JAY-BEE OIL & GAS, INC.

APPLICATION FOR GENERAL PERMIT

Sleepy Well Pad Production Facility
Tyler County, West Virginia

98 Vanadium Road
Bridgeville, PA 15017
(412) 221-1100

Jay-Bee Oil + Gas, Inc.
Sleepy Well Pad
095-00063
G70-A179
Roy Kees

APPLICATION FOR G70-A GENERAL PERMIT

Jay-Bee Oil & Gas, Inc.

Sleepy Well Pad Production Facility

Tyler County, West Virginia

Table of Contents

SECTION I

Application Form

WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street, SE
Charleston, WV 25304
Phone: (304) 926-0475 • www.dep.wv.gov/daq

APPLICATION FOR GENERAL PERMIT REGISTRATION

CONSTRUCT, MODIFY, RELOCATE OR ADMINISTRATIVELY UPDATE
A STATIONARY SOURCE OF AIR POLLUTANTS

☒ CONSTRUCTION ☐ MODIFICATION ☐ RELOCATION ☐ CLASS I ADMINISTRATIVE UPDATE ☐ CLASS II ADMINISTRATIVE UPDATE

CHECK WHICH TYPE OF GENERAL PERMIT REGISTRATION YOU ARE APPLYING FOR:

- ☐ **G10-D** – Coal Preparation and Handling
- ☐ **G20-B** – Hot Mix Asphalt
- ☐ **G30-D** – Natural Gas Compressor Stations
- ☐ **G33-A** – Spark Ignition Internal Combustion Engines
- ☐ **G35-A** – Natural Gas Compressor Stations (Flare/Glycol Dehydration Unit)
- ☐ **G40-C** – Nonmetallic Minerals Processing
- ☐ **G50-B** – Concrete Batch
- ☐ **G60-C** - Class II Emergency Generator
- ☐ **G65-C** – Class I Emergency Generator
- ☒ **G70-A** – Class II Oil and Natural Gas Production Facility

SECTION I. GENERAL INFORMATION

1. Name of applicant (as registered with the WV Secretary of State's Office):
Jay-Bee Oil & Gas, Inc.

2. Federal Employer ID No. **(FEIN):**
55-073-8862

3. Applicant's mailing address:
3570 Shields Hill Rd
Cairo, WV 26337

4. Applicant's physical address:
3570 Shields Hill Rd
Cairo, WV 26337

5. If Applicant is a subsidiary corporation, please provide the name of parent corporation.
N/A

WV BUSINESS REGISTRATION. Is the applicant a resident of the State of West Virginia? ☒ **YES** ☐ **NO**

- IF **YES,** provide a copy of the Certificate of **Incorporation/ Organization / Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**

- IF **NO,** provide a copy of the **Certificate of Authority / Authority of LLC / Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

SECTION II. FACILITY INFORMATION

7. Type of plant or facility (stationary source) to be constructed, modified, relocated or administratively updated (e.g., coal preparation plant, primary crusher, etc.):
Natural Gas Well Pad Production Facility

8a. Standard Industrial Classification AND 8b. North American Industry
Classification (SIC) code: **1311** System (NAICS) code: **211111**

9. DAQ Plant ID No. (for existing facilities only):

10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only):

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site:	12A. Address of primary operating site:
Sleepy Well Pad Production Facility	Mailing: **None** Physical:

13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☒ YES ☐ NO

→ IF **YES**, please explain: **Applicant has a lease agreement with the land owner for installation of the Well Pad and associated equipment**

→ IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14A→ For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;

→ For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

From Middlebourne, proceed south/east on State Route 18 (Main Street) out of town. Proceed approximately 5.8 miles to the junction with (Indian Creek Road on the left. From WV 18 and Indian Creek CR13 intersection, take Indian Creek Rd east for 4.6 miles. Turn left onto CR 13/1 (Walnut Fork) follow north for 1.7 miles to well pad entrance on left.

15A. Nearest city or town:	16A. County:	17A. UTM Coordinates:
Middlebourne	**Tyler**	Northing (KM): 4369.5798 Easting (KM): 522.47246 Zone: 17

18A. Briefly describe the proposed new operation or change (s) to the facility:	19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Natural gas production and separation of liquids.	Latitude: 39.475506 Longitude: -80.738682

B: 1ST ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits)

11B. Name of 1st alternate operating site:	12B. Address of 1st alternate operating site:
	Mailing: Physical:

13B. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☐ YES ☐ NO

→ IF **YES**, please explain:

→ IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14B. → For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;

→ For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

15B. Nearest city or town:	16B. County:	17B. UTM Coordinates: Northing (KM): Easting (KM): Zone:
18B. Briefly describe the proposed new operation or change (s) to the facility:		19B. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: Longitude:

C: 2ND ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits):

11C. Name of 2nd alternate operating site:	12C. Address of 2nd alternate operating site: Mailing: Physical:

13C. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☐ **YES** ☐ **NO**

→ IF **YES**, please explain:

→ IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14C. → For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;

→ For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

15C. Nearest city or town:	16C. County:	17C. UTM Coordinates: Northing (KM): Easting (KM): Zone:
18C. Briefly describe the proposed new operation or change (s) to the facility:		19C. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: Longitude:

20. Provide the date of anticipated installation or change:	21. Date of anticipated Start-up if registration is granted:
12/ 1 / 15 If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: : ____/____/____	12/ 1/ 15

22. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application if other than 8760 hours/year. (Note: anything other than 24/7/52 may result in a restriction to the facility's operation).

Hours per day 24 Days per week 7 Weeks per year 52 Percentage of operation 100

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

23. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

24. Include a **Table of Contents** as the first page of your application package.

All of the required forms and additional information can be found under the Permitting Section (General Permits) of DAQ's website, or requested by phone.

25. Please check all attachments included with this permit application. Please refer to the appropriate reference document for an explanation of the attachments listed below.

- ☒ ATTACHMENT A : CURRENT BUSINESS CERTIFICATE
- ☒ ATTACHMENT B: PROCESS DESCRIPTION
- ☒ ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS
- ☒ ATTACHMENT D: PROCESS FLOW DIAGRAM
- ☒ ATTACHMENT E: PLOT PLAN
- ☒ ATTACHMENT F: AREA MAP
- ☒ ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM
- ☒ ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS
- ☒ ATTACHMENT I: EMISSIONS CALCULATIONS
- ☒ ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT
- ☐ ATTACHMENT K: ELECTRONIC SUBMITTAL
- ☒ ATTACHMENT L: GENERAL PERMIT REGISTRATION APPLICATION FEE
- ☐ ATTACHMENT M: SITING CRITERIA WAIVER
- ☒ ATTACHMENT N: MATERIAL SAFETY DATA SHEETS (MSDS)
- ☒ ATTACHMENT O: EMISSIONS SUMMARY SHEETS
- ☒ OTHER SUPPORTING DOCUMENTATION NOT DESCRIBED ABOVE (Equipment Drawings, Aggregation Discussion, etc.)

Please mail an original and two copies of the complete General Permit Registration Application with the signature(s) to the DAQ Permitting Section, at the address shown on the front page of this application. Please DO NOT fax permit applications. For questions regarding applications or West Virginia Air Pollution Rules and Regulations, please refer to the website shown on the front page of the application or call the phone number also provided on the front page of the application.

SECTION IV. CERTIFICATION OF INFORMATION

This General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of a Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, Emission Inventory, Certified Emission Statement, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. Any administratively incomplete or improperly signed or unsigned Registration Application will be returned to the applicant.

FOR A CORPORATION (domestic or foreign)

☒ I certify that I am a President, Vice President, Secretary, Treasurer or in charge of a principal business function of the corporation

FOR A PARTNERSHIP

☐ I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

☐ I certify that I am a General Partner or General Manager

FOR AN ASSOCIATION

☐ I certify that I am the President or a member of the Board of Directors

FOR A JOINT VENTURE

☐ I certify that I am the President, General Partner or General Manager

FOR A SOLE PROPRIETORSHIP

☐ I certify that I am the Owner and Proprietor

☐ *I hereby certify that* (please print or type) _____

is an Authorized Representative and in that capacity shall represent the interest of the business (e.g., Corporation, Partnership, Limited Liability Company, Association Joint Venture or Sole Proprietorship) and may obligate and legally bind the business. If the business changes its Authorized Representative, a Responsible Official shall notify the Director of the Office of Air Quality immediately, and/or,

I hereby certify that all information contained in this General Permit Registration Application and any supporting documents appended hereto is, to the best of my knowledge, true, accurate and complete, and that all reasonable efforts have been made to provide the most comprehensive information possible

Signature _____ 10-9-2015
(please use blue ink) Responsible Official Date

Name & Title **Shane Dowell, Office Manager**
(please print or type)

Signature _____
(please use blue ink) Authorized Representative (if applicable) Date

Applicant's Name _____

Phone & Fax **304/628-3119** **304/628-3119**
Phone Fax

Email **sdowell@jaybeeoil.com**

SECTION II

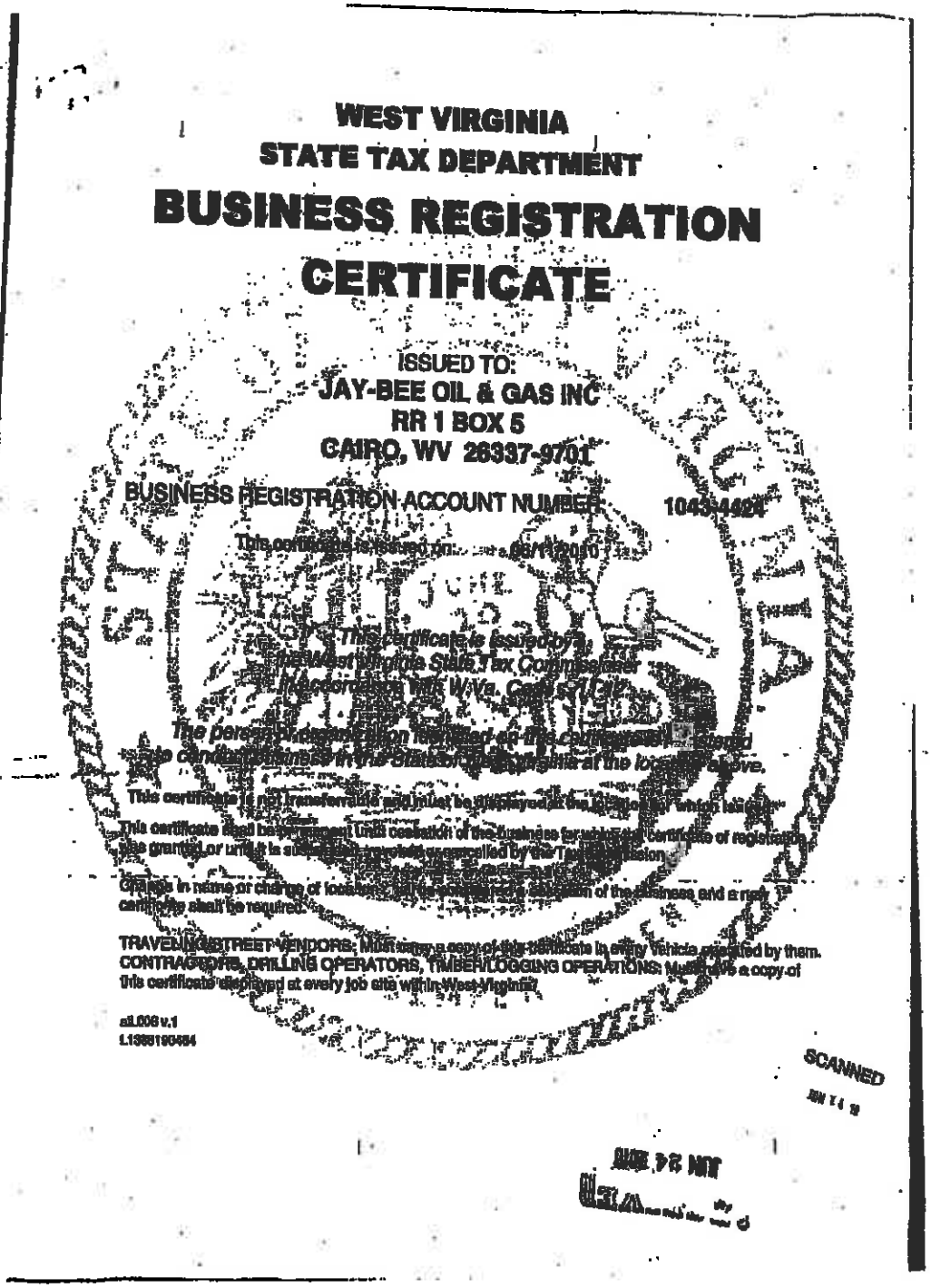
Attachments

ATTACHMENT A

Business Registration

Attachment A

Attached Current WV Business Certificate



WEST VIRGINIA
STATE TAX DEPARTMENT

BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
JAY-BEE OIL & GAS INC
RR 1 BOX 5
CAIRO, WV 26337-9701

BUSINESS REGISTRATION ACCOUNT NUMBER: 1043-4424

This certificate is issued on: 08/11/2010

This certificate is issued by the West Virginia State Tax Commissioner in accordance with W.Va. Code 11-12-2.

The person identified on this certificate is licensed to conduct business in the State of West Virginia at the location above.

This certificate is not transferable and must be displayed at the location for which issued.

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location must be reported. Cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them.
CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

sBL008 v.1
L1388190484

SCANNED

ATTACHMENT B

Process Description

Jay-Bee Oil & Gas, Incorporated
Sleepy Well Pad Production Facility
Attachment B
Process Description

At this facility, Natural gas and Produced Fluids (condensate and water) will be received from three wells passed through Gas Processing Units (one per well) to avoid ice formation during subsequent pressure drops. These materials will then pass through a three-way separator where gas, condensate and water are separated. The gas will be routed to a gathering pipeline owned and operated by others.

Both Condensate and Produced Water will be accumulated in six 210 BBL tanks (three for Condensate and three for Produced Water), pending truck transportation by others. The Condensate will be transported to a regional processing facility and the Produced Water a regional disposal facility. Flash, working and breathing losses from these tanks will be routed to a Vapor Recovery Unit (VRU) with the captured vapors routed back to the raw gas discharge line. An enclosed combustor will be utilized as a backup control device for times when the VRU is not available (estimated max of 200 hours per year) and if a large slug of condensate production generates flash gas in excess of the capacity of the VRU.

A capture and control efficiency of 95% is being claimed for the VRU and 98% for the combustor.

A Process Flow Diagram depicting these features is provided in Attachment D.

Lastly, Jay-Bee is seeking approval for installation of a Thermo-electric generator to meet the minor electric demands for various monitoring and data tracking equipment..

There are no gas-fired compressor engines, other than a single engine for the vapor recovery unit (VRU). Additionally, no dehydration units are proposed for this facility at this time.

All gas fired equipment (GPUs) use natural gas produced at the site as fuel.

40 CFR 60, Subpart OOOO requires that VOC emissions from each "storage vessel affected facility" installed after April 12, 2013 (GROUP 2) must be controlled by at least 95% by April 15, 2014 when the VOC uncontrolled emissions exceed 6 tpy. As described in 40 CFR 60.5365(e), *the determination may take into account requirements under a legally and practically enforceable limit in an operating permit or other requirement established under a Federal, State, local or tribal authority.* The control systems proposed in this application will reduce VOC emissions from the tanks described above to rates well below the 6 tpy limit and operation of these controls will become part of the permit. Thus, the tanks at this facility will not be regulated under 40 CFR 60, Subpart OOOO.

Emission Units Table

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
GPU-1	1E	Gas Processing Unit	Pending Permit	1.5 MMBTU/Hr	NEW	None
GPU-2	2E	Gas Processing Unit	Pending Permit	1.5 MMBTU/Hr	NEW	None
GPU-3	3E	Gas Processing Unit	Pending Permit	1.5 MMBTU/Hr	NEW	None
T01	4E/9E	Condensate Tank	Pending Permit	210 BBL	NEW	VRU-1/EC-1
T02	4E/9E	Condensate Tank	Pending Permit	210 BBL	NEW	VRU-1/EC-1
T03	4E/9E	Condensate Tank	Pending Permit	210 BBL	NEW	VRU-1/EC-1
T04	4E/9E	Produced Water Tank	Pending Permit	210 BBL	NEW	VRU-1/EC-1
T05	4E/9E	Produced Water Tank	Pending Permit	210 BBL	NEW	VRU-1/EC-1
T06	4E/9E	Produced Water Tank	Pending Permit	210 BBL	NEW	VRU-1/EC-1
TL-1	5E	Condensate Truck Loading	Pending Permit	30,000 BBL/Yr.	NEW	None
TL-2	6E	Produced Water Loading	Pending Permit	63,600 BBL/Yr.	NEW	None
CE-1	7E	VRU Driver	Pending Permit	84 Hp	NEW	1C
EC-1	9E	Enclosed Combustor	Pending Permit	10.0 MMBTU/Hr	NEW	
TEG-1	8E	Thermoelectric Generator	Pending Permit	4.4 KW/Hr	NEW	None
---	---	Fugitive VOC Emissions – Fittings and Connections	Pending Permit	N/A	NEW	None
---	---	Haul Roads	Pending Permit	6 Trucks per day max.	NEW	None

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

ATTACHMENT C

Description of Fugitive Emissions

Jay-Bee Oil & Gas, Inc.
Sleepy Well Pad Production Facility
Attachment C
Fugitive Emissions Data

Equipment Fugitive Emissions

As noted in the process description, Jay Bee plans to install various equipment at its Sleepy Well Pad Production Facility. This equipment will contain a variety of piping containing natural gas and separated liquids under pressure. During the normal course of operation minor leaks from valves, pressure release devices and various fittings associated with this piping may occur. The number of valves, flanges, etc. reflects the inclusion of equipment that will be installed. A potential emission rate of 0.77 tpy of VOCs and 21.2 tpy CO_2e has been estimated. As HAPs represent approximately 1.2% of the VOCs, HAP emissions are estimated at 0.01 tpy.

