west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone (304) 926-0475 • FAX: (304) 926-0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	G70-A179
Plant ID No.:	095-00063
Applicant:	Jay-Bee Oil & Gas, Inc.
Facility Name:	Sleepy Well Pad
Location:	Middlebourne, Tyler County
NAICS Code:	211111
Application Type:	Class II General Permit
Received Date:	October 13, 2015
Engineer Assigned:	Roy F. Kees, P.E.
Fee Amount:	$1,500.00
Date Received:	October 16, 2015
Complete Date:	November 16, 2015
Due Date:	December 31, 2015
Applicant Ad Date:	October 21, 2015
Newspaper:	*Tyler Star News*
UTM's:	Easting: 522.472 km Northing: 4,369.580 km Zone: 17
Description:	Application for a natural gas well pad consisting of three (3) wells, three (3) gas production units, three (3) condensate and three (3) produced water tanks, one (1) vapor recovery unit compressor engine, one enclosed combustor, one (1) thermoelectric generator and truck loading.

DESCRIPTION OF PROCESS

A mixture of condensate and entrained gas from the three (3) wells enters the facility through a number of low pressure separators where the gas phase is separated from the liquid phase. Gas Production Units (GPU-1 - GPU-3) are used in conjunction with the separators to help separate the gas from the liquid phases. These heaters are fueled by a slip stream of the separated gas. The compressed gas is then metered and sent to the sales gas pipeline. The separated water and condensate from the separators flow to their

respective storage tanks (T01-T03 and T04-T06).

The facility has six (6) tanks (T01-T03 & T04-T06) on site to store condensate and produced water prior to removal from the site. Flashing, working, and breathing losses from the tanks are captured by the vapor recovery unit and sent to the sales line. The facility will utilize a 84 hp Cummins 4SRB compressor designed to operate at 8,760 hours per year. Also, an enclosed combustor (EC-1) will be utilized during VRU downtime estimated to be 200 hours per year and in the event of a large slug of condensate by which the flash would overwhelm the VRU.

Condensate and produced water are transported off-site on an as-needed basis via tanker truck. The maximum annual condensate and produced water throughput will be 1,260,000 and 2,670,000 gallons per year, respectively. Truck loading connections are in place to pump condensate and produced water (TL-1 & TL-2), respectively from the storage tanks into tanker trucks. Emissions from the loading operations are vented to the atmosphere.

Emissions from the facility's emission sources were calculated using the extended analysis of the condensate and gas from RPT 8-1, one of the wells in the RPT8 Pad. These extended analysis are considered representative of the materials from Sleepy, being in the same Marcellus rock formation. The flashing, working & breathing losses from the tanks are sent to the VRU. The VRU that will be used to control emissions is designed to achieve an efficiency of 95%. The vapor combustor used for VRU downtime is designed to achieve an efficiency of 98%. Calculations are based on 8,560 hours of VRU operation combined with 200 hours of no control for downtime.

SITE INSPECTION

A site inspection of the proposed facility was conducted by James Robertson of the enforcement section on November 17, 2015. "Three wells have been drilled and the site has been rocked. There was no equipment onsite. The pad is located on top of a hill in a remote area with the closest house being approximately 1500' away.

In my opinion this site is suitable for a General Permit."

From Middlebourne, proceed southeast on Route 18 (main Street) out of town. Proceed approximately 5.8 miles to the junction with C/R 1/3 (Indian Creek Road) on the left. From the intersection, take Indian Creek Road east for 4.6 miles. Turn left onto 13/1 (Walnut Fork) follow north for 1.7 miles to well pad entrance on 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. Heater treater and flare emissions were calculated using AP-42 emission factors. Storage tank and loading emissions were calculated using Gas to Oil Ratio method, TANKS 4.0. and AP-42. Engine emissions were calculated using emission data from the vendor.

Emission Unit	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
HTR-1 - HTR-3 (3) 1.5 mmBtu/hr Heater Treaters (Combined)	Nitrogen Oxides	0.45	1.98
	Carbon Monoxide	0.39	1.65
	Volatile Organic Compounds	0.03	0.12
	Sulfur Dioxide	<0.01	0.01
	Particulate Matter-10	0.03	0.15
	CO_2e	544	2,382
T01-T03 & T04-T06 Condensate/P. Water Tanks (Combined)	Volatile Organic Compounds	6.73	28.80
	Total HAPs	0.23	0.98
Enclosed Combustor EC-1	Nitrogen Oxides	0.27	0.05
	Carbon Monoxide	1.48	0.30
	Volatile Organic Compounds	2.69	0.54
	Total HAPs	0.09	0.02
Enc. Comb. Pilot	Nitrogen Oxides	0.07	0.29
	Carbon Monoxide	0.06	0.24
TL-1 Cond. Loading	Volatile Organic Compounds	12.42	1.86
	Total HAPs	0.85	0.13
	Nitrogen Oxides	0.19	0.81

Arrow VRC2 4SRB Eng. (VRU-1)	Carbon Monoxide	0.37	1.62
	Volatile Organic Compounds	0.05	0.21
	Formaldehyde	0.02	0.07
	CO_2e	89	391
Fugitives F001	Volatile Organic Compounds	0.17	0.77
	CO_2e	--	22

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

Pollutant	Facility Wide Emissions (tons/year)
Nitrogen Oxides	3.13
Carbon Monoxide	3.82
Volatile Organic Compounds	32.93
Particulate Matter-10/2.5	3.26
Sulfur Dioxide	0.02
Total HAPs	1.27
Carbon Dioxide Equivalent	3,256

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 Gas Production Units (GPU-1 - GPU-3) have been determined to meet the definition of a "fuel burning unit" under 45CSR2 and are, therefore, subject to the applicable requirements therein. However, pursuant to the exemption given under §45-2-11, as the MDHI of the unit is less than 10 mmBtu/hr, it is not subject to sections 4, 5, 6, 8 and 9 of 45CSR2. The only remaining substantive requirement is under Section 3.1 - Visible Emissions Standards.

