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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: G70-A095A
Plant ID No.: 095-00051
Applicant: Jay-Bee Oil & Gas, Inc.
Facility Name: Bashful Well Pad
Location: Stringtown, Tyler County
NAICS Code: 211111
Application Type: Modification
Received Date: December 2, 2015
Engineer Assigned: Caraline Griffith
Fee Amount: \$500.00
Date Received: December 3, 2015
Complete Date: December 29, 2015
Due Date: February 15, 2016
Applicant Ad Date: December 9, 2015
Newspaper: *Tyler Star News*
UTM's: Easting: 523.994 km Northing: 4,369.319 km Zone: 17
Description: Approval for installation of an enclosed combustor as a back-up for the VRU to capture and destroy tank emissions for those times when the VRU is not available and approval for the installation of a single thermoelectric generator.

DESCRIPTION OF PROCESS

Natural gas and produced fluids (condensate and water) are received from two wells at this location at approximately 2,500 psi and pass through Gas Processing Units (on per well) to avoid ice formation during subsequent pressure drops. These materials then pass through a three-way separator where gas, condensate and water are separated. The gas is routed to a gathering pipeline owned and operated by others.

Both the condensate and produced water are accumulated in four 210 bbl tanks (two for condensate and two for produced water), pending truck transportation by others. The

condensate is transported to a regional processing facility and the produced water to a regional disposal facility. Flash, working and breathing losses from these tanks are currently being routed to a Vapor Recover Unit (VRU) with the captured vapors routed back to the raw gas discharge line. The VRU has a maximum capture and control efficiency of 95%.

Jay-Bee is seeking approval for installation of an enclosed combustor as a back-up for the VRU to capture and destroy tank emissions for those times when the VRU is not available (e.g. engine and compressor maintenance). In association with this change, condensate and water production rates have changed subsequent to the issuance of the initial permit registration. Accordingly, Jay-Bee is seeking to revise the permitted rates for production and associated tank emissions and truck loading emissions for these two liquids.

Separately, the original permit application, and subsequent permit (G70-A095), did not address fugitive dusts associated with truck traffic. Jay-Bee seeks to correct this oversight.

Jay-Bee is also seeking approval to install a single thermoelectric generator (TEG).

SITE INSPECTION

A site inspection of the proposed facility was conducted by Doug Hammell of the enforcement section on September 16, 2014. "Site is suitable for G70-A095. Closest residence ~1700 ft South. When I was on site, no perm equip had been rec'd. Drilling operations were still on-going."

Directions:

From SR-18 north of Alma, WV, take CR Rt. 1/3 east for 6 miles. Proceed left onto CR 13/1 for 2 miles. Take right onto Bonelick Rd. Proceed approximately 0.6 miles. Access road is on the left.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Maximum controlled point source emissions listed below were calculated by Jay-Bee and reviewed for accuracy by the writer. Thermoelectric generator and enclosed combustor emissions were calculated using AP-42 Chapter 1.4 emission factors. Fugitive dust emissions from haul roads were added and VOC emissions were updated to reflect the increase in throughput of the condensate and produced water loading. There were also slight variations in recalculating emissions for the GPUs that are corrected in the General Permit Registration G70-A095A. These minor changes consist of an increase in VOC from 1.29 TPY to 1.31 TPY, an increase in CO from 1.08 TPY to 1.10 TPY, and an increase in PM from 0.09 to 0.10. These minor increases were due to Jay-Bee originally using AP-42 factors to calculate these emissions and then went back and adjusted for the variation in gas heat content between what gas is on-site (commercial grade) and the AP-42 factors.

The CO₂e emission increases that weren't caused by the addition of the Enclosed Combustor (EC-1) are from different units on-site (GPUs, VRU, Tanks, etc.) where Jay-Bee has gone back and recalculated these emissions using manufacturer specs instead of AP-42 factors.

Emission Unit	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
TEG-1 Thermoelectric Generator 0.013 mmBtu/hr	Nitrogen Oxides	<0.01	0.01
	Carbon Monoxide	<0.01	0.01
	Volatile Organic Compounds	<0.01	<0.01
	Sulfur Dioxide	<0.01	<0.01
	Particulate Matter-10	<0.01	<0.01
	CO ₂ e	2.00	7.00
EC-1 Enclosed Combustor 10.0 mmBtu/hr	Volatile Organic Compounds	3.49	15.33
	Nitrogen Oxides	0.26	1.16
	Carbon Monoxide	1.44	6.32
	n-Hexane	0.22	0.96
	Sulfur Dioxide	<0.01	<0.01
	Particulate Matter-10	0.01	0.06
	CO ₂ e	457.53	2,004
	Total HAPs	0.32	1.38