Estimates of these emissions are included in the calculations (Attachment N) and summarized on the form included in this section. These calculations are based on emission factors accepted by the American Petroleum Institute and EPA.

Pigging Emission Estimates

There will be no pigging operations in association with this planned facility.

Facility Blowdown Emission Estimates

There will be one gas compressor at this facility, utilized as a Vapor Recovery Unit (VRU). This device will require blowdowns to allow for routine maintenance. The volume of natural gas released per blowdown event from this unit and associated inlet separator and piping is estimated at 64.4 cubic feet at STP (see attached calculations from vendor). There will be a maximum of 16 blow downs per year for this VRU. Thus, there is a potential for 1030 cubic feet of gas emitted from blowdowns per year.

For permitting purposes, it is conservatively assumed that all the gas blown down is condensate tank flash gas, which is the vast majority of gas routed to the VRU. The density of this gas at STP is 0.11 lb/scf (see the Condensate Flash Gas Composition Page in the preceding calculation spreadsheets. Thus, the mass of gas released per year is 113 pounds (1030 cf x 0.110). As the percentage of VOCs in the gas (by weight) is 70.2 percent (again see the Condensate Flash Gas Composition spreadsheet), the VOC emissions from blowdown operations are estimated at approximately 79.6 lbs or 0.04 tons per year. HAPs (almost exclusively n-hexane) are estimated to be 6.76 percent of the mass of the blowdown emissions or 5.4 lb/yr or <0.01 tpy. As the methane concentration in this gas is approximately 9.9% (by weight), methane emissions will be 7.9 lbs/yr. Using a GHG factor of 25, methane emissions from blowdowns in CO_{2e} will be 0.09 tons CO_2e.

Storage Tank and Haul Road Fugitive Emissions

Produced Fluids (water and condensate) received by this facility will be accumulated in six 210-BBL tanks (three condensate and three water) prior to off-site shipment. Emissions from these tanks were determined by using flash gas measurements from pressurized condensate produced at an area Jay-Bee well pad and working/breathing losses using AP-42 methods using condensate vapor data from this same condensate. Uncontrolled emissions from these tanks were determined to be 589.7 tons per year of VOCs. These vapors are routed to the VRU a minimum capture and control efficiency of 95%. Emission calculations are presented in Attachment I.

Emissions from these sources (exclusive of tank emissions) are summarized in the following fugitive emissions form and the calculations are included in the emissions summary in Attachment N.

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? ☒ Yes ☐ No ☒ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☐ Yes ☒ No ☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☒ Yes ☐ No ☒ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? ☒ Yes ☐ No ☒ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads						
Unpaved Haul Roads	PM	13.04	3.03	13.04	3.03	EE
Loading/Unloading Operations	VOCs	12.42	1.86	12.42	1.86	EE
	Total HAPs	0.85	0.13	0.85	0.13	EE
Equipment Leaks	VOCs	0.175	0.765	0.175	0.765	EE
	Total HAPs	<0.01	0.01	<0.01	0.01	EE
Blowdowns	VOCs	N/A	0.04	N/A	0.04	EE
	Total HAPs	N/A	<0.01	N/A	<0.01	EE
Other:						

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. DO NOT LIST H_2, H_2O, N_2, O_2, and Noble Gases.

[2] Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[4] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

G5.9C VRC2, 3 Stage (Note: assumed ideal gas behavior and used OD for volume calc)

ENTER the following Values:

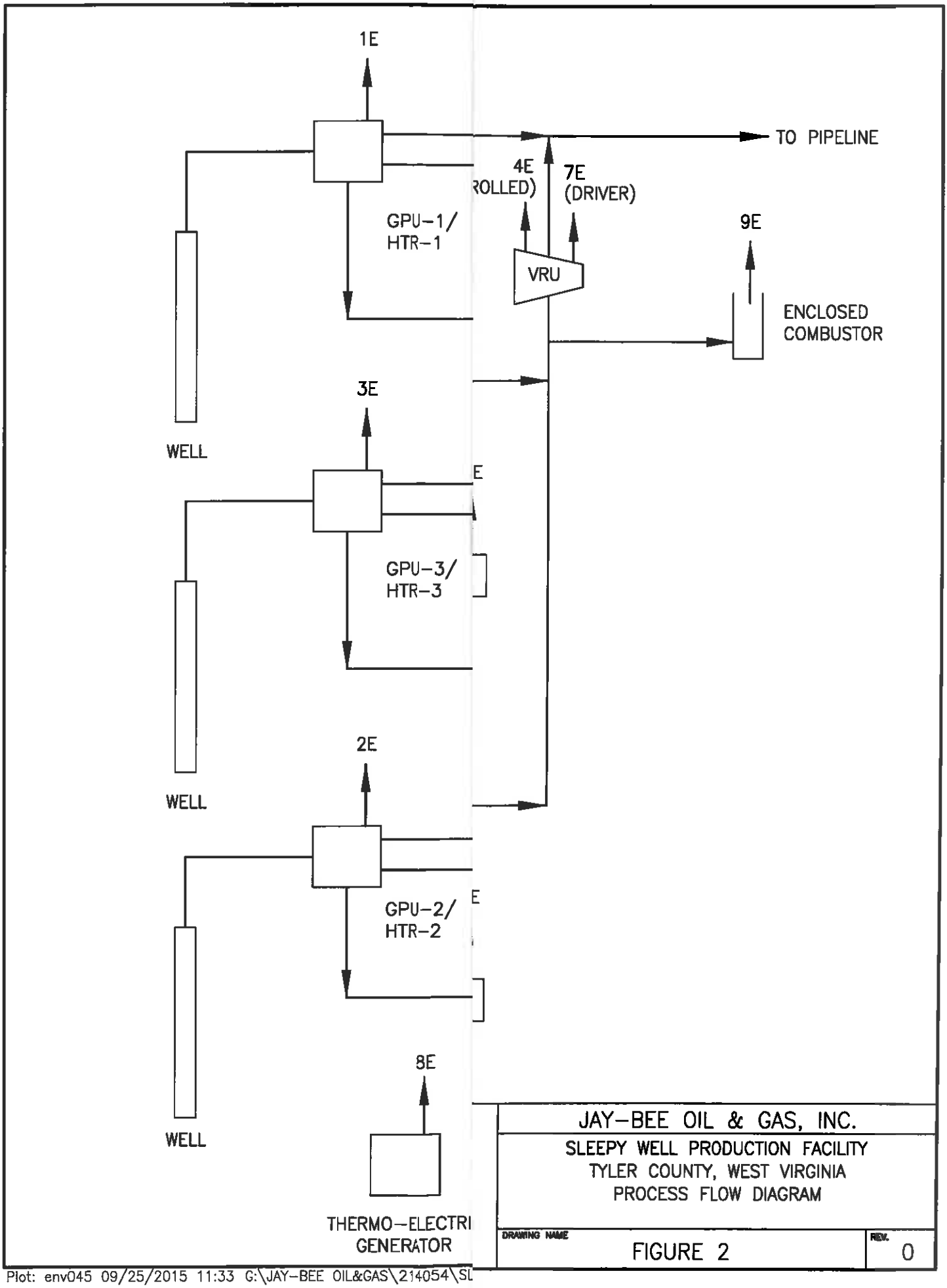
Suction Pressure, psig	1	Suction Temperature, F	80
Discharge Pressure, psig	300	Discharge Temperature, F	130

Cylinders	Bore, in	Stroke, in	Rod Diameter, in	Pocket Clearance, in³	Total Cylinder Volume, in³	Temperature, R	Pressure, psig	Calculated Moles
1st Stage Cylinder	6.50	3.00	1.125	0.00	97	539	100	0.001
2nd Stage Cylinder	2.25	3.00	1.125	0.00	9	739	199	0.000
3rd Stage Cylinder	4.00	3.00	1.125	0.00	35	739	300	0.001
Scrubbers/Suction & Discharge Bottle	**OD, in**	**Height, in**	**Total Scrubber Volume, in³**			**Temperature, R**	**Pressure, psig**	**Calculated Moles**
1st Stage Scrubber	12.00	60.00	6786			539	1	0.011
2nd Stage Scrubber	8.00	48.00	2413			689	100	0.025
3rd Stage Scrubber	8.00	48.00	2413			689	199	0.047
Cooler Section	**No. of Tubes**	**OD, in**	**Length, in**	**Total Tube Volume, in³**		**Temperature, R**	**Pressure, psig**	**Calculated Moles**
1st Stage Cooler Section	33	0.63	96	577		739	100	0.006
2nd Stage Cooler Section	20	0.63	96	589		739	199	0.009
3rd Stage Cooler Section	24	0.63	96	707		739	300	0.016
Piping	**OD, in**	**Length, in**	**Total Piping Volume, in³**			**Temperature, R**	**Pressure, psig**	**Calculated Moles**
1st Stage Piping	4.00	300	2513			739	100	0.021
2nd Stage Piping	3.00	87	403			739	199	0.006
3rd Stage Piping	2.00	330	1037			739	300	0.024
Bypass	0.00	0	0			559	300	0.000

Total Estimated Moles of Gas Discharged to Atmosphere per Blowdown =	0.17
Total Estimated Volume of Blowdown Gas, ft^3 @ STP (68F, 14.7 psia) =	84.4

ATTACHMENT D

Process Flow Diagram



JAY-BEE OIL & GAS, INC.

SLEEPY WELL PRODUCTION FACILITY
TYLER COUNTY, WEST VIRGINIA
PROCESS FLOW DIAGRAM

DRAWING NAME: FIGURE 2

REV. 0

Plot: env045 09/25/2015 11:33 G:\JAY-BEE OIL&GAS\214054\SL

ATTACHMENT E

Plot Plan

JAY–BEE OIL & GAS

SLEEPY WELL PAD
TYLER COUNTY, WEST VIRGINIA
SITE LAYOUT

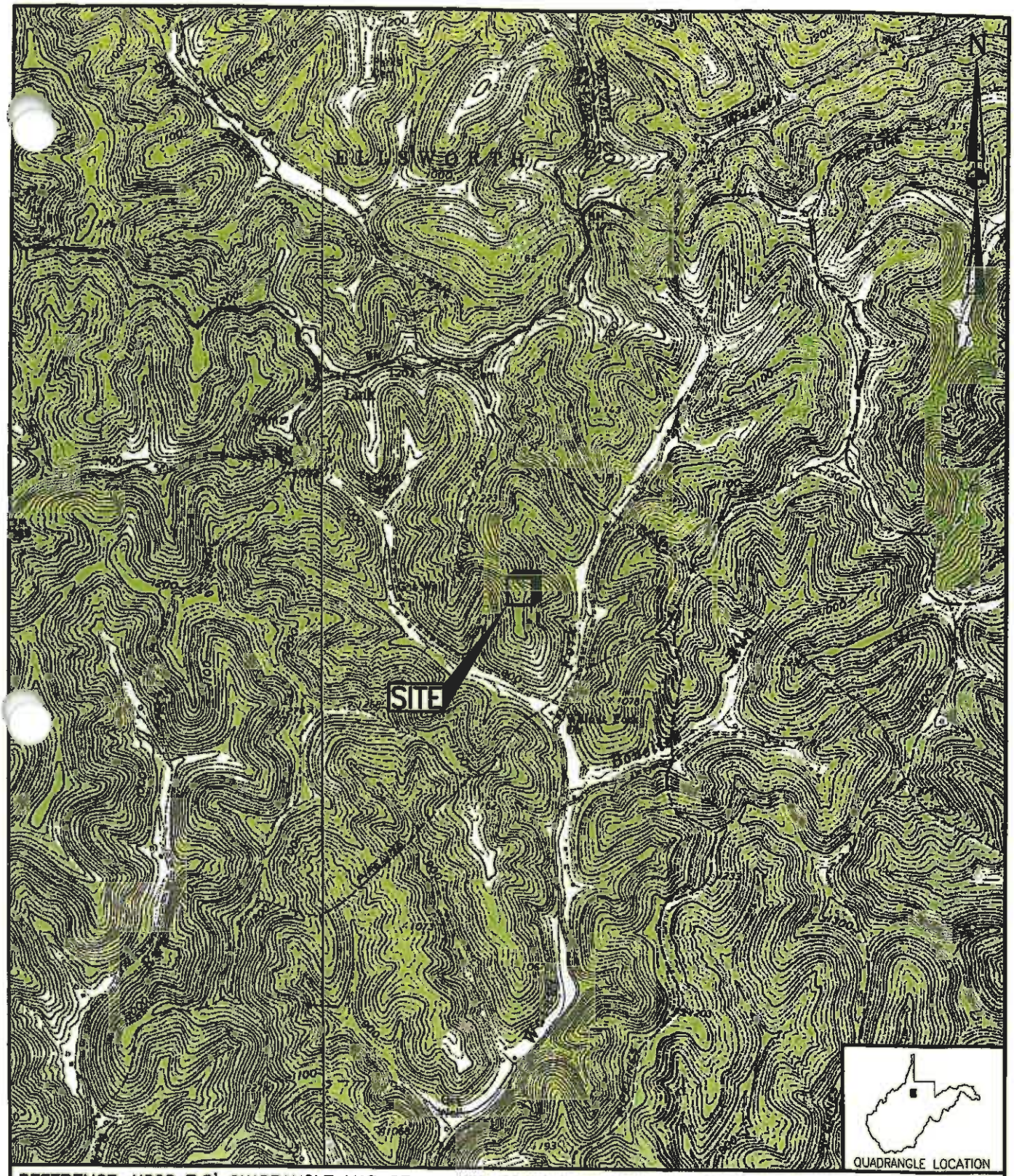
DRAWING NAME: FIGURE 2

REV. 0

Plot: env045 09/29/2015 13:42 G:\JAY–BEE OIL&GAS\214054\SLEE

ATTACHMENT F

Area Map



REFERENCE: USGS 7.5' QUADRANGLE MAP OF: CENTER POINT, WEST VIRGINIA; DATED 1961, PHOTOREVISED 1976.

DRAWN BY	DJF
DATE	11/3/14
CHECKED BY	RAD
JOB NO.	214054-05
DWG FILE	SLEEPYm01.dwg
DRAWING SCALE	1"=2000'

SE TECHNOLOGIES
98 Vanadium Road Bridgeville, PA 15017 (412) 221-1100

JAY-BEE OIL & GAS, INC.

SLEEPY WELL PAD
TYLER COUNTY, WEST VIRGINIA
SITE LOCATION MAP

DRAWING NO. FIGURE 1

REV. 0

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ATTACHMENT G

Equipment Data Sheets and Registration Section Applicability Form

General Permit G70-A Registration
Section Applicability Form

General Permit G70-A was developed to allow qualified applicants to seek registration for a variety of sources. These sources include natural gas well affected facilities, storage tanks, natural gas-fired compressor engines (RICE), natural gas producing units, natural gas-fired in-line heaters, pneumatic controllers, heater treaters, tank truck loading, glycol dehydration units, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

General Permit G70-A allows the registrant to choose which sections of the permit they are seeking registration under. Therefore, please mark which additional sections that you are applying for registration under. If the applicant is seeking registration under multiple sections, please select all that apply. Please keep in mind, that if this registration is approved, the issued registration will state which sections will apply to your affected facility.

Section 5	Natural Gas Well Affected Facility	☒
Section 6	Storage Vessels*	☒
Section 7	Gas Producing Units, In-Line Heaters, Heater Treaters, and Glycol Dehydration Reboilers	☒
Section 8	Pneumatic Controllers Affected Facility(NSPS, Subpart OOOO)	☐
Section 9	*Reserved*	☐
Section 10	Natural gas-fired Compressor Engine(s) (RICE)**	☒
Section 11	Tank Truck Loading Facility ***	☒
Section 12	Standards of Performance for Storage Vessel Affected Facilities (NSPS, Subpart OOOO)	☐
Section 13	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (NSPS, Subpart JJJJ)	☒
Section 14	Control Devices not subject to NSPS, Subpart OOOO	☒
Section 15	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (40CFR63, Subpart ZZZZ)	☐
Section 16	Glycol Dehydration Units	☐
Section 17	Dehydration Units With Exemption from NESHAP Standard, Subpart HH § 63.764(d) (40CFR63, Subpart HH)	☐
Section 18	Dehydration Units Subject to NESHAP Standard, Subpart HH and Not Located Within an UA/UC (40CFR63, Subpart HH)	☐
Section 19	Dehydration Units Subject to NESHAP Standard, Subpart HH and Located Within an UA/UC (40CFR63, Subpart HH)	☐

* *Applicants that are subject to Section 6 may also be subject to Section 12 if the applicant is subject to the NSPS, Subpart OOOO control requirements or the applicable control device requirements of Section 14.*

** *Applicants that are subject to Section 10 may also be subject to the applicable RICE requirements of Section 13 and/or Section 15.*

*** *Applicants that are subject to Section 11 may also be subject to control device requirements of Section 14.*

NATURAL GAS WELL AFFECTED FACILITY DATA SHEET

Complete this data sheet if you are the owner or operator of a gas well affected facility for which construction, modification, or reconstruction commenced after August 23, 2011. This form must be completed for natural gas well affected facilities regardless of when flowback operations occur (or have occurred).

Please provide the API number(s) for each NG well at this facility:	
047-095-02144	
047-095-02145	
047-095-02146	

Note: This is the same API well number(s) provided in the well completion notification and as provided to the WVDEP, Office of Oil and Gas for the well permit. The API number may be provided on the application without the state code (047).

Every oil and gas well permitted in West Virginia since 1929 has been issued an API (American Petroleum Institute) number. This API is used by agencies to identify and track oil and gas wells.

The API number has the following format: 047-001-00001

Where,
047 = State code. The state code for WV is 047.
001 = County Code. County codes are odd numbers, beginning with 001 (Barbour) and continuing to 109 (Wyoming).
00001= Well number. Each well will have a unique well number.

NATURAL GAS FIRED FUEL BURNING UNITS
EMISSION DATA SHEET

Complete the information on this data for each Gas Producing Unit(s), Heater Treater(s), and in-line heater(s) at the production pad. Reboiler information should be entered on the Glycol Dehydration Emission Unit Data Sheet.

