxides	2.87	12.59
		Carbon Monoxide	1.11	4.85
		Volatile Organic Compounds	2.87	12.59
		Sulfur Dioxide	0.01	0.05
		PM	0.18	0.80
		PM <sub>10</sub>	0.18	0.80
		Formaldehyde	0.29	1.26
		CO <sub>2</sub> e	2,820	12,352

VC U-1	TEG Dehydrator Still Vent Controlled by Combustor 60 MMscf/day	Volatile Organic Compounds	1.72	7.51
		Benzene	0.02	0.07
		n-Hexane	0.04	0.17
		Toluene	0.05	0.21
		Xylenes	0.09	0.39
		CO <sub>2</sub> e	65	136
RB V-1	Reboiler 1.0 MMBTU/hr	Nitrogen Oxides	0.10	0.44
		Carbon Monoxide	0.09	0.37
		Volatile Organic Compounds	0.01	0.03
		CO <sub>2</sub> e	162	710
VC U-2	TEG Dehydrator Still Vent Controlled by Combustor 60 MMscf/day	Volatile Organic Compounds	1.72	7.51
		Benzene	0.02	0.07
		n-Hexane	0.04	0.17
		Toluene	0.05	0.21
		Xylenes	0.09	0.39
		CO <sub>2</sub> e	65	136
RB V-2	Reboiler 1.0 MMBTU/hr	Nitrogen Oxides	0.10	0.44
		Carbon Monoxide	0.09	0.37
		Volatile Organic Compounds	0.01	0.03
		CO <sub>2</sub> e	162	710
VC U-3	TEG Dehydrator Still Vent Controlled by Combustor 60 MMscf/day	Volatile Organic Compounds	1.72	7.51
		Benzene	0.02	0.07
		n-Hexane	0.04	0.17
		Toluene	0.05	0.21
		Xylenes	0.09	0.39
		CO <sub>2</sub> e	65	136
RB V-3	Reboiler 1.0 MMBTU/hr	Nitrogen Oxides	0.10	0.44
		Carbon Monoxide	0.09	0.37
		CO <sub>2</sub> e	162	710
VC U-4	Produced Water Tank Controlled by a Combustor	Nitrogen Oxides	0.08	0.35
		Carbon Monoxide	0.44	1.93
		Volatile Organic Compounds	0.72	3.16
		CO <sub>2</sub> e	139	609
TL-1	Truck Loading	Volatile Organic Compounds	7.46	1.19



Table 2: Maximum Estimated Controlled Facility Wide Air Emissions

Pollutant	Maximum Annual Facility Wide Emissions (tons/year)
Nitrogen Oxides	59.02
Carbon Monoxide	25.36
Volatile Organic Compounds	85.86
Particulate Matter	4.47
PM <sub>10</sub>	4.47
Sulfur Dioxide	0.23
Formaldehyde	6.36
Benzene	0.37
n-Hexane	0.93
Toluene	0.63
Xylenes	1.17
Total HAPs	16.01
Carbon Dioxide Equivalent	60,015

## REGULATORY APPLICABILITY

### **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 heat input of all of the proposed fuel burning units RBV-1, RBV-2, and RBV-3 (1.00 MMBTU/hr each) is below 10 MMBTU/hr. Therefore, this unit are exempt from the aforementioned sections of 45CSR2. However, RBV-1, RBV-2, and RBV-3 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***

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.

**45CSR10 - *To Prevent and Control Air Pollution From the Emissions of Sulfur Oxides***  
The Reboilers

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 heat input of all of the proposed fuel burning units RBV-1, RBV-2, and RBV-3 (1.00 MMBTU/hr) is below 10 MMBTU/hr. Therefore, this unit 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 the changes proposed under this permitting action results in an emissions increase above permitting thresholds (6 lb/hr and 10 tons/year of NO<sub>x</sub> and VOCs).

**45CSR22 - *Air Quality Management Fee Program***

This facility is a minor source, not subject to 45CSR30, and the NSPS are Title V exempt. This facility is required to keep their Certificate to Operate current. Since this facility has a total reciprocating engine capacity of less than 1,000 hp (10,860 hp) this facility is subject to 8D with an annual fee of \$500.

**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. Nice Station is a natural gas production facility that processes, upgrades, or stores natural gas prior to transmission. Nice Station 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 shown above, the maximum PTE of benzene emissions from each GDU process vent is 0.07 TPY. Therefore, the GDU is exempt from the Subpart HH requirements given under §63.764(d).

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

EPA issued its new source performance standards (NSPS) and air toxics rules for the oil and gas sector on April 17, 2012. 40CFR60 Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO<sub>2</sub>) 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 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 will be five (5) reciprocating compressor associated with CE-1 through CE-6 at this facility. The compressors associated with CE-1 through CE-6 were constructed after the effective date of this regulation and is therefore subject. Requirements will include replacing rod packing systems, recordkeeping, and reporting.*

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- b. 1. 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.
2. 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.

*The pneumatic controllers at this facility will be intermittent or will vent less than 6 scf/hr and therefore this facility is not subject to this section of this regulation.*

**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 Nice Station is subject to the area source requirements and has non-emergency spark ignition engines.

Engine CE-1 through CE-6 are "New Stationary RICE" sources at an area source of HAPs and are affected source because construction will commenced after June 12, 2006 [63.6590(a)(2)(iii)] due to the manufacture's dates of the engines.

This regulation states engines CE-1 through CE-6 must meet the requirements of 40CFR60 subpart JJJJ, but has no additional requirements due to this regulation.

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

Engines (CE-1 through CE-6) are subject to 40CFR60 Subpart JJJJ because construction was after June 12, 2006. Engines CE-1 through CE-4 were manufactured after July 1, 2010 (non-emergency SI natural gas lean-burn greater than 1,350 bhp).

**[40CFR60.4230(4)]**

40CFR60.4248 Table 1 provides the allowable emission standards for stationary spark ignition internal combustion engines. The engines are non-emergency lean-burn  $hp \geq 1,350$  bhp manufacturer date after July 1, 2010 the allowable emission standards in g/hp-hr are: 1.0 for  $NO_x$ , 2.0 for CO, and 0.7 for VOC. The estimated emissions with the 10% markup were estimated in g/hp-hr with: 0.55 for  $NO_x$ , 0.22 for CO, and 0.55 for VOC, which are below the allowable standards. The engines will also have operating limits, performance tests, notification requirements, and recordkeeping requirements.

## TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There will be small amounts of various regulated hazardous air pollutants emitted from the operation of this facility as seen in Table 1. The facility is a minor source of HAPs as can be seen in Table 2. If you want to obtain additional information about certain hazardous air pollutants feel free to visit [<http://www.epa.gov/ttn/atw/hlthef/hapindex.html>].

## AIR QUALITY IMPACT ANALYSIS

Modeling was not performed 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 can be seen in Table 2.

## RECOMMENDATION TO DIRECTOR

The information provided in this facility's permit application indicates that compliance with all state and federal air quality requirements should be achieved . It is recommended that Jay-Bee Oil & Gas, Inc. should be granted a 45CSR13 Modification permit for the Big Moses Site.

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David Keatley  
Permit Writer - NSR Permitting

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February 17, 2015  
Date

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