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T01-T02 & T03-T04 Condensate/P. Water Tanks (Combined)	Volatile Organic Compounds	8.64	38.38
	Total HAPs	0.79	3.46
TL-1 Cond. Loading	Volatile Organic Compounds	51.00	3.51
	Total HAPs	2.51	0.17
TL-2 Produced Water Loading	Volatile Organic Compounds	0.14	0.02
Fugitives F001	Volatile Organic Compounds	--	1.35
	CO ₂ e	--	30.80

The total facility potential to emit (PTE) is shown in the following table:

Pollutant	Facility Wide Emissions G70-A095 (tons/year)	Facility Wide Emissions G70-A095A (tons/year)	Increase in Emissions (tons/year)
Nitrogen Oxides	3.56	4.79	1.23
Carbon Monoxide	4.98	11.35	6.37
Volatile Organic Compounds	15.96	58.76	2,162
Particulate Matter-10/2.5	0.13	0.90	42.80
Sulfur Dioxide	0.01	0.01	--
Total HAPs	0.27	5.17	4.90
Carbon Dioxide Equivalent	1,889	4,051	2,162

REGULATORY APPLICABILITY

The proposed Jay-Bee natural gas production facility is subject to substantive requirements in the following state and federal air quality rules and regulations: 45CSR2, and 45CSR13. Each applicable rule (and ones that have reasoned non-applicability), and Jay-Bee's compliance therewith, will be discussed in detail below.

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 each of the existing fuel burning units (GPU-1, GPU-2) is below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR2. However, Jay-Bee would be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

The heat input of the proposed enclosed combustor (EC-1) is 10.0 mmBTU/hr. Therefore, this unit is subject to all sections including 4, 5, 6, 8, and 9.

Section 4: For Type 'b' fuel burning units, the product of 0.09 and the total design heat inputs for such units in million B.T.U.'s per hour, provided however that no more than six hundred (600) pounds per hour of particulate matter shall be discharged into the open air from all such units.

$0.09 \times 10 \text{ mmBTU/hr} = 0.90 \text{ lb/hr of Particulate Matter}$

If Jay-Bee expands the facility with one or more similar fuel burning units, the emission rate for those units will be calculated as follows, however know that the above calculated maximum allowable emission limit cannot be exceeded by any emission unit:

$$R_e = (1 - ((H_{et} - H_e) \div H_e)) \times R_{et}$$

Where:

R_e : Total allowable emission rate in pound per hour for the new emission unit

H_{et} : Total design heat input in mmBTU/hr of the existing and new emission units

H_e : Total design heat input in mmBTU/hr of the new emission unit

R_{et} : Total allowable emission rate in lb/hr corresponding to H_{et} .

Section 5: Jay-Bee may not allow any source of fugitive particulate matter to operate without a fugitive particulate matter control system. Sources of fugitive particulate matter for fuel burning units could consist of stockpiling ash or fuel in the open or in enclosed facilities like silos, transporting ash including by vehicle or conveyer that may produce spillage, tracking, or blowing of PM from such transportation methods, and ash disposal systems/ash or fuel handling systems.

Section 6: Any units, if applicable, that were existing as of September 1, 1974 must register with the Director. Any units, if applicable, under construction as of October 1, 1974 must register with the Director.

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Section 8:

Testing (8.1a)

The owner or operator of a fuel burning unit(s) shall demonstrate compliance with section 3 by periodic testing in accordance with 40CFR Part 60, Appendix A, Method 9, or a certified continuous opacity monitoring system, as approved by the Director, and section 4 by periodic particulate matter stack testing, conducted in accordance with the appropriate test method set forth in the Appendix to this rule or other equivalent EPA approved method approved by the Director. The owner or operator shall conduct such testing at a frequency to be established by the Director.

Monitoring (8.2)

The owner or operator of a fuel burning unit(s) shall monitor compliance with section 3 as set forth in an approved monitoring plan for each emission unit. Such monitoring plan(s) shall include, but not be limited to, one or more of the following: continuous measurement of emissions, monitoring of emission control equipment, periodic parametric monitoring, or such other monitoring as approved by the Director.

Recordkeeping and Recording

The owner or operator of a fuel burning unit(s) shall maintain on-site all records of monitored data established in the monitoring plan pursuant to subdivision 8.2.a. Such records shall be made available to the Director or his duly authorized representative upon request. Such records shall be retained on-site for a minimum of five years.