Emission Unit ID #[1]	Emission Point ID#[2]	Emission Unit Description (Manufacturer / Model #)	Year Installed/ Modified	Type[3] and Date of Change	Control Device[4]	Design Heat Input (mmBtu/hr)[5]	Fuel Heating Value (Btu/scf)[6]
GPU-1	1E	Gas Processing Unit	2015	NEW	None	1.5 MMBTU/Hr	1263
GPU-2	2E	Gas Processing Unit	2015	NEW	None	1.5 MMBTU/Hr	1263
GPU-3	3E	Gas Processing Unit	2015	NEW	None	1.5 MMBTU/Hr	1263
TEG-1	8E	Thermoelectric Generator	Upon Receipt of Permit	NEW	None	0.013 MMBTU/Hr	1263

1 Enter the appropriate Emission Unit (or Sources) identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For sources, use 1S, 2S, 3S... or other appropriate designation. Enter glycol dehydration unit Reboiler Vent data on the *Glycol Dehydration Unit Data Sheet*.

2 Enter the appropriate Emission Point identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1,
LH-2, etc. For emission points, use 1E, 2E, 3E... or other appropriate designation.

3 New, modification, removal

4 Complete appropriate air pollution control device sheet for any control device.

5 Enter design heat input capacity in mmBtu/hr.

6 Enter the fuel heating value in Btu/standard cubic foot.(HHV)

NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET

Source Identification Number[1]		CE-1					
Engine Manufacturer and Model		Cummins G5.9					
Manufacturer's Rated bhp/rpm		84 @ 1800					
Source Status[2]		NS					
Date Installed/Modified/Removed[3]		Upon Receipt of Permit					
Engine Manufactured/Reconstruction Date[4]		After 3/1/2013					
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart JJJJ? (Yes or No)[5]		No					
Engine, Fuel and Combustion Data	Engine Type[6]	RB4S					
	APCD Type[7]	NSCR					
	Fuel Type[8]	RG					
	H_2S (gr/100 scf)	<1					
	Operating bhp/rpm	84 @ 1800					
	BSFC (Btu/bhp-hr)	7914					
	Fuel throughput (ft^3/hr)	526.4					
	Fuel throughput ($MMft^3$/yr)	4.62					
	Operation (hrs/yr)	8760					
Reference[9]	Potential Emissions[10]	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
AP	NO_X	0.19	0.81				
AP	CO	0.37	1.62				
AP	VOC	0.05	0.21				
AP	SO_2	<0.001	<0.01				
AP	PM_{10}	0.013	0.06				
AP	Formaldehyde	0.017	0.08				
AP	Total HAPs	0.024	0.11				
AP	CO2e	89	391				

1. Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the compressor station. Multiple compressor engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. If more than three (3) engines exist, please use additional sheets.

2. Enter the Source Status using the following codes:

NS	Construction of New Source (installation)	ES	Existing Source
MS	Modification of Existing Source	RS	Removal of Source

3. Enter the date (or anticipated date) of the engine's installation (construction of source), modification or removal.

4. Enter the date that the engine was manufactured, modified or reconstructed.

5. Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart JJJJ. If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance according to 40CFR§60.4243a(2)(i) through (iii), as appropriate.

   Provide a manufacturer's data sheet for all engines being registered.

6. Enter the Engine Type designation(s) using the following codes:

LB2S	Lean Burn Two Stroke	RB4S	Rich Burn Four Stroke
LB4S	Lean Burn Four Stroke		

7. Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:

A/F	Air/Fuel Ratio	IR	Ignition Retard
HEIS	High Energy Ignition System	SIPC	Screw-in Precombustion Chambers
PSC	Prestratified Charge	LEC	Low Emission Combustion
NSCR	Rich Burn & Non-Selective Catalytic Reduction	SCR	Lean Burn & Selective Catalytic Reduction

8. Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas

9. Enter the Potential Emissions Data Reference designation using the following codes. Attach all referenced data to this *Compressor/Generator Data Sheet(s)*.

MD	Manufacturer's Data	AP	AP-42	
GR	GRI-HAPCalc™	OT	Other _____	(please list)

10. Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the *Emissions Summary Sheet*.

Attachment G
EMISSIONS UNIT DATA SHEET
BULK LIQUID TRANSFER OPERATIONS

Furnish the following information for each new or modified bulk liquid transfer area or loading rack, as shown on the *Equipment List Form* and other parts of this application. This form is to be used for bulk liquid transfer operations such as to and from drums, marine vessels, rail tank cars, and tank trucks.

Identification Number (as assigned on *Equipment List Form*):	
1. Loading Area Name: **Tank Un-Loading Area**	
2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply): ☐ Drums ☐ Marine Vessels ☐Rail Tank Cars ☒ Tank Trucks	
3. Loading Rack or Transfer Point Data:	
Number of pumps	1 (on truck)
Number of liquids loaded	2
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1
4. Does ballasting of marine vessels occur at this loading area? ☐ Yes ☐ No ☒ Does not apply	
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: **None**	
6. Are cargo vessels pressure tested for leaks at this or any other location? ☐ Yes ☒ No If YES, describe:	

7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):				
Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	3	3	3	3
days/month	30	30	30	30
days/year	340	340	340	340

8. Bulk Liquid Data *(add pages as necessary)*:							
Pump ID No.		N/A	N/A				
Liquid Name		Condensate	Produced Water				
Max. daily throughput (1000 gal/day)		4.2	7.5				
Max. annual throughput (1000 gal/yr)		1260	2,670				
Loading Method [1]		SUB	SUB				
Max. Fill Rate (gal/min)		30	30				
Average Fill Time (min/loading)		40	40				
Max. Bulk Liquid Temperature (°F)		70	70				
True Vapor Pressure [2]		3.1 psia	N/A				
Cargo Vessel Condition [3]		U	U				
Control Equipment or Method [4]		None	None				
Minimum control efficiency (%)		N/A					
Maximum Emission Rate	Loading (lb/hr)	12.42	N/A				
	Annual (lb/yr)	3727	N/A				
Estimation Method [5]		AP-42	N/A				

[1] BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill

[2] At maximum bulk liquid temperature

[3] B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

[4] List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets*):CA = Carbon Adsorption LOA = Lean Oil AdsorptionCO = Condensation SC = Scrubber (Absorption)CRA = Compressor-Refrigeration-Absorption TO = Thermal Oxidation or Incineration
CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system)
O = other (descibe)

[5] EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance
TM = Test Measurement based upon test data submittal
O = other (describe)

9. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
Truck load-outs per month and volume of liquid removed each load-out	Truck load-outs per month and volume of liquid removed each load-out
REPORTING	**TESTING**
Truck load-outs per month and volume of liquid removed each load-out	None

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY

THE MONITORING.
REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.
TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.
10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty N/A

STORAGE VESSEL EMISSION UNIT DATA SHEET

Provide the following information for each new or modified bulk liquid storage tank.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Sleepy Tank Farm**	2. Tank Name **T01-T03**
3. Emission Unit ID number **N/A Vapors to combustors, emission point 4E**	4. Emission Point ID number **4E**
5. Date Installed or Modified *(for existing tanks)* **Pending Permit Approval**	6. Type of change: ☒ New construction ☐ New stored material ☐ Other
7A. Description of Tank Modification *(if applicable)*	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.) **A maximum of 30,000 BBL per year throughput for Tanks T01 through T03 combined.**	

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons)*. Use the internal cross-sectional area multiplied by internal height. **210 BBL**	
9A. Tank Internal Diameter (ft.) **10**	9B. Tank Internal Height (ft.)**15**
10A. Maximum Liquid Height (ft.)**14**	10B. Average Liquid Height (ft.) **8**
11A. Maximum Vapor Space Height (ft.) **14.5**	11B. Average Vapor Space Height (ft.) 7
12. Nominal Capacity *(specify barrels or gallons)*. This is also known as "working volume. **190 BBL**	
13A. Maximum annual throughput (gal/yr) **420,000 (each)**	13B. Maximum daily throughput (gal/day) **800**
14. Number of tank turnovers per year **48(max)**	15. Maximum tank fill rate (gal/min) **6**
16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading	
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): ☒ Fixed Roof __X_ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe) ☐ External Floating Roof ___ pontoon roof ___ double deck roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof ___ vertical column support ___ self-supporting ☐ Variable Vapor Space ___ lifter roof ___ diaphragm ☐ Pressurized ___ spherical ___ cylindrical ☐ Underground ☐ Other (describe)	

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

☐ Refer to enclosed TANKS Summary Sheets
☒ Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

☒ Refer to enclosed TANKS Summary Sheets
☐ Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

☒ Refer to enclosed TANKS Summary Sheets
☐ Refer to the responses to items 34 – 39 in section VII

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply):

☐ Does Not Apply
☐ Carbon Adsorption[1]
☒ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers)
☐ Condenser[1]
☐ Other[1] (describe)
☐ Rupture Disc (psig)
☐ Inert Gas Blanket of _____
☐ Conservation Vent (psig
Vacuum Setting Pressure Setting
☐ Emergency Relief Valve (psig)

[1] Complete appropriate Air Pollution Control Device Sheet

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name and CAS No.	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method[1]
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
VOCs	132.5	580.3	0.155	0.68	0.539	2.36	133.2	583.3	Flash Measurements
(Un-controlled)									+EPA Tanks For W+B
Tanks T01-T03 Combined									
Emissions									

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

SECTION VII (required if did not provide TANKS Summary Sheets)

TANK CONSTRUCTION AND OPERATION INFORMATION

19. Tank Shell Construction:
☒ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color: **Blue**	20B. Roof Color: **Blue**	20C. Year Last Painted: **2011**

21. Shell Condition (if metal and unlined):
☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ Yes ☒ No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?

23. Operating Pressure Range (psig): **Less than 0.3 psig**

24. Is the tank a **Vertical Fixed Roof Tank**? ☒ Yes ☐ No	24A. If yes, for dome roof provide radius (ft): **N/A**	24B. If yes, for cone roof, provide slop (ft/ft) **N/A**

25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☒

25A. Year Internal Floaters Installed:

25B. Primary Seal Type *(check one)*: ☐ Metallic (mechanical) shoe seal ☐ Liquid mounted resilient seal ☐ Vapor mounted resilient seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a secondary seal? ☐ Yes ☐ No

25D. If yes, how is the secondary seal mounted? *(check one)* ☐ Shoe ☐ Rim ☐ Other (describe):			
25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No			
25F. Describe deck fittings:			
26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply			
26A. Deck Type: ☐ Bolted ☐ Welded		26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction: ☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based:			
28. Daily Avg. Ambient Temperature (°F):		29. Annual Avg. Maximum Temperature (°F):	
30. Annual Avg. Minimum Temperature (°F):		31. Avg. Wind Speed (mph):	
32. Annual Avg. Solar Insulation Factor (BTU/ft^2-day):		33. Atmospheric Pressure (psia):	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): **60**	34A. Minimum (°F): **50**	34B. Maximum (°F): **70**	
35. Avg. operating pressure range of tank (psig): **0-0.3 psig**	35A. Minimum (psig): **0 psig**	35B. Maximum (psig): **0.3 psig**	
36A. Minimum liquid surface temperature (°F):		36B. Corresponding vapor pressure (psia):	
37A. Avg. liquid surface temperature (°F):		37B. Corresponding vapor pressure (psia):	
38A. Maximum liquid surface temperature (°F):		38B. Corresponding vapor pressure (psia):	
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	**Condensate**		
39B. CAS number:	N/A		
39C. Liquid density (lb/gal):	**6.20**		
39D. Liquid molecular weight (lb/lb-mole):	**81.3**		
39E. Vapor molecular weight (lb/lb-mole):	**39.56**		
39F. Maximum true vapor pressure (psia):			
39G. Maxim Reid vapor pressure (psia):	**5.28**		
39H. Months Storage per year. From: To:	**Continuous**		

STORAGE VESSEL EMISSION UNIT DATA SHEET

Provide the following information for each new or modified bulk liquid storage tank.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Sleepy Tank Farm**	2. Tank Name **T04-T06**
3. Emission Unit ID number **N/A Vapors to combustors, emission point 4E**	4. Emission Point ID number **4E**
5. Date Installed or Modified *(for existing tanks)* **Pending Permit Approval**	6. Type of change: ☐ New construction ☐ New stored material ☒ Other
7A. Description of Tank Modification *(if applicable)*	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.) **A maximum of 63,600 BBL per year throughput for Tanks T04 through T06 combined.**	

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons)*. Use the internal cross-sectional area multiplied by internal height. **210 BBL**	
9A. Tank Internal Diameter (ft.) **10**	9B. Tank Internal Height (ft.)**15**
10A. Maximum Liquid Height (ft.)**14**	10B. Average Liquid Height (ft.) **8**
11A. Maximum Vapor Space Height (ft.) **14.5**	11B. Average Vapor Space Height (ft.) **7**
12. Nominal Capacity *(specify barrels or gallons)*. This is also known as "working volume. **190 BBL**	
13A. Maximum annual throughput (gal/yr) **890,400 (each)**	13B. Maximum daily throughput (gal/day) **5,000 (each)**
14. Number of tank turnovers per year **112 (max)**	15. Maximum tank fill rate (gal/min) **6**
16. Tank fill method ☐ Submerged ☐ Splash	☒ Bottom Loading
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): ☒ Fixed Roof __X_ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe) ☐ External Floating Roof ___ pontoon roof ___ double deck roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof ___ vertical column support ___ self-supporting ☐ Variable Vapor Space ___ lifter roof ___ diaphragm ☐ Pressurized ___ spherical ___ cylindrical ☐ Underground ☐ Other (describe)	

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

☐ Refer to enclosed TANKS Summary Sheets
☒ Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

☒ Refer to enclosed TANKS Summary Sheets
☐ Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

☐ Refer to enclosed TANKS Summary Sheets
☒ Refer to the responses to items 34 – 39 in section VII

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply):

☐ Does Not Apply
☐ Carbon Adsorption[1]
☒ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers)
☐ Condenser[1]
☐ Other[1] (describe)
☐ Rupture Disc (psig)
☐ Inert Gas Blanket of _____
☐ Conservation Vent (psig
Vacuum Setting Pressure Setting
☐ Emergency Relief Valve (psig)

[1] Complete appropriate Air Pollution Control Device Sheet

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name and CAS No.	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method[1]
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
VOCs	1.67	7.3							W&B losses from
(Un-controlled)									Water tanks is
									negligible.
Tanks T04-T06 Combined									Tanks Emissions
Emissions									Controlled 98%

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

SECTION VII (required if did not provide TANKS Summary Sheets)

TANK CONSTRUCTION AND OPERATION INFORMATION

19. Tank Shell Construction:
☒ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color: **Blue**	20B. Roof Color: **Blue**	20C. Year Last Painted: **2011**

21. Shell Condition (if metal and unlined):
☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ Yes ☒ No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?

23. Operating Pressure Range (psig): **Less than 0.3 psig**

24. Is the tank a **Vertical Fixed Roof Tank**? ☒ Yes ☐ No	24A. If yes, for dome roof provide radius (ft): **N/A**	24B. If yes, for cone roof, provide slop (ft/ft) **N/A**

25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☒

25A. Year Internal Floaters Installed:

25B. Primary Seal Type *(check one)*: ☐ Metallic (mechanical) shoe seal ☐ Liquid mounted resilient seal ☐ Vapor mounted resilient seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a secondary seal? ☐ Yes ☐ No

25D. If yes, how is the secondary seal mounted? *(check one)* ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No			
25F. Describe deck fittings:			
26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply			
26A. Deck Type: ☐ Bolted ☐ Welded		26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction: ☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based:			
28. Daily Avg. Ambient Temperature (°F):		29. Annual Avg. Maximum Temperature (°F):	
30. Annual Avg. Minimum Temperature (°F):		31. Avg. Wind Speed (mph):	
32. Annual Avg. Solar Insulation Factor (BTU/ft^2-day):		33. Atmospheric Pressure (psia):	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): **60**	34A. Minimum (°F): **50**	34B. Maximum (°F): **70**	
35. Avg. operating pressure range of tank (psig): **0-0.3 psig**	35A. Minimum (psig): **0 psig**	35B. Maximum (psig): **0.3 psig**	
36A. Minimum liquid surface temperature (°F):		36B. Corresponding vapor pressure (psia):	
37A. Avg. liquid surface temperature (°F):		37B. Corresponding vapor pressure (psia):	
38A. Maximum liquid surface temperature (°F):		38B. Corresponding vapor pressure (psia):	
39 Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	**Produced Water**		
39B. CAS number:	N/A		
39C. Liquid density (lb/gal):	**8.347**		
39D. Liquid molecular weight (lb/lb-mole):	**18.04**		
39E. Vapor molecular weight (lb/lb-mole):	**30.68**		
39F. Maximum true vapor pressure (psia):			
39G. Maxim Reid vapor pressure (psia):			
39H. Months Storage per year. From: To:	**Continuous**		

ATTACHMENT H

Air Pollution Control Device Sheets

USA COMPRESSION

USA Compression Partners, LLC

Date: May 27, 2014
Unit #: 6041
Customer: To Be Determined

To:

Lease Location: To Be Determined

Please find the below information for the USA Compression unit number listed above:

Package Information	
Compressor Manufacturer:	Arrow
Compressor Model:	VRC2
Compressor Serial Number:	12095
Compressor Cylinders:	6.5" x 4.0" x 2.25"
Driver Manufacturer:	Cummins
Driver Model:	G5.9
Rated HP & Speed	84 HP @ 1800 RPM
Driver Type:	4-stroke Rich Burn
Engine Serial Number:	73364060
Engine Manufacturing Date:	3/19/2012
Engine Catalyst Model:	VXC-1408-04-HSG
Engine Catalyst Element:	VX-RE-08XC
Engine AFR Model:	AFR-1RD-10-TK2
Engine Stack Height:	9' 5"
Engine Stack Diameter:	4"
Operating Information	
Suction Pressure:	N/A psig
Discharge Pressure:	N/A psig
Design Capacity:	N/A MSCFD
Gas Specific Gravity:	N/A

Emission Output information included in the attached catalyst specification sheet.