Pursuant to 45CSR2, Section 3.1, the line heaters are subject to an opacity limit of 10%. Proper maintenance and operation of the unit (and the use of natural gas as fuel) should keep the opacity of the unit well below 10% during normal operations.

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 Sleepy 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 October 21, 2015 in *Tyler Star News*.

45CSR22 Air Quality Management Fee Program

The Sleepy Facility is not subject to 45CSR30. The facility is subject to 40CFR60 Subpart OOOO, however they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided they are not required to obtain a permit for a reason other than their status as an area source, therefore, the facility is not subject and will pay its annual fees through the Rule 22 program.

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 Sleepy pad will begin operation after August 23, 2011 it is subject to the requirements of Subpart OOOO. The tanks at the Sleepy facility will utilize a vapor recovery unit. Even with the VRU 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 that 6 scfd, therefore the controllers will not be subject to the applicable provisions of Subpart OOOO. The gas wells at the Sleepy pad will also be affected facilities subject to Subpart OOOO.

Non Applicability Determinations

45CSR10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

Pursuant to the exemption given under §45-10-10.1, as the MDHI of the Gas Production Units (GPU-1 - GPU-3) are less than 10 mmBtu/hr, the units are not subject to the substantive sections of 45CSR10.

45CSR14: ***Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration.***

45CSR19: ***Permits for Construction and Major Modification of Major Stationary Sources which Cause or Contribute to Nonattainment.***

As shown in the following table, facility-wide potential-to-emit of the Sleepy natural gas production facility is below the levels that would define the source as "major" under 45CSR14 and, therefore, the construction evaluated herein is not subject to the provisions of 45CSR14 or 45CSR19.

Pollutant	PSD (45CSR14) Threshold (tpy)	NANSR (45CSR19) Threshold (tpy)	Sleepy PTE (tpy)	45CSR14 or 45CSR19 Review Required?
Carbon Monoxide	250	NA	3.82	No
Nitrogen Oxides	250	NA	3.13	No
Sulfur Dioxide	250	NA	0.02	No
Particulate Matter 2.5	250	NA	3.26	No
Ozone (VOC)	250	NA	32.93	No

Classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of "Building, structure, facility, or installation" as given in §45-14-2.13 and §45-19-2.12. The definition states:

> "Building, Structure, Facility, or Installation" means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

Sleepy shares the same SIC code as other well pads owned by Jay-Bee in the area. Therefore, the potential classification of the Sleepy facility as one stationary

source any other facility depends on the determination if these stations are considered "contiguous or adjacent properties."

"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 one stationary source. 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.*

The Sleepy Well Pad Production Facility and the receiving Big Moses and Ketel Compressor Stations are under the same general SIC Code. They are also under common ownership and may, from time to time have a sharing of staff. However, the Big Moses and Ketel compressor stations are over 5.0 miles from the Sleepy Well Pad, with no clear line of sight and properties owned by others in between. While there is a temporary dependency of the well pad on this compressor station, operation of the compressor station is not dependent upon the Sleepy Well Pad ass it also receives, compresses and
dehydrates gas from other well pads. More importantly, the distance between the facilities does not rise to the definition of contiguous or adjacent. Thus, not all of the criteria for aggregation are met. Hence, emissions from the Sleepy Well Pad Production Facility should not be aggregated with those of the receiving Big Moses and Ketel Compressor Stations.

The closest Jay-Bee facility to the Sleepy Well Pad is the Happy Well Pad. As with the compressor stations discussed above, this facility is under common ownership, the same SIC code and from time to time have a sharing of staff. However these two pads are approximately 0.78 miles apart.

Upon review of these facilities, the Sleepy Pad does not meet all three (3) prongs to be considered the same "Building, structure, facility, or installation". Therefore, the emissions from these facilities have been aggregated in determining major source and/or PSD status.

45CSR30: Requirements for Operating Permits

Jay-Bee is not subject to 45CSR30. The Sleepy Pad is subject to 40CFR60 Subparts JJJJ and OOOO, however they are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided they are not required to obtain a permit for a reason other than their status as an area source. Please see Source Aggregation Section above where emissions from the Sleepy Pad and the McIntyre Pad are listed and do not exceed 45CSR30 major source thresholds.

40 CFR 60 Subpart Kb ***Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984***

Pursuant to §60.110b, 40 CFR 60, Subpart Kb applies to "each storage vessel with a capacity greater than or equal to 75 cubic meters (m^3) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984." The largest storage tanks located at the Sleepy facility are each 16,800 gallons, or 63.5 m^3. Therefore, Subpart Kb does not apply to any of the storage tanks.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the Sleepy 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 (PM_{10}), Particulate Matter less than 2.5 microns ($PM_{2.5}$), and Sulfur Dioxide (SO_2). 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 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*.

AIR QUALITY IMPACT ANALYSIS

The estimated maximum emissions from the proposed Sleepy 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 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-A179 for the construction of a natural gas production facility near Middlebourne, Tyler County, be granted to Jay-Bee Oil & Gas, Inc.

Roy F. Kees, P.E.
Engineer - NSR Permitting

12/3/15
DATE