However, the exemptions state that an owner or operator whose fuel burning unit has a heat input of less than 100 mmBTU/hr shall be exempt from the periodic testing requirements of subdivision 8.1.a and the monitoring requirements of subsection 8.2. The Director reserves the right to require testing pursuant to subdivisions 8.1.b and 8.1.c.

Section 9: The only variances allowed in the visible emission limits are during times of start-up, shutdowns and malfunctions. In the event of a malfunction of the air pollution control equipment or the unit itself that results in any excess PM emission rate or excess opacity, it must be reported to the Director.

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. All facilities are inspected by the DAQ Enforcement Section. The facility-wide requirements of the general permit include the odor standards of 45CSR §4-3.1.

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.

Jay-Bee will have one (1) enclosed combustor on site (EC-1). This enclosed combustor will be used to comply with emissions standards of Subpart OOOO, being the backup control device for the VRU associated with the Condensate Tanks and the Produced Water Tanks.

45CSR10: To Prevent and Control Air Pollution from the Emission 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 heat input of each of the existing fuel burning units (GPU-1, GPU-2) is below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR10.

The heat input of the proposed enclosed combustor (EC-1) is 10.0 mmBTU/hr. Therefore, this unit is subject to all sections including 3, 6, 7, and 8.

Section 3: For Type 'b' and 'c' fuel burning units in Priority Regions I and II (Tyler County being in Priority Region II), the product of 3.10 and the total design heat inputs for such units discharging through stacks in million B.T.U.'s per hour

3.10 x 10 mmBTU/hr = 31 lb/hr of Sulfur Dioxide

Section 6: All persons owning or operating a source of sulfur dioxide who has not been previously registered must register with the Director after the effective date of this rule (August 2000).

Section 7: No person shall construct, modify or relocate any source of sulfur dioxide without first obtaining a permit in accordance with the provisions of W. Va. Code §22-5-1 et seq., and Series 13, 14, 19 and 30 of Title 45.

Section 8:

Testing:

At such reasonable times as the Director may designate, the owner or operator of any fuel burning unit(s), manufacturing process source(s) or combustion source(s) may be required to conduct or have conducted tests to determine the compliance of such source(s) with the emission limitations of sections 3, 4 or 5. Such tests shall be conducted in accordance with the appropriate test method set forth in 40 CFR Part 60, Appendix A, Method 6, Method 15 or other equivalent EPA testing method approved by the Director. The Director, or his or her duly authorized representative, may at his or her option witness or conduct such tests. Should the Director exercise his or her option to conduct such tests, the operator will provide all necessary sampling connections and sampling ports to be located in such manner as the Director may require, power for test equipment, and the required safety equipment such as scaffolding, railings, and ladders to comply with generally accepted good safety practices.

Monitoring:

At the request of the Director the owner and/or operator of a source shall install such stack gas monitoring devices as the Director deems necessary to determine compliance with the provisions of this rule. The data from such devices shall be readily available at the source location or such other reasonable location that the Director may specify. At the request of the Director, or his or her duly authorized representative, such data shall be made available for inspection or copying. Failure to promptly provide such data shall constitute a violation of this rule.

The owner or operator of fuel burning unit(s), manufacturing process source(s) or combustion source(s) shall demonstrate compliance with sections 3, 4 and 5 of this rule by testing and /or monitoring in accordance with one or more of the following: 40 CFR Part 60, Appendix A, Method 6, Method 15, continuous emissions monitoring systems (CEMS) or fuel sampling and analysis as set forth in an approved monitoring plan for each emission unit.

Recordkeeping and Recording:

The owner or operator of fuel burning unit(s), manufacturing process source(s) or combustion source(s) subject to sections 3, 4 or 5 shall maintain on-site a record of all required monitoring data as established in a monitoring plan pursuant to subdivision 8.2.c. Such records shall be made available to the Director or his duly authorized

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representative upon request. Such records shall be retained on-site for a minimum of five years.

The owner or operator shall submit a periodic exception report to the Director, in a manner specified by the Director. Such an exception report shall provide details of all excursions outside the range of measured emissions or monitored parameters established in an approved monitoring plan and shall include, but not be limited to, the time of the excursion, the magnitude of the excursion, the duration of the excursion, the cause of the excursion and the corrective action taken.

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*

The construction of the Bashful natural gas production facility has a potential to emit a regulated pollutant in excess of six (6) lbs/hour and ten (10) TPY and, therefore, pursuant to §45-13-2.24, the facility is defined as a "stationary source" under 45CSR13. Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the construction . . . and operation of any stationary source to be commenced without . . . obtaining a permit to construct." Therefore, Jay-Bee is required to obtain a permit registration under 45CSR13 for the construction and operation of the natural gas production facility.