MIRATECH

CONFIDENTIAL

MIRATECH Emissions Control Equipment Specification Summary

Proposal Number: TJ-14-0081 Rev(1)

Engine Data

Number of Engines:	1
Application:	Gas Compression
Engine Manufacturer:	Cummins
Model Number:	G 5.9
Power Output:	84 bhp
Lubrication Oil:	0.6 wt% sulfated ash or less
Type of Fuel:	Natural Gas
Exhaust Flow Rate:	430 acfm (cfm)
Exhaust Temperature:	1,078°F

System Details

Housing Model Number:	VXC-1408-04-HSG
Element Model Number:	VX-RE-08XC
Number of Catalyst Layers:	1
Number of Spare Catalyst Layers:	1
System Pressure Loss:	3.0 inches of WC (Fresh)
Sound Attenuation:	28-32 dBA insertion loss
Exhaust Temperature Limits:	750 – 1250°F (catalyst inlet); 1350°F (catalyst outlet)

NSCR Housing & Catalyst Details

Model Number:	VXC-1408-04-XC1
Material:	Carbon Steel
Approximate Diameter:	14 inches
Inlet Pipe Size & Connection:	4 inch FF Flange, 150# ANSI standard bolt pattern
Outlet Pipe Size & Connection:	4 inch FF Flange, 150# ANSI standard bolt pattern
Shell Length:	53 inches
Weight Without Catalyst:	152 lbs
Weight Including Catalyst:	162 lbs
Instrumentation Ports:	1 inlet/1 outlet (1/2" NPT)

Emission Requirements

Exhaust Gases	Engine Outputs (g/ bhp-hr)	Reduction (%)	Warranted Converter Outputs (g/ bhp-hr)	Requested Emissions Targets
NOx	11.41	91%	1.00	1.00 g/bhp-hr
CO	14.64	86%	2.00	2.00 g/bhp-hr
NMNEHC	0.22	0%	0.70	0.70 g/bhp-hr
CH_2O	0.08	0%	1.00	1.00 g/bhp-hr
Oxygen	0.5%			

MIRATECH warrants the performance of the converter, as stated above, per the MIRATECH General Terms and Conditions of Sale.

Engine Performance Data

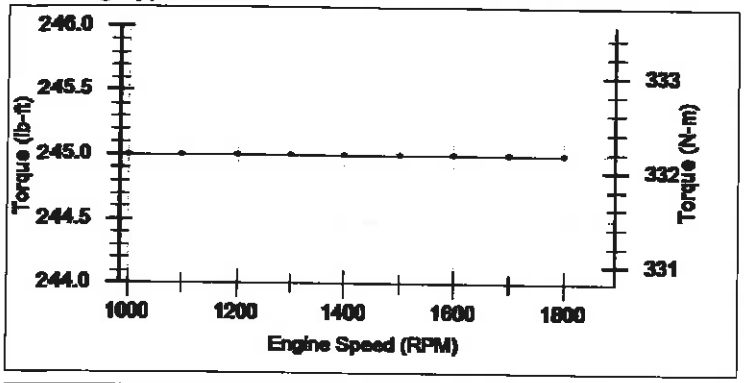
Cummins Inc
Columbus, Indiana 47202-3005
http://www.cummins.com

Industrial	84 BHP (63 kW) @ 1800 RPM 245 lb-ft (332 N-m) @ 1800 RPM		
G5.9	Configuration	CPL Code	Revision
FR 9961	**D491010CX02**	**8655**	**12-May-2011**

Compression Ratio:	**10.5:1**	Displacement:	**359 In3 (5.9 L)**
Fuel System:	**Field Gas, Dry Processed Nat Gas**	Aspiration:	**Naturally Aspirated**
Emission Certification:	**Non-certified**		

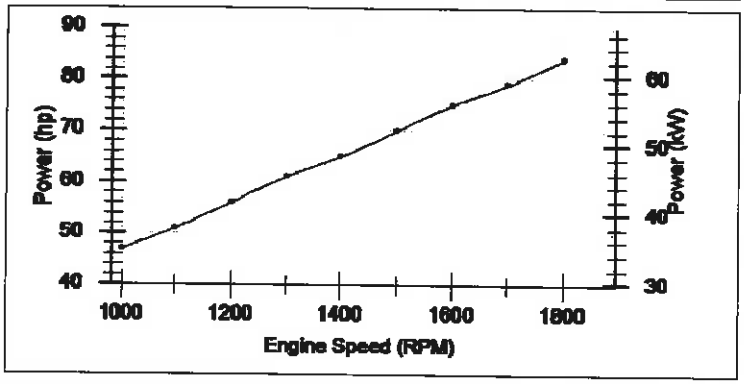
All data is based on the engine operating with fuel system, water pump, and 7 in H2O (1.74 kPa) inlet air restriction with 3.5 in (89 mm) inner diameter, and with 1 in Hg (3 kPa) exhaust restriction with 3 in (76 mm) inner diameter; not included are alternator, fan, optional equipment and driven components. Coolant flows and heat rejection data based on coolants as 50% ethylene glycol/50% water. All data is subject to change without notice.

Rating Type: Continuous/WMR



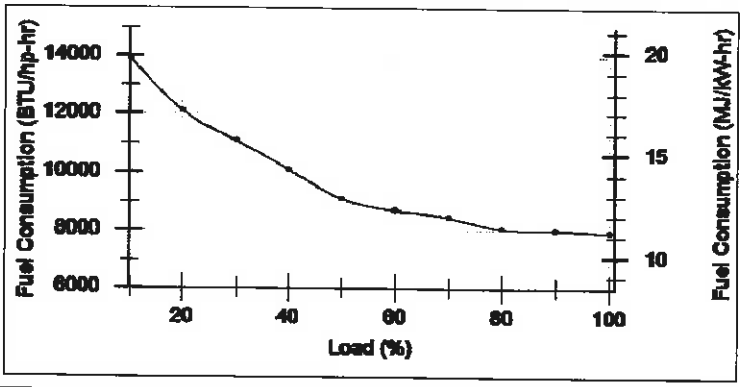
Torque Output

RPM	lb-ft	N-m
1,000	245	332
1,100	245	332
1,200	245	332
1,300	245	332
1,400	245	332
1,500	245	332
1,600	245	332
1,700	245	332
1,800	245	332



Power Output

RPM	hp	kW
1,000	47	35
1,100	51	38
1,200	56	42
1,300	61	45
1,400	65	48
1,500	70	52
1,600	75	56
1,700	79	59
1,800	84	63



Fuel Consumption @ 1,800 RPM

hp	kW	% Load	BTU/hp-hr	MJ/kW-hr
84	63	100	7,914	11.2
76	57	90	7,987	11.3
67	50	80	8,056	11.4
59	44	70	8,452	11.96
50	37	60	8,689	12.29
42	31	50	9,094	12.87
34	25	40	10,083	14.27
25	19	30	11,069	15.66
17	13	20	12,116	17.14
8	6	10	13,889	19.65

Data represents gross engine capabilities obtained and corrected in accordance with SAE J1995 using dry processed natural gas fuel with 905 BTU per standard cubic foot lower heating value. Deration may be required due to altitude, temperature and type of fuel. Consult Cummins Customer Engineering for operation above this altitude.

STATUS FOR CURVES AND DATA: Limited-(measured data)
TOLERANCE: Within +/- 5 %

CHIEF ENGINEER:
Alfred S Weber

Bold entries revised after 1-Mar-2010

Intake Air System

Maximum allowable air temperature rise over ambient at Intake Manifold (Naturally Aspirated Engines) or Turbo Compressor inlet (Turbo-charged Engines): (This parameter impacts emissions, LAT and/or altitude capability)	15 delta deg F	8.3 delta deg C

Cooling System

Maximum coolant temperature for engine protection controls	215 deg F	102 deg C
Maximum coolant operating temperature at engine outlet (max. top tank temp):	212 deg F	100 deg C

Exhaust System

Maximum exhaust back pressure:	2 in-Hg	7 kPa
Recommended exhaust piping size (inner diameter):	3 in	76 mm

Lubrication System

Nominal operating oil pressure		
@ minimum low idle	10 psi	69 kPa
@ maximum rated speed	50 psi	345 kPa
Minimum engine oil pressure for engine protection devices		
@ minimum low idle	10 psi	69 kPa

Fuel System

Maximum fuel inlet pressure:	1 psi	5 kPa

Performance Data

Engine low idle speed:	900 RPM	
Maximum low idle speed:	1,800 RPM	
Minimum low idle speed:	800 RPM	
Engine high idle speed	1,800 RPM	
Governor break speed:		
Maximum torque available at closed throttle low idle speed:	50 lb-ft	68 N-m

	100% Load		75% Load		50% Load	
Engine Speed	1,800 RPM		1,800 RPM		1,800 RPM	
Output Power	84 hp	63 kW	63 hp	47 kW	42 hp	31 kW
Torque	245 lb-ft	332 N-m	184 lb-ft	249 N-m	123 lb-ft	167 N-m
Intake Manifold Pressure	-1 in-Hg	-3 kPa	-5 in-Hg	-17 kPa	-9 in-Hg	-30 kPa
Inlet Air Flow	121 ft3/min	57 L/s	101 ft3/min	48 L/s	82 ft3/min	39 L/s
Exhaust Gas Flow	430 ft3/min	203 L/s	360 ft3/min	170 L/s	292 ft3/min	138 L/s
Exhaust Gas Temperature	1,078 deg F	581 deg C	999 deg F	537 deg C	902 deg F	483 deg C
Heat Rejection to Coolant	3,824 BTU/min	67 kW	3,244 BTU/min	57 kW	2,596 BTU/min	46 kW
Heat Rejection to Ambient	1,194 BTU/min	21 kW	784 BTU/min	14 kW	613 BTU/min	11 kW
Heat Rejection to Exhaust	2,523 BTU/min	44 kW	1,916 BTU/min	34 kW	1,371 BTU/min	24 kW
Fuel Consumption	7,914 BTU/hp-hr	11 MJ/kW-hr	8,214 BTU/hp-hr	12 MJ/kW-hr	9,094 BTU/hp-hr	13 MJ/kW-hr
Air Fuel Ratio (dry)	16.52 vol/vol		16.51 vol/vol		16.52 vol/vol	
Ignition timing (BTDC)	26 deg	26 deg	26 deg	26 deg	26 deg	26 deg
Total Hydrocarbons	1.48 g/hp-hr		1.3 g/hp-hr		1.62 g/hp-hr	
VOC ppm w/o Catalyst						
VOC ppm with Catalyst						
NOx	11.41 g/hp-hr	15.3 g/kW-hr	13.7 g/hp-hr	18.37 g/kW-hr	12.85 g/hp-hr	17.23 g/kW-hr
NOx ppm w/o Catalyst						
NOx ppm with Catalyst						
CO	14.64 g/hp-hr	19.63 g/kW-hr	0.82 g/hp-hr	1.1 g/kW-hr	1.38 g/hp-hr	1.85 g/kW-hr
CO ppm w/o Catalyst						
CO ppm with Catalyst						
CO2	449 g/hp-hr	602 g/kW-hr	489 g/hp-hr	656 g/kW-hr	540 g/hp-hr	724 g/kW-hr
O2	0.45 %		1.66 %		3.67 %	

Bold entries revised after 1-Mar-2010

Cranking System (Cold Starting Capability)

Unaided Cold Start:	
Minimum cranking speed	250 RPM
Cold starting aids available	Block Heater, Oil Pan Heater
Maximum parasitic load at 10 deg F @	

Noise Emissions

Top	89.9 dBa
Right Side	90.1 dBa
Left Side	89.8 dBa
Front	90.5 dBa
Exhaust noise emissions	103.1 dBa

Estimated Free Field Sound Pressure Level at 3.28ft (1m) and Full-Load Governed Speed
(Excludes Noise from Intake, Exhaust, Cooling System and Driven Components)

Aftercooler Heat Rejection - Heat Load on Aftercooler
BTU/min (kW)

Altitude ft (m)	Ambient Temp deg F (deg C) 120 (49)	110 (43)	100 (38)	90 (32)	80 (27)	70 (21)
0 (0)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)
1000 (305)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)
2000 (610)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)
3000 (914)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)
4000 (1219)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)
5000 (1524)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)
6000 (1829)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)
7000 (2134)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)
8000 (2438)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)
9000 (2743)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)
10000 (3048)	(.0)	(.0)	(.0)	(.0)	(.0)	(.0)

End of Report

Bold entries revised after 1-Mar-2010

Gas/Site Analysis & Engine Selection/Derate

Cummins Stationary Natural Gas Engines

Date: 4/10/2014

Industrial	NG
G5.9	84 HP (63 kW) @1800 RPM & 10.5:1 Compression Ratio
Available FR Number(s) From Selection: FR9936, FR9961	Catalyst Fuel Rating Industrial Continuous

Engine (as entered by user)		
Application:	Industrial	
Fuel Type:	NG	
Engine:	G5.9	
Fuel Rating:	Catalyst	
Compression Ratio:	10.5:1	
RPM:	1800	
HP (Natural Gas):	84 HP (63 kW)	
HP (Propane):	NA HP (NA kW)	
Site (as entered by user)		
Ambient Air Temperature:	90° F	
Relative Humidity:	30%	
Altitude:	1200 ft	
Cooling Fan Load:	8 HP	
Generator Efficiency:	93%	
Vapor Pressure (Calculated from Site Conditions Entered):	0.427 inHg	
Dew Point (Calculated from Site Conditions Entered):	54.4° F	
Dry Barometer (Calculated from Site Conditions Entered):	28.22 inHg	
Derate (Natural Gas)		
Advertised NG Rating:	84 HP (63 kW)	
Engine Derate Due to Site Altitude and Temperature:	2%	
Engine Derate Due to Gas Composition:		
Derate Due to Low BTU Fuel:	0%	⚠ The sample percentage for "Name Sample" is 99.991%. Results are based on the input sample normalized to 100%.
Derate Due to Methane Number:	0%	
Total Power Available (%) After All Applicable Derates:	98% of rated	
Total Site Derate due to Altitude, Temperature, and Gas Composition:	2 HP (1 kW)	
Total Available Horsepower from Selected Engine Running on Specified Fuel Composition at Specified Site (includes 8 HP reduction for for cooling fan load):	74 HP (55 kW)	
Derate (Propane)		
Advertised Propane Rating:	NA HP (NA kW)	
Engine Derate Due to Site Altitude and Temperature:	NA%	
Total Power Available (%) After All Applicable Derates:	NA% of rated	
Total Site Derate due to Altitude and Temperature:	NA HP (NA kW)	
Total Available Horsepower from Selected Engine Running on Propane at Specified Site (includes 8 HP reduction for for cooling fan load):	NA HP (NA kW)	

Intake Manifold Requirements for Turbocharged Engines

Maximum Allowed Intake Manifold Temperature for Selected Engine is na °F with a Maximum Aftercooler Water Inlet (CAC air inlet) of na °F based on FR9936

Factory Set Points	Factory Supplied	Recommended
Engine Speed Target:	1800 rpm	
Spark Plug Gap:	0.020 in	⚠ NOTICE: A Change to Ignition Timing is Recommended Due to Methane Number of Fuel
Excess Oxygen Target-PV:	na %O2	
Propane Engine Timing Target:	na °BTDC	
Propane Gas over air Press at Carb Low:	na inH2O	
Propane Gas Press at Sec Reg Target:	na inH2O	
Excess Oxygen Target-NG:	0.45% O_2	
Natural Gas Engine Timing Target:	Factory: 28 °BTDC	Recommended Timing: 25 ° BTDC
Natural Gas over air Press at Carb Target:	5 inH2O	
Natural Gas Press at Sec Reg Target:	15 inH2O	

FR9936 Created/Revised On: 4/30/2013. Data Files Updated On: 12/12/2013

Gas Sample Analysis			
			The sample percentage for "Name Sample" is 99.991%. Results are based on the input sample normalized to 100%.
Sample Name: Name Sample			
Gas Compound:		Volume Fraction % (User Input)	Mass Fraction % (Calculated)
Methane:		77.09	59.36
Ethane:		14.83	21.41
Propane:		4.97	10.51
i-Butane:		0.62	1.72
n-Butane:		1.21	3.38
i-Pentane:		0.27	0.92
n-Pentane:		0.26	0.91
n-Hexane:		0.15	0.62
n-Heptane:		0.04	0.2
n-Octane:		0.02	0.09
n-Nonane:		0	0
n-Decane:		0	0.02
Hydrogen:		0	0
Hydrogen Sulfide (H_2S):		0 ppm	0 ppm
Carbon Dioxide:		0.15	0.32
Carbon Monoxide:		0	0
Nitrogen:		0.39	0.53
Oxygen:		0	0
Total Percent: (Sample Input Percentage: 99.991%)		Normalized Percentage: 100%	
Performance Parameters:		Standard Units	Metric Units
Lower Heating Value (LHV): Standard Conditions (60F/14.696psia)	by volume	1140.6 Btu/scf	42.5 MJ/scm
	by mass	20776 Btu/lbm	48.326 MJ/kg
Higher Heating Value (HHV): Standard Conditions (60F/14.696psia)	by volume	1257.5 Btu/scf	46.85 MJ/scm
	by mass	22906 Btu/lbm	53.280 MJ/kg
Methane Number:		56.1	56.1
Specific Gravity (SG):		0.7193	0.7193
Wobbe Index :	LHV/√ SG	1345 Btu/scf	50.11 MJ/scm
	HV/√ SG	1483 Btu/scf	55.24 MJ/scm
Molecular Weight:		20.83 g/mol	20.83 g/mol
Specific Heat (Cp):		0.473 BTU/lbm-R	1.979 kJ/kg-K
Specific Heat Ratio (Cp/Cv):		1.253	1.253
Ideal Gas Density:		0.0549 lbm/ft3	0.8788 kg/m3 std
H/C Ratio:		3.492	3.492
Gas Constant (R_{GAS}):		95.3 BTU/lbm-°R	399.1 kJ/kg-°K
Stoich Air Fuel Ratio (Dry):		16.54	16.54
Fuel Flow Data			
BTU/HP-HR:		7914	
Maximum Fuel Flow (SCFH):		583	
Maximum Fuel Flow Calculation is Based on 100% Continuous Rating of 84 HP at 1800 RPM and 10.5:1 Compression Ratio from FR9936			
Gas Regulator Details			
The Industrial G5.9 uses a Maxitrol Regulator			Notes:

FR Differences for Selected Engine

Description of FR Differences for Selected Engine

	FR9936	FR9961
Exhaust Manifold	Dry	Wet
Exhaust Stack Temp High	1300	1220

Gas Analysis Tool
References & Standards

Date: 4/10/2014

Tool Revision Date: 3/27/2014

Performance Parameters:		Reference Standard or Document	
		Standard Units	Metric Units
Lower Heating Value (LHV): Standard Conditions	by volume	ASTM D 3588-91 @ 60F/14.696psia	ASTM D 3588-91 @ 15.5C/101.3kPa
	by mass	ASTM D 3588-91 @ 60F/14.696psia	ASTM D 3588-91 @ 15.5C/101.3kPa
Lower Heating Value (LHV): Normal Conditions	by volume	ASTM D 3588-91 @ 32F/14.696psia	ASTM D 3588-91 @ 0C/101.3kPa
Higher Heating Value (HHV): Standard Conditions	by volume	ASTM D 3588-91 @ 60F/14.696psia	ASTM D 3588-91 @ 15.5C/101.3kPa
	by mass	ASTM D 3588-91 @ 60F/14.696psia	ASTM D 3588-91 @ 15.5C/101.3kPa
Higher Heating Value (HHV): Normal Conditions	by volume	ASTM D 3588-91 @ 32F/14.696psia	ASTM D 3588-91 @ 0C/101.3kPa
Methane Number:		Cummins Methane Number	Cummins Methane Number
Specific Gravity (SG) (Ideal Rel. Density):		–	–
Wobbe Index :	LHV/√ SG	Ideal gas @ 60F/14.696psia	Ideal gas @ 15.5C/101.3kPa
	HV/√ SG	Ideal gas @ 60F/14.696psia	Ideal gas @ 15.5C/101.3kPa
Molecular Weight:		–	–
Specific Heat (Cp):		@ 60F/14.696psia	@ 15.5C/101.3kPa
Specific Heat Ratio (Cp/Cv):		@ 60F/14.696psia	@ 15.5C/101.3kPa
Ideal Gas Density:		ASTM D 3588-91 @ 60F/14.696psia	ASTM D 3588-91 @ 15.5C/101.3kPa
H/C Ratio:		–	–
Gas Constant (R_{GAS}):		@ 60F/14.696psia	@ 15.5C/101.3kPa
Stoich Air Fuel Ratio (Dry):		–	–

Conversion Factors			
		Standard Units	Metric Units

Notes

Model 5120 Thermoelectric Generators

Global Thermoelectric's Model 5120 Thermoelectric Generator contains no moving parts. It is a reliable, low maintenance source of DC electrical power for any application where regular utilities are unavailable or unreliable.

Power Specifiations

Power Rating at 20°C
120 Watts at 6.7 Volts
108 Watts at 12 Volts
108 Watts at 24 Volts
108 Watts at 48 Volts

Electrical

Adjustment:	6.7V	up to 11 Volts
	12 V	12 -18 Volts
	24 V	24 - 30 Volts
	48 V	48 - 60 Volts

Reverse current protection included.

Output: Terminal block which accepts up to 8 AWG wire. Opening for 3/4" conduit in the base of the cabinet.

Fuel

Natural Gas:	8.8 m^3/day (311 ft^3/day) of Std. 1000 BTU/SCF (37.7 MJ/SM^3) gas
Propane:	11.4 l/day (3.0 US gal/day)
Max. Supply Pressure:	1724 kPa (250 psi)
Min. Supply Pressure:	103 kPa (15 psi)
Fuel Connection:	1/4" MNPT

Environmental

Ambient Operation Temperature: Max. 55°C (130°F) Min. -55°C (-67°F)
Operating Conditions: Unsheltered operation

Materials of Construction

Cabinet:	304 SS
Cooling Type:	Natural Convection
Thermopile:	Hermetically Sealed Lead Tin-Telluride (PbSnTe)
Burner:	Meeker Type/Inconel 600
Fuel System:	Brass, Aluminum & SS

Standard Features

- Automatic Spark Ignition (SI)
- Fuel Filter
- Low Voltage Alarm Contacts (VSR)
- Volt & Amp Meter

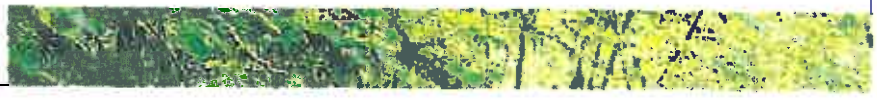
Optional Features

- Cathodic Protection Interface
- Pole Mount or bench stand
- Automatic Fuel Shut-off (SO)
- Corrosive Environmental Fuel System
- Flame Arrestor

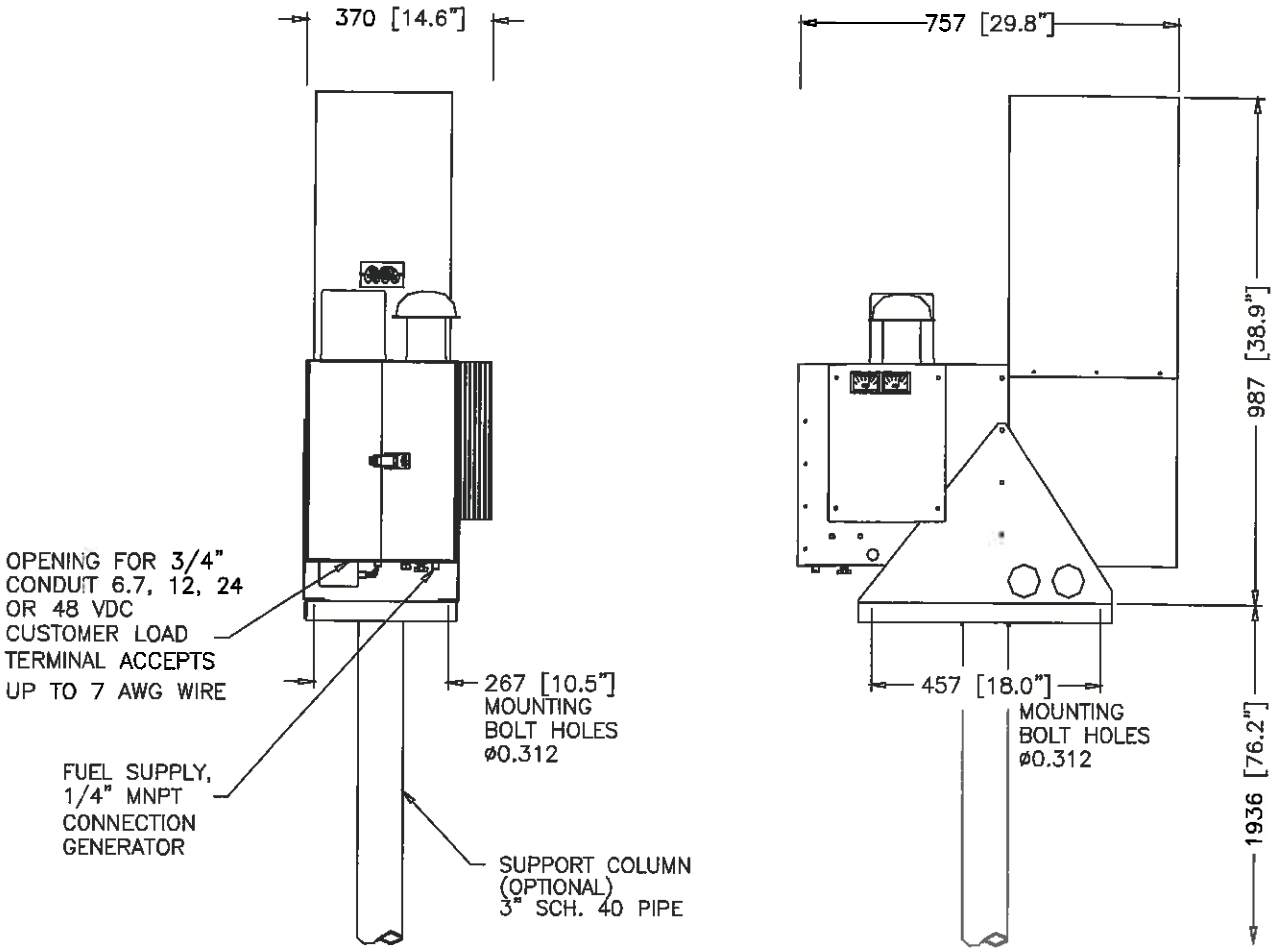
Note: Specifications shown are for standard configurations. Global Thermoelectric's Applications Engineering Department is available to design custom voltages, fuel supply systems and non-standard operating temperatures.

Global Thermoelectric

Power where you need it.



Typical Installation



NOTES:
1. GENERATOR WEIGHT: 60 kg [132 lb].
2. DIMENSIONS IN mm [INCHES].

Global Thermoelectric

Power where you need it.

Corporate Office
#9, 3700 - 78 Avenue SE
Calgary, Alberta T2C 2L8
CANADA
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HY-BON/EDI
Vent Gas Management

2404 Commerce Dr.
Midland, TX 79703
432-697-2292
hy-bon.com

100 Ayers Blvd.
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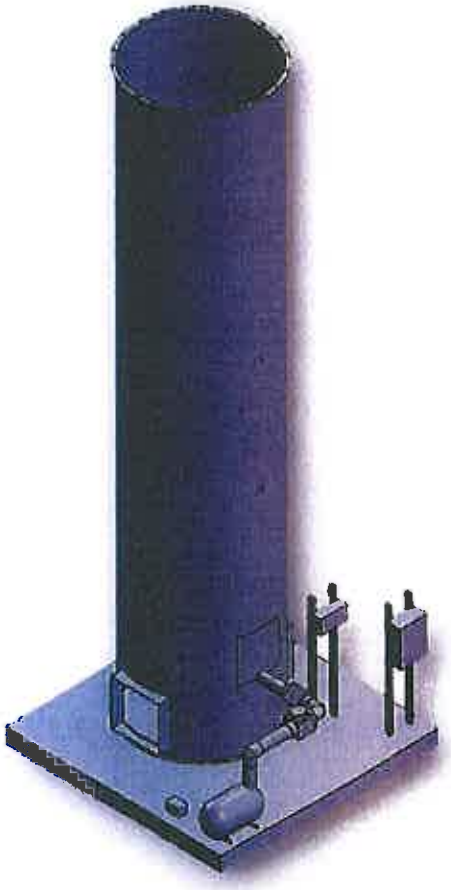
With the fairly recent publication of the NSPS OOOO emission standard, all storage tank facilities constructed on or after August 23, 2011 will be allowed to emit 6 Tons or less of VOC's per year. This regulation not only forces companies to monitor and control their emissions, but it also forces the *means* of emission monitoring and controlling to be more reliable and exact. In response to such a stringent protocol, HY-BON Engineering Company is pleased to offer the **CH10.0** enclosed Vapor Combustor Unit (VCU). Built upon a foundation of 60+ years' experience with tank vapors, the VCU is the solution for reducing residual tank vapor emissions when a Vapor Recovery Unit (VRU) is not sufficient or a viable option.



GENERAL PROPERTIES	
TYPE	Enclosed Tank Battery Flare
AMBIENT TEMPERATURE	-20 °F to +100 °F
PILOT FUEL REQUIREMENTS	Propane or Site Gas @5psi of natural gas = 13.3 SCFM @5 psi of propane = 12.5 SCFM
BURNER SIZE	10.0 million BTU/hr
INLET PRESSURE REQUIRMENTS	Minimum 0.5 oz/in^2 (~1.0 inches w.c.)
TURN DOWN RATIO	5:1
DESTRUCTION EFFICIENCY	99.99% DRE
MECHANICAL PROPERTIES	
DESIGN WIND SPEED	100 MPH
AMBIENT TEMPERATURE	-20 °F to +120 °F
ELECTRICAL AREA CLASSIFICATION	General Area Classification (Non-Hazardous)
ELEVATION	up to 3,000ft ASL
PROCESS PROPERTIES	
SMOKELESS CAPACITY	100%
OPERATING TEMPERATURE	800 °F to 2000 °F (1500 °F Nominal)
UTILITIES	
PILOT GAS	Process Gas
ELECTRICITY	1 Phase, 60 Hz, 120V/10A
SOLAR PANEL OPTION AVAILABLE	YES

- EPA 40 CFR 60, Quad O Compliant
- Completely Enclosed Combustion
- 99.99% Destruction Efficiency
- Fully Automated System
- Output Operational Data via Thumb Drive
- Capable of SCADA Integration

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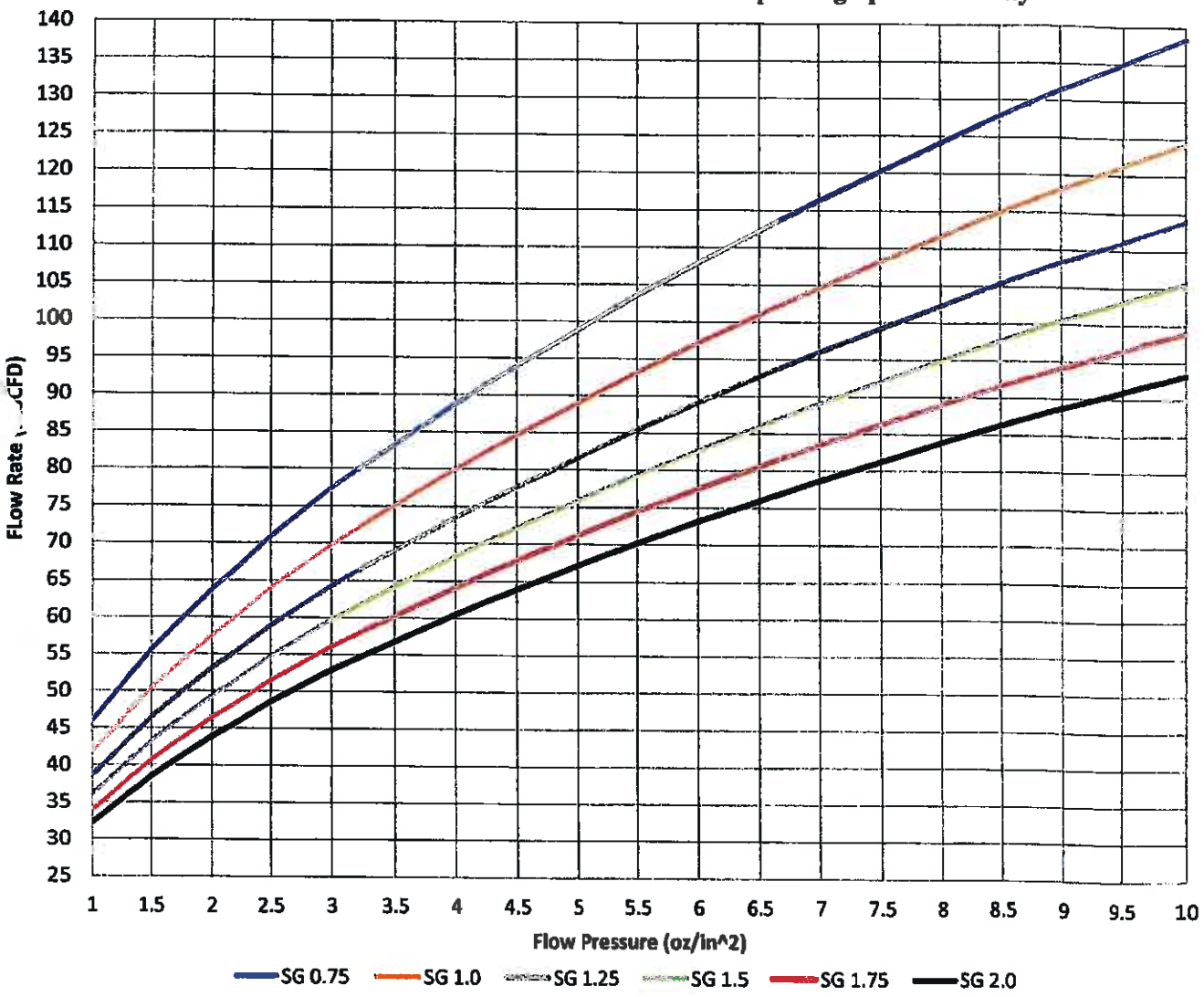
CH10.0: Flow Rate vs Flow Pressure with Corresponding Specific Gravity



ATTACHMENT I

Emissions Calculations

Jay-Bee Oil & Gas, Inc.