As required under §45-13-8.3 ("Notice Level A"), Jay-Bee placed a Class I legal advertisement in a "newspaper of general circulation in the area where the source is . . . located." The ad ran on December 9, 2015 in *Tyler Star News*.

45CSR22 *Air Quality Management Fee Program*

The Bashful Facility paid the \$500.00 Modification fee for a G70-A application. There are no NSPS or NESHAPs fees that apply to this modification.

40 CFR 60, Subpart OOOO *Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution*

Subpart OOOO applies to facilities that commence construction, reconstruction, or modification after August 23, 2011 (October 15, 2012 for well completions). Since the Gorby pad will begin operation after August 23, 2011 it is subject to the requirements of Subpart OOOO. The tanks at the Gorby facility will utilize a vapor recovery unit, with a newly installed backup enclosed combustor. Even with the VRU and back enclosed

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combustor in place, the tanks will have the potential to emit more than 6 tpy of VOC's, therefore the tanks will be subject to the rule. The site will also include pneumatic controllers that were ordered and installed after August 23, 2011 with a bleed rate equal to or less than 6 scfd, therefore the controllers will not be subject to the applicable provisions of Subpart OOOO. The gas wells at the Gorby pad will also be affected facilities subject to Subpart OOOO.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the Bashful natural gas production 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. Jay-Bee included the following HAPs as emitted in substantive amounts in their emissions estimate: Benzene, n-Hexane, Toluene, and Trimethylpentane. 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	VOC	No	Inadequate Data
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Toluene	VOC	No	Inadequate Data
Xylene	VOC	No	Inadequate Data
Trimethylpentane	VOC	No	Inadequate Data

All HAPs have other non-carcinogenic chronic and acute effects. These

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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

The estimated maximum emissions from the proposed Bashful natural gas production facility are less than applicability thresholds that would define the proposed facility as a "major stationary source" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature of the proposed construction, modeling was not required under 45CSR13, Section 7.

MONITORING OF OPERATIONS

The following substantive monitoring, compliance demonstration, and record-keeping requirements (MRR) shall be required:

- For the purposes of demonstrating compliance with maximum limit for the aggregate production of condensate/liquids from the wells set forth in Section 4.0 of the general permit registration, Jay-Bee shall be required to monitor and record the monthly and rolling twelve month total of condensate/liquids (in gallons) produced in the wells. Monitoring and recording the monthly and rolling twelve month total of condensate/liquids (in gallons) unloaded from the storage tanks can be used to show compliance with this requirement.
- For the purposes of demonstrating compliance with visible emissions limitations set forth in Section 7.0 of the G70-A general permit, Jay-Bee shall be required to:
 - (1) Conduct an initial Method 22 visual emission observation on the heater treaters to determine the compliance with the visible emission provisions. Jay-Bee shall be required to take a minimum of two (2) hours of visual emissions observations on the line heaters.
 - (2) Conduct monthly Method 22 visible emission observations of the heater treater stack to ensure proper operation for a minimum of ten (10) minutes each month the line heaters are in operation.
 - (3) In the event visible emissions are observed in excess of the limitations given under Section 7.5 of the G70-A general permit, Jay-Bee shall be required to

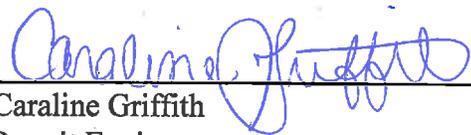
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take immediate corrective action.

- Jay-Bee shall be required to maintain records of all visual emission observations pursuant to the monitoring required under Section 7.2 of the G70-A general permit including any corrective action taken.
- Jay-Bee shall be required to report any deviation(s) from the allowable visible emission requirement for any emission source discovered during observations using 40CFR Part 60, Appendix A, Method 9 or 22 to the Director of the Division of Air Quality as soon as practicable, but in any case within ten (10) calendar days of the occurrence and shall include at least the following information: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any corrective measures taken or planned.
- Jay-Bee shall be required to maintain records of the amount of natural gas burned in all engines, heaters or other fuel burning units.

RECOMMENDATION TO DIRECTOR

Information supplied in the registration application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that general permit registration G70-A095A for the modification of a natural gas production facility near Stringtown, Tyler County, be granted to Jay-Bee Oil & Gas, Inc.



Caraline Griffith
Permit Engineer



DATE

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