Sleepy Well Pad Production Facility
Tyler County, WV

Source	Description	NOx lb/hr	CO lb/hr	CO2e lb/hr	VOC lb/hr	SO2 lb/hr	PM lb/hr	n-Hexane lb/Hr	benzene lb/hr	formaldehyde lb/hr	Total HAPs lb/hr
CE-1	VRU Compressor [4]	0.19	0.37	89.36	0.05	0.000	0.013		0.001	0.017	0.024
GPU-1	GPU #1	0.15	0.13	181.18	0.01	0.001	0.011	0.003	0.002	0.000	0.003
GPU-2	GPU #2	0.15	0.13	181.18	0.01	0.001	0.011	0.003	0.000	0.000	0.003
GPU-3	GPU#3	0.15	0.13	181.18	0.01	0.001	0.011	0.003	0.000	0.000	0.003
EC-1	Combustor + Pilot	0.34	1.54	557.15	2.83	0.000	0.005				0.090
TEG-1	Thermoelectric Generator	0.00	0.00	1.57	0.00	0.000	0.000	0.000	0.000	0.000	0.000
—	Blowdowns [1]			N/A	N/A						
T01-T06	Condensate Tanks + Water Tanks [2]			24.80	6.73			0.210			0.230
TL-1 + TL-2	Truck Loading [3]				12.42						0.850
—	Truck Traffic Fugitive Dust						13.04				
—	Fittings Fugitive Emissions			4.84	0.17						
Total		0.98	2.29	1,221	22.23	0.00	13.09	0.22	0.00	0.02	1.20

Source		NOx tpy	CO tpy	CO2e tpy	VOC tpy	SO2 tpy	PM tpy	n-Hexane TPY	benzene tpy	formaldehyde tpy	Total HAPs tpy
CE-1	VRU Compressor [4]	0.81	1.62	391	0.21	0.002	0.06		0.00	0.07	0.11
GPU-1	GPU #1	0.66	0.55	794	0.04	0.004	0.05	0.01	0.00	0.00	0.01
GPU-2	GPU #2	0.66	0.55	794	0.04	0.004	0.05	0.01	0.00	0.00	0.01
GPU-3	GPU#3	0.66	0.55	794	0.04	0.004	0.05	0.01	0.00	0.00	0.01
EC-1	Combustor + Pilot	0.35	0.54	350	1.15	0.002	0.02				0.02
TEG-1	Thermoelectric Generator	0.01	0.00	7	0.00	0.000	0.00	0.00	0.00	0.00	0.00
—	Blowdowns [1]			0	0.04						
T01-T06	Condensate Tanks + Water Tanks [2]			106	28.80			0.90			0.98
TL-1 + TL-2	Truck Loading [3]				1.86						0.13
—	Truck Traffic Fugitive Dust						3.03				
—	Fittings Fugitive Emissions			21	0.77						
Total		3.13	3.82	3,256	32.93	0.02	3.26	0.94	0.00	0.08	1.27

[1] See Attachment C for Blowdown Calculations

[2] Condensate and water tank emissions will be controlled by a VRU at 95% . This entry represents the un-controlled 5%.

[3] This represents un-captured truck loading emissions.

[4] Emission presented herein for VOCs and Formaldehyde represent un-controlled Mfg. specs. + 15%. The Catalyst Warranty

Jay-Bee Oil &Gas ,LLC
ENGINE EMISSIONS

Sleepy Well Pad Production Facility
Tyler County, WV

Controlled Emission Rates

Source CE-1
Flash Gas Compressor

Engine Data:

Engine Manufacturer	Cummins	
Engine Model	G5.9	
Type (Rich-burn or Low Emission)	Rich Burn	
Aspiration (Natural or Turbocharged)	Natural	
Manufacturer Rating	84	hp
Speed at Above Rating	1,800	rpm
Configeration (In-line or Vee)	In-line	
Number of Cylinders	6	
Engine Bore	4.020	inches
Engine Stroke	4.720	inches
Engine Displacement	359	cu. in.
Engine BMEP	103	psi
Fuel Consumption (HHV)	7,914	Btu/bhp-hr

Emission Rates:

	g/bhp-hr	lb/hr	tons/year	g/hr	lb/day	AP-42 4stokelean lb/mmbtu	
Oxides of Nitrogen, NOx	1.000	0.19	0.81	84	4.44		Comment
Carbon Monoxide CO	2.000	0.37	1.62	168	8.89		453.59 grams = 1 pound
VOC (NMNEHC)	0.253	0.05	0.21	21	1.12		2,000 pounds = 1 ton
CO2	449	83	364	37,716	1,998		
CO2e		89	391				
Total Annual Hours of Operation	**8,760**						
SO2		0.0004	0.0017			0.0006	
PM2.5		0.0063	0.0277			0.0095	
PM (Condensable)		0.0066	0.0289			0.00991	
CH_4		0.1262	0.5529			0.0022	Factor From 40 CFR 98, Table C-2
N_2O		0.0115	0.0503			0.0002	Factor From 40 CFR 98, Table C-2
acrolein		0.0017	0.0077			0.00263	
acetaldehyde		0.0019	0.0081			0.00279	
formaldehyde	0.092	0.0170	0.0746				Per Mfg.
benzene		0.0011	0.0048			0.00158	
toluene		0.0004	0.0016			0.000558	
ethylbenzene		2E-05	0.0001			2.48E-05	
xylene s		0.0001	0.0006			0.000195	
methanol		0.002	0.0089			0.00306	
total HAPs		0.0242	0.1062				

Exhaust Parameters:

Exhaust Gas Temperature	1,078	deg. F
Exhaust Gas Mass Flow Rate		lb/hr
Exhaust Gas Mass Flow Rate	430	acfm
Exhaust Stack Height	96	inches
	8.00	feet
Exhaust Stack Inside Diameter	4	inches
	0.333	feet
Exhaust Stack Velocity	82.1	ft/sec
	4,927.4	ft/min

Jay-Bee Oil &Gas ,LLC

Sleepy Well Pad Production Facility
Tyler County, WV

Potential Emission Rates

Source GPU-1

Burner Duty Rating	1500.0	Mbtu/hr
Burner Efficiency	98.0	%
Gas Heat Content (HHV)	1263.0	Btu/scf
Total Gas Consumption	29086.0	scfd
H2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.1501	lbs/hr	0.657	TPY
CO	0.1261	lbs/hr	0.552	TPY
CO2	180.1	lbs/hr	788.7	TPY
CO2e	181	lbs/hr	794	tpy
VOC	0.0083	lbs/hr	0.036	TPY
SO2	0.0009	lbs/hr	0.004	TPY
H2S	0.0000	lbs/hr	0.000	TPY
PM10	0.0114	lbs/hr	0.050	TPY
CHOH	0.0001	lbs/hr	0.000	TPY
Benzene	0.0000	lbs/hr	0.000	TPY
N-Hexane	0.0027	lbs/hr	0.012	TPY
Toluene	0.0000	lbs/hr	0.000	TPY
Total HAPs	0.0028	lbs/hr	0.012	TPY

AP-42 Factors Used

NOx	**100**	**Lbs/MMCF**	
CO	**84**	**Lbs/MMCF**	
CO_2	**120,000**	**Lbs/MMCF**	**Global Warming Potential = 1**
VOC	**5.5**	**Lbs/MMCF**	
PM	**7.6**	**Lbs/MMCF**	
SO_2	**0.6**	**Lbs/MMCF**	
CH_4	**2.3**	**Lbs/MMCF**	**Global Warming Potential = 25**
N_2O	**2.2**	**Lbs/MMCF**	**Global Warming Potential =310**
HCOH	**0.075**	**Lbs/MMCF**	
Benzene	**0.0021**	**Lbs/MMCF**	
n-Hexane	**1.8**	**Lbs/MMCF**	
Toluene	**0.0034**	**Lbs/MMCF**	

Jay-Bee Oil &Gas ,LLC

Sleepy Well Pad Production Facility
Tyler County, WV

Potential Emission Rates

Source GPU-2

Burner Duty Rating	1500.0	Mbtu/hr
Burner Efficiency	98.0	%
Gas Heat Content (HHV)	1263.0	Btu/scf
Total Gas Consumption	29086.0	scfd
H2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.1501	lbs/hr	0.657	TPY
CO	0.1261	lbs/hr	0.552	TPY
CO2	180.1	lbs/hr	788.7	TPY
CO2e	181	lbs/hr	794	tpy
VOC	0.0083	lbs/hr	0.036	TPY
SO2	0.0009	lbs/hr	0.004	TPY
H2S	0.0000	lbs/hr	0.000	TPY
PM10	0.0114	lbs/hr	0.050	TPY
CHOH	0.0001	lbs/hr	0.000	TPY
Benzene	0.0000	lbs/hr	0.000	TPY
N-Hexane	0.0027	lbs/hr	0.012	TPY
Toluene	0.0000	lbs/hr	0.000	TPY
Total HAPs	0.0028	lbs/hr	0.012	TPY

AP-42 Factors Used

NOx	**100**	**Lbs/MMCF**	
CO	**84**	**Lbs/MMCF**	
CO_2	**120,000**	**Lbs/MMCF**	**Global Warming Potential = 1**
VOC	**5.5**	**Lbs/MMCF**	
PM	**7.6**	**Lbs/MMCF**	
SO_2	**0.6**	**Lbs/MMCF**	
CH_4	**2.3**	**Lbs/MMCF**	**Global Warming Potential = 25**
N_2O	**2.2**	**Lbs/MMCF**	**Global Warming Potential =310**
HCOH	**0.075**	**Lbs/MMCF**	
Benzene	**0.0021**	**Lbs/MMCF**	
n-Hexane	**1.8**	**Lbs/MMCF**	
Toluene	**0.0034**	**Lbs/MMCF**	

Jay-Bee Oil &Gas ,LLC

Sleepy Well Pad Production Facility
Tyler County, WV

Potential Emission Rates

Source GPU-3

Burner Duty Rating	1500.0	Mbtu/hr
Burner Efficiency	98.0	%
Gas Heat Content (HHV)	1263.0	Btu/scf
Total Gas Consumption	29086.0	scfd
H2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.1501	lbs/hr	0.657	TPY
CO	0.1261	lbs/hr	0.552	TPY
CO2	180.1	lbs/hr	788.7	TPY
CO2e	181	lbs/hr	794	tpy
VOC	0.0083	lbs/hr	0.036	TPY
SO2	0.0009	lbs/hr	0.004	TPY
H2S	0.0000	lbs/hr	0.000	TPY
PM10	0.0114	lbs/hr	0.050	TPY
CHOH	0.0001	lbs/hr	0.000	TPY
Benzene	0.0000	lbs/hr	0.000	TPY
N-Hexane	0.0027	lbs/hr	0.012	TPY
Toluene	0.0000	lbs/hr	0.000	TPY
Total HAPs	0.0028	lbs/hr	0.012	TPY

AP-42 Factors Used

NOx	**100**	**Lbs/MMCF**	
CO	**84**	**Lbs/MMCF**	
CO_2	**120,000**	**Lbs/MMCF**	**Global Warming Potential = 1**
VOC	**5.5**	**Lbs/MMCF**	
PM	**7.6**	**Lbs/MMCF**	
SO_2	**0.6**	**Lbs/MMCF**	
CH_4	**2.3**	**Lbs/MMCF**	**Global Warming Potential = 25**
N_2O	**2.2**	**Lbs/MMCF**	**Global Warming Potential =310**
HCOH	**0.075**	**Lbs/MMCF**	
Benzene	**0.0021**	**Lbs/MMCF**	
n-Hexane	**1.8**	**Lbs/MMCF**	
Toluene	**0.0034**	**Lbs/MMCF**	

Jay-Bee Oil &Gas ,LLC

Sleepy Well Pad Production Facility
Tyler County, WV

Potential Emission Rates

Source TEG-1

Burner Duty Rating	13.0	Mbtu/hr
Burner Efficiency	98.0	%
Gas Heat Content (HHV)	1263.0	Btu/scf
Total Gas Consumption	252.1	scfd
H2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.0013	lbs/hr	0.006	TPY
CO	0.0011	lbs/hr	0.005	TPY
CO2	1.6	lbs/hr	6.8	TPY
CO2e	2	lbs/hr	7	tpy
VOC	0.0001	lbs/hr	0.000	TPY
SO2	0.0000	lbs/hr	0.000	TPY
H2S	0.0000	lbs/hr	0.000	TPY
PM10	0.0001	lbs/hr	0.000	TPY
CHOH	0.0000	lbs/hr	0.000	TPY
Benzene	0.0000	lbs/hr	0.000	TPY
N-Hexane	0.0000	lbs/hr	0.000	TPY
Toluene	0.0000	lbs/hr	0.000	TPY
Total HAPs	0.0000	lbs/hr	0.000	TPY

AP-42 Factors Used

NOx	**100**	**Lbs/MMCF**	
CO	**84**	**Lbs/MMCF**	
CO_2	**120,000**	**Lbs/MMCF**	**Global Warming Potential = 1**
VOC	**5.5**	**Lbs/MMCF**	
PM	**7.6**	**Lbs/MMCF**	
SO_2	**0.6**	**Lbs/MMCF**	
CH_4	**2.3**	**Lbs/MMCF**	**Global Warming Potential = 25**
N_2O	**2.2**	**Lbs/MMCF**	**Global Warming Potential =310**
HCOH	**0.075**	**Lbs/MMCF**	
Benzene	**0.0021**	**Lbs/MMCF**	
n-Hexane	**1.8**	**Lbs/MMCF**	
Toluene	**0.0034**	**Lbs/MMCF**	

Spencer Well Pad Pad
Tyler County, WV

Potential Emission Rates

Source EC-1

Combustor Pilot

Burner Duty Rating	837.90	Mbtu/hr
Burner Efficiency	99.0	%
Gas Heat Content (LHV)	1263.0	Btu/scf
Total Gas Consumption	15,922	scfd
H2S Concentration	0.000	Mole %
Duty Hrs/Yr	8760	

NOx	0.0663	lbs/hr	0.291	TPY
CO	0.0557	lbs/hr	0.244	TPY
CO2e	79.689	lbs/hr	349.04	TPY
VOC	0.1388	lbs/hr	0.608	TPY
SO2	0.0004	lbs/hr	0.002	TPY
PM	0.0050	lb/hr	0.022	TPY

AP-42 Factors Used

NOx	**100 Lbs/MMCF**
CO	**84 Lbs/MMCF**
CO2	**120,000 Lbs/MMCF**
VOC	**5.5 Lbs/MMCF**
PM	**7.6 Lbs/MMCF**
SO2	**0.6 Lbs/MMCF**
CH4	**2.3 Lbs/MMCF**

Spencer Well Pad Pad
Tyler County, WV

Potential Emission Rates

Source EC-1

Enclosed Combustors (Flare)

Destruction Efficiency	98.0	%	
Gas Heat Content (HHV)	2278.0	Btu/scf[1]	
Max Flow to T-E	42,264	scf/day	0.704 MMCF/Yr[2]
Max BTUs to Flare	4.01	MMBTU/Hr	1,604 MMBTU/Yr

NOx	0.27	lbs/hr	0.05	tpy
CO	1.48	lbs/hr	0.30	tpy
CO2	468.91	lbs/hr	93.73	tpy
CO2e	477.46	lb/hr	95.80	tpy
VOC	2.69	lb/hr	0.54	tpy
PM	0.01	lb/Hr	0.00	tpy
HAPs[3]	0.09	lb/hr	0.02	tpy
CH4	0.3900	lbs/hr	0.0800	tpy
N2O	0.0009	lbs/hr	0.0002	tpy

[1] BTU content of gas is derived as shown in attached discussion of gas streams to combustor
[2] Annual flow assumes daily flow 365 days per year.
VOC emissons are 2% of VOC loading to the combustor.
[3] HAP emissions are based on the HAP fraction of the combined gas streams to the combustor (3.4% of VOC content).

Factors Used

AP-42 Table 13.5-1	**NOx**	**0.068 Lbs/MMBTU**
AP-42 Table 13.5-1	**CO**	**0.37 Lbs/MMBTU**
40 CFR 98 Table C-1	**CO2**	**116.89 Lbs/MMBTU**
40 CFR 98 Table C-2	**CH4**	**0.0022 Lbs/MMBTU**
40 CFR 98 Table C-2	**N2O**	**0.00022 Lbs/MMBTU**
	PM	**7.6 Lbs/MMCF**

VOC emissions equals non-combusted NMNEHC

Jay-Bee Oil & Gas, Inc.
FUGITIVE EMISSIONS

Sleepy Well Pad Production Facility
Tyler County, WV

Fugitive VOC Emissions

Volatile Organic Compounds, NMNEHC from gas analysis:	18.40	weight percent
Methane from gas analysis:	59.35	weight percent
Carbon Dioxide from gas analysis:	0.32	weight percent
Gas Density	0.0580	lb/scf

Emission Source:	Number	Oil & Gas Production*	VOC %	VOC, lb/hr	VOC TPY	CO2 lb/Hr	CO2 TPY	CH4 lb/hr	CH4 TPY	CO2e
Valves:										
Gas/Vapor:	8	0.02700 scf/hr	18.4	0.002	0.010	0.000	0.000	0.007	0.0326	0.814
Light Liquid:	24	0.05000 scf/hr	100.0	0.070	0.305					0.000
Heavy Liquid (Oil):	-	0.00050 scf/hr	100.0	0.000	0.000					0.000
Low Bleed Pneumatic	3	1.39000 scf/hr	18.4	0.044	0.195	0.144	0.629	0.144	0.6285	16.342
Relief Valves:	12	0.04000 scf/hr	18.4	0.005	0.022	0.000	0.000	0.017	0.0724	1.809
Open-ended Lines, gas:	3	0.06100 sfc/hr	18.4	0.002	0.009					0.000
Open-ended Lines, liquid:	-	0.05000 lb/hr	100.0	0.000	0.000					0.000
Pump Seals:										0.000
Gas:		0.00529 lb/hr	18.4	0.000	0.000	0.000	0.000	0.000	0.0000	0.000
Light Liquid:	-	0.02866 lb/hr	100.0	0.000	0.000					0.000
Heavy Liquid (Oil):	-	0.00133 lb/hr	100.0	0.000	0.000					0.000
Compressor Seals, Gas:	1	0.01940 lb/hr	18.4	0.004	0.016	0.000	0.000	0.001	0.0029	0.073
Connectors:										0.000
Gas:	72	0.00300 scf/hr	18.4	0.002	0.010	0.000	0.000	0.007	0.0326	0.814
Light Liquid:	12	0.00700 scf/hr	100.0	0.084	0.368					0.000
Heavy Liquid (Oil):	-	0.00030 scf/hr	100.0	0.000	0.000					0.000
Flanges:										0.000
Gas:	24	0.00086 lb/hr	18.4	0.004	0.017	0.000	0.000	0.012	0.0537	1.342
Light Liquid:	12	0.00300 scf/hr	100.0	0.002	0.009					0.000
Heavy Liquid:		0.0009 scf/hr	100.0	0.000	0.000					0.000

Fugitive Calculations:

	lb/hr	t/y
VOC	0.175	0.765
CH4	0.044	0.194
CO2	0.000	0.001
CO2e	4.839	21.19

Notes: *Factors are from 40 CFR 98, Table W-1A (scf/hr), where available. Remaining are API (lb/hr)

Jay-Bee Oil & Gas, Inc.
GAS ANALYSIS INFORMATION

Sleepy Well Pad Production Facility
Tyler County, WV

Inlet Gas Composition Information:

	Fuel Gas mole %	Fuel M.W. lb/lb-mole	Fuel S.G.	Fuel Wt. %	LHV, dry Btu/scf	HHV, dry Btu/scf	AFR vol/vol	VOC NM / NE	Z Factor	GPM
Nitrogen, N2	0.394	0.110	0.004	0.530			-		0.0039	
Carbon Dioxide, CO2	0.151	0.066	0.002	0.319			-		0.0015	
Hydrogen Sulfide, H2S	0.000	0.000	0.000	0.000	0.0	0.0	0.000		0.0000	
Helium, He	-	-	-	-			-		-	
Oxygen, O2	-	-	-	-			-		-	
Methane, CH4	77.080	12.366	0.427	59.350	701.0	778.5	7.346		0.7693	
Ethane, C2H6	14.832	4.460	0.154	21.406	240.1	262.5	2.474		0.1471	3.945
Propane	4.967	2.190	0.076	10.512	115.0	125.0	1.183	10.512	0.0488	1.361
Iso-Butane	0.616	0.358	0.012	1.718	18.5	20.0	0.191	1.718	0.0060	0.200
Normal Butane	1.210	0.703	0.024	3.375	36.4	39.5	0.375	3.375	0.0117	0.379
Iso Pentane	0.266	0.192	0.007	0.921	9.8	10.6	0.101	0.921	0.0027	0.097
Normal Pentane	0.262	0.189	0.007	0.907	9.7	10.5	0.100	0.907	0.0026	0.094
Hexane	0.158	0.136	0.005	0.654	7.0	7.5	0.072	0.654	0.0016	0.065
Heptane	0.064	0.064	0.002	0.308	3.3	3.5	0.034	0.308	0.0006	0.029
	100.000	20.836	0.719		1,140.7	1,257.6	11.875	18.396	0.9958	6.172

Gas Density (STP) = 0.058

Ideal Gross (HHV)	1,257.6
Ideal Gross (sat'd)	1,236.5
GPM	-
Real Gross (HHV)	1,263.0
Real Net (LHV)	1,145.6

Jay-Bee Oil & Gas, Inc.
GAS ANALYSIS INFORMATION

Sleepy Well Pad Production Facility
Tyler County, WV

Condensate Flash Gas Composition Information:

	Fuel Gas mole %	Fuel M.W. lb/lb-mole	Fuel S.G.	Fuel Wt. %	LHV, dry Btu/scf	HHV, dry Btu/scf	AFR vol/vol	VOC NM / NE	Z Factor	GPM
Nitrogen, N2	0.036	0.010	0.000	0.026			-		0.0004	
Carbon Dioxide, CO2	0.141	0.062	0.002	0.157			-		0.0014	
Hydrogen Sulfide, H2S	0.000	0.000	0.000	0.000	0.0	0.0	0.000		0.0000	
Helium, He	-	-	-	-			-		-	
Oxygen, O2	-	-	-	-			-		-	
Methane, CH4	24.485	3.928	0.136	9.947	222.7	247.3	2.333		0.2444	
Ethane, C2H6	25.943	7.801	0.269	19.754	419.9	459.1	4.327		0.2573	6.901
Propane	23.253	10.254	0.354	25.965	538.3	585.1	5.539	25.965	0.2285	6.373
Iso-Butane	4.773	2.774	0.096	7.025	143.2	155.2	1.478	7.025	0.0464	1.553
Normal Butane	10.980	6.382	0.220	16.161	330.6	358.2	3.401	16.161	0.1061	3.443
Iso Pentane	3.135	2.262	0.078	5.728	116.0	125.4	1.195	5.728	0.0314	1.141
Normal Pentane	3.175	2.291	0.079	5.801	117.7	127.3	1.210	5.801	0.0318	1.144
Hexane	2.572	2.216	0.077	5.613	113.3	122.3	1.164	5.613	0.0254	1.052
Heptane+	1.507	1.510	0.052	3.824	76.9	82.9	0.790	3.824	0.0150	0.692
	100.000	39.491	1.364		2,078.5	2,262.8	21.437	70.116	0.9879	22.299

Gas Density (STP) = 0.110

Ideal Gross (HHV)	2,262.8
Ideal Gross (sat'd)	2,224.1
GPM	-
Real Gross (HHV)	2,290.5
Real Net (LHV)	2,103.9

Jay-Bee Oil & Gas, Inc.
GAS ANALYSIS INFORMATION

Sleepy Well Pad Production Facility
Tyler County, WV

Produced Water Flash Gas Composition Information

	Fuel Gas mole %	Fuel M.W. lb/lb-mole	Fuel S.G.	Fuel Wt. %	LHV, dry Btu/scf	HHV, dry Btu/scf	AFR vol/vol	VOC NM / NE	Z Factor	GPM
Nitrogen, N2	1.821	0.510	0.018	1.665			-		0.0182	
Carbon Dioxide, CO2	1.049	0.462	0.016	1.507			-		0.0105	
Hydrogen Sulfide, H2S	0.000	0.000	0.000	0.000	0.0	0.0	0.000		0.0000	
Helium, He	-	-	-	-			-		-	
Oxygen, O2	-	-	-	-			-		-	
Methane, CH4	56.602	9.081	0.314	29.646	514.7	571.7	5.394		0.5649	
Ethane, C2H6	16.424	4.939	0.171	16.124	265.9	290.6	2.740		0.1629	4.369
Propane	8.000	3.528	0.122	11.517	185.2	201.3	1.906	11.517	0.0786	2.193
Iso-Butane	1.516	0.881	0.030	2.877	45.5	49.3	0.470	2.877	0.0147	0.493
Normal Butane	4.274	2.484	0.086	8.110	128.7	139.4	1.324	8.110	0.0413	1.340
Iso Pentane	1.784	1.287	0.044	4.202	66.0	71.4	0.680	4.202	0.0178	0.650
Normal Pentane	2.405	1.735	0.060	5.665	89.2	96.4	0.917	5.665	0.0241	0.866
Hexane	2.953	2.545	0.088	8.308	130.0	140.4	1.337	8.308	0.0292	1.208
Heptane+	3.172	3.179	0.110	10.377	161.8	174.5	1.662	10.377	0.0316	1.456
	100.000	30.630	1.058		1,586.9	1,735.1	16.428	51.057	0.9937	12.574

Gas Density (STP) = 0.085

Ideal Gross (HHV)	1,735.1
Ideal Gross (sat'd)	1,705.6
GPM	-
Real Gross (HHV)	1,746.1
Real Net (LHV)	1,597.0

GAS DATA INFORMATION

Specific Graivity of Air, @ 29.92 in. Hg and 60 -F, 28.9625
One mole of gas occupies, @ 14.696 psia & 32 -F, 359.2 cu ft. per lb-mole
One mole of gas occupies, @ 14.696 psia & 60 -F, 379.64 cu ft. per lb-mole

Hydrogen Sulfide (H2S) conversion chart:

0 grains H2S/100 scf	=	0.00000 mole % H2S
		0.0 ppmv H2S
0 mole % H2S	=	0 grains H2S/100 scf
		0.0 ppmv H2S
0 ppmv H2S	=	0.000 grains H2S/100 scf
		0.00000 mole % H2S

Ideal Gas at 14.696 psia and 60°F

		MW lb/mol	Specific Gravity	Lb per Cu Ft	Cu Ft per Lb	LHV, dry Btu/scf	HHV, dry Btu/scf	LHV Btu/lb	HHV Btu/lb	cu ft of air / 1 cu ft of gas	Z factor
Nitrogen	N2	28.013	0.9672	0.0738	13.552	0	0	0	0	0	0.9997
Carbon Dioxide	CO2	44.010	1.5196	0.1159	8.626	0	0	0	0	0	0.9964
Hydrogen Sulfide	H2S	34.076	1.1766	0.0898	11.141	587	637	6,545	7,100	7.15	0.9846
Water	H20	18.000	0.6215	0.0474	21.091	0	0	0	0	0	1.0006
Oxygen	O2	31.999	1.1048	0.0843	11.864	0	0	0	0	0	0.9992
Methane	CH4	16.043	0.5539	0.0423	23.664	909.4	1,010.0	21,520	23,879	9.53	0.9980
Ethane	C2H6	30.070	1.0382	0.0792	12.625	1,618.7	1,769.6	20,432	22,320	16.68	0.9919
Propane	C3H8	44.097	1.5226	0.1162	8.609	2,314.9	2,516.1	19,944	21,661	23.82	0.9825
Iso-Butane	C4H10	58.124	2.0069	0.1531	6.532	3,000.4	3,251.9	19,629	21,257	30.97	0.9711
Normal Butane	C4H10	58.124	2.0069	0.1531	6.532	3,010.8	3,262.3	19,680	21,308	30.97	0.9667
Iso Pentane	C5H12	72.151	2.4912	0.1901	5.262	3,699.0	4,000.9	19,478	21,052	38.11	1.0000
Normal Pentane	C5H12	72.151	2.4912	0.1901	5.262	3,706.9	4,008.9	19,517	21,091	38.11	1.0000
Hexane	C6H14	86.178	2.9755	0.2270	4.405	4,403.8	4,755.9	19,403	20,940	45.26	0.9879
Heptane	C7H16	100.205	3.4598	0.2639	3.789	5,100.0	5,502.5	22,000	23,000	52.41	0.9947

Real Gas at 14.696 psia and 60°F

		MW lb/mol	Specific Gravity	Lb per Cu Ft	Cu Ft per Lb	LHV, dry Btu/scf	HHV, dry Btu/scf	LHV Btu/lb	HHV Btu/lb	cu ft of air / 1 cu ft of gas	Gal/Mole	
Nitrogen	N2	28.013	0.9672	0.0738	13.552	0	0	0	0	0	4.1513	
Carbon Dioxide	CO2	44.010	1.5196	0.1159	8.626	0	0	0	0	0	6.4532	
Hydrogen Sulfide	H2S	34.076	1.1766	0.0898	11.141	621	672	6,545	7,100	7.15	5.1005	
Water	H2O	18.000	0.6215	0.0474	21.091						3.8376	
Oxygen	O2	31.999	1.1048	0.0843	11.864	0	0	0	0	0	3.3605	
Methane	CH4	16.043	0.5539	0.0423	23.664	911	1,012	21,520	23,879	9.53	6.4172	
Ethane	C2H6	30.070	1.0382	0.0792	12.625	1,631	1,783	20,432	22,320	16.68	10.126	
Propane	C3H8	44.097	1.5226	0.1162	8.609	2,353	3,354	19,944	21,661	23.82	10.433	
Iso-Butane	C4H10	58.124	2.0069	0.1531	6.532	3,101	3,369	19,629	21,257	30.97	12.386	
Normal Butane	C4H10	58.124	2.0069	0.1531	6.532	3,094	3,370	19,680	21,308	30.97	11.937	
Iso Pentane	C5H12	72.151	2.4912	0.1901	5.262	3,709	4,001	19,478	21,052	38.11	13.86	
Normal Pentane	C5H12	72.151	2.4912	0.1901	5.262	3,698	4,009	19,517	21,091	38.11	13.713	
Hexane	C6H14	86.178	2.9755	0.2270	4.405	4,404	4,756	19,403	20,940	45.26	15.566	16.3227
Heptane	C7H16	100.205	3.4598	0.2639	3.789	5,101	5,503	22,000	23,000	52.41	17.468	17.468

Jay-Bee Oil & Gas, Incorporated
Sleepy Well Pad Production Facility
Condensate and Produced Water Tank Emissions

Utilizing direct measurements of the Gas to Oil (GOR) ratio and flash gas composition from a nearby Jay-Bee well pad, the attached calculation spreadsheet was used to determine un-controlled VOC and HAP flash emissions from the Condensate tanks of 580.3 tpy and 19.0 tpy respectively for the maximum annual throughput of 30,000 BBL/Yr. In a similar manner, flash emissions from the Produced Water tanks were projected to be 7.3 tpy of VOCs and 0.61 tpy of HAPs. Lastly, using EPA Tanks 4.0, working and breathing losses from the condensate tanks were determined to be 3.04 tpy. Using the percentage of VOCs in the condensate flash emissions as a surrogate (70.2%), working and breathing VOC losses are estimated at 2.13 tpy Working and breathing losses of HAPs were then estimated at 0.10 tpy using the ratio of HAPs to VOCs in the flash losses. Thus, total uncontrolled tank emissions are projected to be 589.7 tpy of VOCs (580.3+7.3+2.1) and 19.7 tpy of HAPs (19.0+0.61+0.10). As emissions from these tanks is anticipated to be continuous, this is equivalent to 134.6 pounds per hour VOCs and 4.50 pounds per hour HAPs. These vapors are routed by piping from the tanks to a Vapor Recovery Unit (VRU).

The largest component to the HAPs is Hexane. Using the process described above, potential un-controlled n-Hexane emissions were determined to be 18.0 tons per year or 4.1 pounds per hour.

Methane will also be emitted at a maximum rate of 82.7 tpy from the condensate tanks and 4.21 tpy from the produced water tanks for a total of 86.9 tpy of Methane. Using the GHG factor of 25 for Methane, the CO_{2e} uncontrolled emission rate is 86.9 x 25 or 2173 tpy. This is equivalent to 496 lb/hr of CO_{2e}

During operation of the VRU, emissions will be controlled at a minimum of 95%. Actual control efficiency is anticipated to be much higher, but only 95% is claimed as allowed under the G70-A General Permit. Thus, when in operation, un-captured/un-controlled emissions will be 6.73 pounds per hour of VOCs (134.6 x 0.05) and 0.23 (4.52 x 0.05) pounds per hour of HAPs. CO_{2e} emissions will be controlled to 24.8 lb/hr (496 x0.05) while n-Hexane will be controlled to 0.21 pounds per hour (4.1 x 0.05).

The VRU is anticipated to be operated continuously, except for brief intervals for preventive maintenance (8 hours per month or 96 hours per year). Additionally, time must be allotted for potential equipment failures and emergency repairs. Thus, it is conservatively estimated that the VRU will not be available for 200 hours per year. During that time, the gas will be controlled by the enclosed combustor. Additionally, from time to time, there may be slugs of condensate route to the tanks, causing surges in flash gas. Under these circumstances, any flash gas in excess of the VRU's capacity will also be routed to the enclosed combustor. Thus, total potential tank emissions associated with the VRU are calculated as follows:

VOCs
6.73 lb/Hr (controlled) x (8760-200) = 57,609 lb/yr or 28.80 tpy

HAPs
0.23 lb/Hr (controlled) x (8760-200) = 1,969lb/yr or 0.98 tpy

n-Hexane
0.21 lb/Hr (controlled) x (8760-200) = 1,798 lb/yr or 0.90 tpy

CO_{2e}
24.8 lb/Hr (controlled) x (8760-200) = 212,290 lb/yr or 106.1 tpy

The gases routed to the combustor for the 200 hours per year that the VRU is down and any gas in excess of the VRU capacity are addressed in the combustor emissions calculations.

Jay-Bee Oil & Gas - Sleepy

Flash Emission Calculations

Using Gas-Oil Ratio Method

Un-Controlled

Site specific data

Gas-Oil-ratio	=	500 scf/bbl Using Actual GOR from RPT-8
Throughput	=	30,000 bbl/yr
Stock tank gas molecular weight	=	39.56 g/mole

Conversions

1 lb	=	453.6 g
1 mole	=	22.4 L
1 scf	=	28.32 L
1 ton	=	2000 lb

Equations

$$E_{TOT} = Q\frac{(bbl)}{(yr)} \times R\frac{(scf)}{(bbl)} \times \frac{28.32(L)}{1(scf)} \times \frac{1(mole)}{22.4(L)} \times MW\frac{(g)}{(mole)} \times \frac{1(lb)}{453.6(g)}) \times \frac{1(ton)}{2000(lb)}$$

E_{TOT} = Total stock tank flash emissions (TPY)

R = Measured gas-oil ratio (scf/bbl)

Q = Throughput (bbl/yr)

MW = Stock tank gas molecular weight (g/mole)

$$E_{spec} = E_{TOT} \times X_{spec}$$

E_{spec} = Flash emission from constituent

X_{spec} = Weight fraction of constituent in stock tank gas

Flash Emissions

Constituent	TPY	
Total	826.9700	E_{TOT}
VOC	580.2765	Sum of C3+
Nitrogen	2.07E-01	
Carbon Dioxide	1.30E+00	
Methane	8.21E+01	
Ethane	1.63E+02	
Propane	2.14E+02	
Isobutane	5.80E+01	
n-Butane	1.33E+02	
2,2 Dimethylpropane	1.63E+00	
Isopentane	4.57E+01	
n-Pentane	4.79E+01	
2,2 Dimethylbutane	1.73E+00	
Cyclopentane	0.00E+00	
2,3 Dimethylbutane	2.51E+00	
2 Methylpentane	1.33E+01	
3 Methylpentane	7.95E+00	
n-Hexane	1.74E+01	HAP
Methylcyclopentane	1.27E+00	
Benzene	2.98E-01	HAP
Cyclohexane	1.79E+00	
2-Methylhexane	3.85E+00	
3-Methylhexane	3.79E+00	
2,2,4 Trimethylpentane	0.00E+00	
Other C7's	3.61E+00	
n-Heptane	5.57E+00	
Methylcyclohexane	3.47E+00	
Toluene	6.78E-01	HAP
Other C8's	5.66E+00	
n-Octane	1.89E+00	
Ethylbenzene	4.13E-02	HAP
M & P Xylenes	4.88E-01	HAP
O-Xylene	6.62E-02	HAP
Other C9's	2.35E+00	
n-Nonane	5.62E-01	
Other C10's	8.85E-01	
n-Decane	1.16E-01	
Undecanes (11)	1.24E-01	

April 24, 2014

FESCO, Ltd.
1100 Fesco Avenue - Alice, Texas 78332

For: Jay-Bee Oil & Gas, Inc.
1720 Route 22 East
Union, New Jersey 07083

Sample: RPT 8-1

Date Sampled: 04/07/14

Date Analyzed: 04/21/14

Job Number: J42794

FLASH LIBERATION OF HYDROCARBON LIQUID		
	Separator HC Liquid	Stock Tank
Pressure, psig	340	0
Temperature, °F	65	70
Gas Oil Ratio (1)	----	500
Gas Specific Gravity (2)	----	1.387
Separator Volume Factor (3)	1.2987	1.000

STOCK TANK FLUID PROPERTIES	
Shrinkage Recovery Factor (4)	0.7700
Oil API Gravity at 60 °F	70.79
Reid Vapor Pressure, psi (5)	5.28

Quality Control Check			
	Sampling Conditions	Test Samples	
Cylinder No.	----	W-2408*	W-2423
Pressure, psig	340	299	297
Temperature, °F	65	66	66

(1) - Scf of flashed vapor per barrel of stock tank oil
(2) - Air = 1.000
(3) - Separator volume / Stock tank volume
(4) - Fraction of first stage separator liquid
(5) - Absolute pressure at 100 deg F
Analyst: M. G.
* Sample used for flash study
Base Conditions: 14.65 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

David Dannhaus 361-661-7015

April 23, 2014

FESCO, Ltd.
1100 Fesco Ave. - Alice, Texas 78332

For: Jay-Bee Oil & Gas, Inc.
1720 Route 22 East
Union, New Jersey 07083

Sample: RPT 8-1
Gas Evolved from Hydrocarbon Liquid Flashed
From 340 psig & 65 °F to 0 psig & 70 °F

Date Sampled: 04/07/14

Job Number: 42794.001

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT - GPA 2286

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.036	
Carbon Dioxide	0.141	
Methane	24.485	
Ethane	25.943	6.993
Propane	23.253	6.457
Isobutane	4.773	1.574
n-Butane	10.980	3.489
2-2 Dimethylpropane	0.108	0.042
Isopentane	3.027	1.116
n-Pentane	3.175	1.160
Hexanes	2.378	0.988
Heptanes Plus	1.701	0.761
Totals	100.000	22.579

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.599	(Air=1)
Molecular Weight	102.69	
Gross Heating Value	5488	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.387	(Air=1)
Compressibility (Z)	0.9850	
Molecular Weight	39.56	
Gross Heating Value		
Dry Basis	2321	BTU/CF
Saturated Basis	2282	BTU/CF

*Hydrogen Sulfide tested in laboratory by: Stained Tube Method (GPA 2377)
Results: <0.013 Gr/100 CF, <0.2 PPMV or <0.001 Mol %

Base Conditions: 14.850 PSI & 60 Deg F

Analyst: MR
Processor: AL
Cylinder ID: ST# 20

Certified: FESCO, Ltd. - Alice, Texas

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT - GPA 2286

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.036		0.025
Carbon Dioxide	0.141		0.157
Methane	24.485		9.930
Ethane	25.943	6.993	19.719
Propane	23.253	6.457	25.920
Isobutane	4.773	1.574	7.013
n-Butane	10.980	3.489	16.132
2,2 Dimethylpropane	0.108	0.042	0.197
Isopentane	3.027	1.116	5.521
n-Pentane	3.175	1.160	5.791
2,2 Dimethylbutane	0.096	0.040	0.209
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.139	0.057	0.303
2 Methylpentane	0.738	0.309	1.608
3 Methylpentane	0.441	0.181	0.961
n-Hexane	0.964	0.400	2.100
Methylcyclopentane	0.072	0.025	0.153
Benzene	0.018	0.005	0.036
Cyclohexane	0.102	0.035	0.217
2-Methylhexane	0.184	0.086	0.466
3-Methylhexane	0.181	0.083	0.458
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.174	0.076	0.436
n-Heptane	0.266	0.124	0.674
Methylcyclohexane	0.169	0.068	0.419
Toluene	0.035	0.012	0.082
Other C8's	0.246	0.115	0.685
n-Octane	0.079	0.041	0.228
Ethylbenzene	0.002	0.001	0.005
M & P Xylenes	0.022	0.009	0.059
O-Xylene	0.003	0.001	0.008
Other C9's	0.089	0.046	0.284
n-Nonane	0.021	0.012	0.068
Other C10's	0.030	0.018	0.107
n-Decane	0.004	0.002	0.014
Undecanes (11)	0.004	0.002	0.015
Totals	100.000	22.579	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.387	(Air=1)
Compressibility (Z)	0.9850	
Molecular Weight	39.56	
Gross Heating Value		
Dry Basis	2321	BTU/CF
Saturated Basis	2282	BTU/CF

May 2, 2014

FESCO, Ltd.
1100 Fesco Ave. - Alice, Texas 78332

For: Jay-Bee Oil & Gas, Inc.
1720 Route 22 East
Union, New Jersey 07083

Sample: RPT 8-1
Breathing Vapor
From 0 psig & 70 °F to 0 psig & 100 °F

Date Sampled: 04/07/14 Job Number: 42794.011

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT - GPA 2286

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.185	
Carbon Dioxide	0.018	
Methane	0.000	
Ethane	0.202	0.054
Propane	10.137	2.815
Isobutane	8.852	2.920
n-Butane	30.167	9.586
2-2 Dimethylpropane	0.370	0.142
Isopentane	15.123	5.574
n-Pentane	17.412	6.361
Hexanes	13.160	5.466
Heptanes Plus	4.374	1.881
Totals	100.000	34.799

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.547	(Air=1)
Molecular Weight	98.01	
Gross Heating Value	5251	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	2.412	(Air=1)
Compressibility (Z)	0.9539	
Molecular Weight	66.64	
Gross Heating Value		
Dry Basis	3921	BTU/CF
Saturated Basis	3853	BTU/CF

*Hydrogen Sulfide tested in laboratory by: Stained Tube Method (GPA 2377)
Results: <0.013 Gr/100 CF, <0.2 PPMV or <0.001 Mol %

Base Conditions: 14.850 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: MR
Processor: AL
Cylinder ID: ST# 21

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT - GPA 2286

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.185		0.078
Carbon Dioxide	0.018		0.012
Methane	0.000		0.001
Ethane	0.202	0.054	0.091
Propane	10.137	2.815	6.706
Isobutane	8.852	2.920	7.721
n-Butane	30.167	9.586	26.312
2,2 Dimethylpropane	0.370	0.142	0.401
Isopentane	15.123	5.574	16.374
n-Pentane	17.412	6.361	18.852
2,2 Dimethylbutane	0.570	0.240	0.737
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.805	0.332	1.041
2 Methylpentane	4.259	1.782	5.508
3 Methylpentane	2.477	1.019	3.203
n-Hexane	5.049	2.093	6.529
Methylcyclopentane	0.356	0.124	0.450
Benzene	0.078	0.022	0.091
Cyclohexane	0.432	0.148	0.545
2-Methylhexane	0.606	0.284	0.911
3-Methylhexane	0.569	0.261	0.856
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.649	0.285	0.966
n-Heptane	0.658	0.306	0.989
Methylcyclohexane	0.408	0.165	0.601
Toluene	0.071	0.024	0.098
Other C8's	0.379	0.178	0.627
n-Octane	0.082	0.042	0.141
Ethylbenzene	0.002	0.001	0.003
M & P Xylenes	0.020	0.008	0.032
O-Xylene	0.002	0.001	0.003
Other C9's	0.048	0.025	0.091
n-Nonane	0.007	0.004	0.013
Other C10's	0.005	0.003	0.011
n-Decane	0.002	0.001	0.004
Undecanes (11)	0.000	0.000	0.000
Totals	100.000	34.799	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	2.412	(Air=1)
Compressibility (Z)	0.9539	
Molecular Weight	66.64	
Gross Heating Value		
Dry Basis	3921	BTU/CF
Saturated Basis	3853	BTU/CF

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Sleepy Condensate T
City:	Huntington
State:	West Virginia
Company:	Jay-Bee Oil & Gas
Type of Tank:	Vertical Fixed Roof Tank
Description:	400 BBL Condensate Tanks Emissions from a Single Tank

Tank Dimensions

Shell Height (ft):	20.00
Diameter (ft):	12.00
Liquid Height (ft) :	19.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	16,074.56
Turnovers:	26.30
Net Throughput(gal/yr):	422,761.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.25
Slope (ft/ft) (Cone Roof)	0.04

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Huntington, West Virginia (Avg Atmospheric Pressure = 14.33 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Sleepy Condensate T - Vertical Fixed Roof Tank
Huntington, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 6)	All	61.42	53.10	69.74	57.09	3.0220	2.5373	3.5797	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Sleepy Condensate T - Vertical Fixed Roof Tank
Huntington, West Virginia

Annual Emission Calculations	
Standing Losses (lb):	895.0332
Vapor Space Volume (cu ft):	1,140.3981
Vapor Density (lb/cu ft):	0.0373
Vapor Space Expansion Factor:	0.1508
Vented Vapor Saturation Factor:	0.3824
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,140.3981
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	10.0833
Tank Shell Height (ft):	20.0000
Average Liquid Height (ft):	10.0000
Roof Outage (ft):	0.0833
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.0833
Roof Height (ft):	0.2500
Roof Slope (ft/ft):	0.0400
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0373
Vapor Molecular Weight (lb/lb-mole):	69.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	3.0220
Daily Avg. Liquid Surface Temp. (deg. R):	521.0866
Daily Average Ambient Temp. (deg. F):	54.8458
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	516.7558
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,246.2101
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1508
Daily Vapor Temperature Range (deg. R):	33.2847
Daily Vapor Pressure Range (psia):	1.0425
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	3.0220
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	2.5373
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	3.5797
Daily Avg. Liquid Surface Temp. (deg R):	521.0866
Daily Min. Liquid Surface Temp. (deg R):	512.7654
Daily Max. Liquid Surface Temp. (deg R):	529.4077
Daily Ambient Temp. Range (deg. R):	20.0583
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.3824
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	3.0220
Vapor Space Outage (ft):	10.0833

Working Losses (lb):	2,098.9157
Vapor Molecular Weight (lb/lb-mole):	69.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	3.0220
Annual Net Throughput (gal/yr.):	422,761.0026
Annual Turnovers:	26.3000
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	16,074.5628
Maximum Liquid Height (ft):	19.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	2,993.9489

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Sleepy Condensate T - Vertical Fixed Roof Tank
Huntington, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 6)	2,098.92	895.03	2,993.95

Jay-Bee Oil & Gas - Sleepy

Flash Emission Calculations - Produced Water

Using Gas-Water Ratio Method

Un-Controlled

Site specific data

Gas-Water-ratio	=	4.06	scf/bbl Using GOW from comparable well pad
Throughput	=	63,600	bbl/yr
Stock tank gas molecular weight	=	39.56	g/mole

Conversions

1 lb	=	453.6 g
1 mole	=	22.4 L
1 scf	=	28.32 L
1 ton	=	2000 lb

Equations

$$E_{TOT} = Q\frac{(bbl)}{(yr)} \times R\frac{(scf)}{(bbl)} \times \frac{28.32(L)}{1(scf)} \times \frac{1(mole)}{22.4(L)} \times MW\frac{(g)}{(mole)} \times \frac{1(lb)}{453.6(g)}) \times \frac{1(ton)}{2000(lb)}$$

E_{TOT} = Total stock tank flash emissions (TPY)
R = Measured gas-oil ratio (scf/bbl)
Q = Throughput (bbl/yr)
MW = Stock tank gas molecular weight (g/mole)

$$E_{spec} = E_{TOT} \times X_{spec}$$

E_{spec} = Flash emission from constituent
X_{spec} = Weight fraction of constituent in stock tank gas

Flash Emissions

Constituent	TPY	
Total	14.2358	E_{TOT}
VOC	7.2809	Sum of C3+
Nitrogen	2.37E-01	
Carbon Dioxide	2.14E-01	
Methane	4.21E+00	
Ethane	2.29E+00	
Propane	1.64E+00	
Isobutane	4.09E-01	
n-Butane	1.15E+00	
2,2 Dimethylpropane	1.81E-02	
Isopentane	5.79E-01	
n-Pentane	8.05E-01	
2,2 Dimethylbutane	3.00E-02	
Cyclopentane	0.00E+00	
2,3 Dimethylbutane	5.79E-02	
2 Methylpentane	3.23E-01	
3 Methylpentane	2.08E-01	
n-Hexane	5.62E-01	HAP
Methylcyclopentane	5.24E-02	
Benzene	1.02E-02	HAP
Cyclohexane	7.22E-02	
2-Methylhexane	1.57E-01	
3-Methylhexane	1.63E-01	
2,2,4 Trimethylpentane	0.00E+00	
Other C7's	1.50E-01	
n-Heptane	2.73E-01	
Methylcyclohexane	1.45E-01	
Toluene	2.25E-02	HAP
Other C8's	2.49E-01	
n-Octane	7.80E-02	
Ethylbenzene	1.57E-03	HAP
M & P Xylenes	1.28E-02	HAP
O-Xylene	1.42E-03	HAP
Other C9's	7.54E-02	
n-Nonane	1.41E-02	
Other C10's	1.65E-02	
n-Decane	2.85E-03	
Undecanes (11)	2.70E-03	

September 2, 2015

FESCO, Ltd.
1100 Fesco Avenue - Alice, Texas 78332

For: SE Technologies, LLC
Building D, Second Floor
98 Vanadium Road
Bridgeville, Pennsylvania 15017-3061

Date Sampled: 08/12/15

Date Analyzed: 08/22/15

Job Number: [redacted]

Sample: [redacted] Well B1 2H

FLASH LIBERATION OF SEPARATOR WATER		
	Separator	Stock Tank
Pressure, psig	640	0
Temperature, °F	78	70
Gas Water Ratio (1)	-----	4.06
Gas Specific Gravity (2)	-----	1.069

(1) - Scf of water saturated vapor per barrel of stock tank water
(2) - Air = 1.000
(3) - Separator volume / Stock tank volume
Analyst: T.G.

Piston No. : WF# 235

Base Conditions: 14.65 PSI & 60 °F

Certified: FESCO, Ltd. Alice, Texas

David Dannhaus 361-661-7015

August 27, 2015

FESCO, Ltd.
1100 Fesco Ave. - Alice, Texas 78332

For: SE Technologies, LLC
Building D, Second Floor
98 Vanadium Road
Bridgeville, Pennsylvania 15017-3061

Sample: [redacted] Well B1 2H
Gas Liberated from Separator Water
From 540 psig & 78 °F to 0 psig & 70 °F

Date Sampled: 08/12/15 Job Number: [redacted]

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT - GPA 2286

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	1.821	
Carbon Dioxide	1.049	
Methane	58.602	
Ethane	16.424	4.367
Propane	8.000	2.191
Isobutane	1.516	0.493
n-Butane	4.274	1.340
2-2 Dimethylpropane	0.054	0.020
Isopentane	1.730	0.629
n-Pentane	2.405	0.867
Hexanes	2.953	1.209
Heptanes Plus	3.172	1.397
Totals	100.000	12.514

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.549	(Air=1)
Molecular Weight	101.90	
Gross Heating Value	5380	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.069	(Air=1)
Compressibility (Z)	0.9914	
Molecular Weight	30.68	
Gross Heating Value		
Dry Basis	1741	BTU/CF
Saturated Basis	1712	BTU/CF

*Hydrogen Sulfide tested in laboratory by: Stained Tube Method (GPA 2377)
Results: <0.013 Gr/100 CF, <0.2 PPMV or <0.001 Mol %

Base Conditions: 14.650 PSI & 60 Deg F

Sampled By: (16) Gonzalez
Analyst: MR
Processor: OA
Cylinder ID: WF# 10S

Certified: FESCO, Ltd. Alice, Texas
David Dannhaus

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT - GPA 2286

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	1.821		1.863
Carbon Dioxide	1.049		1.505
Methane	56.602		29.592
Ethane	16.424	4.367	16.095
Propane	8.000	2.191	11.497
Isobutane	1.516	0.493	2.872
n-Butane	4.274	1.340	8.096
2,2 Dimethylpropane	0.054	0.020	0.127
Isopentane	1.730	0.629	4.069
n-Pentane	2.405	0.867	5.655
2,2 Dimethylbutane	0.075	0.031	0.211
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.145	0.059	0.407
2 Methylpentane	0.807	0.333	2.268
3 Methylpentane	0.520	0.211	1.461
n-Hexane	1.405	0.575	3.947
Methylcyclopentane	0.134	0.046	0.368
Benzene	0.028	0.008	0.072
Cyclohexane	0.185	0.063	0.507
2-Methylhexane	0.337	0.156	1.102
3-Methylhexane	0.351	0.159	1.145
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.326	0.141	1.054
n-Heptane	0.588	0.270	1.921
Methylcyclohexane	0.318	0.127	1.018
Toluene	0.053	0.018	0.158
Other C8's	0.486	0.225	1.747
n-Octane	0.147	0.075	0.548
Ethylbenzene	0.003	0.001	0.011
M & P Xylenes	0.026	0.010	0.090
O-Xylene	0.003	0.001	0.010
Other C9's	0.129	0.065	0.530
n-Nonane	0.024	0.013	0.099
Other C10's	0.025	0.015	0.116
n-Decane	0.004	0.003	0.020
Undecanes (11)	0.004	0.002	0.019
Totals	100.000	12.514	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	1.069	(Air=1)
Compressibility (Z)	0.9914	
Molecular Weight	30.68	
Gross Heating Value		
Dry Basis	1741	BTU/CF
Saturated Basis	1712	BTU/CF

Jay-Bee Oil & Gas, Incorporated
Sleepy Well Pad Production Facility
Loading to Combustor

As noted in the Project Overview, vapors released during the drop in pressure on the condensate and produced water as they are routed to the atmospheric pressure storage tanks (flash gas) and subsequent working and breathing losses during storage of condensate in these tanks will controlled a Vapor Recover Unit (VRU), with an Enclosed Combustor as backup for times when the VRU is down for repair or maintenance or if there is a slug of condensate generating more flash gas than the VRU can handle.

All waste gases are hard piped to the combustor. This hard pipe capture system is conservatively estimated at 99% effective. Additionally, the combustor is warranted by the manufacturer to have 99%+ destruction efficiency, resulting in an overall 98% reduction in VOC emissions from un-controlled emissions.

Based on actual flash liberation tests on both condensate tanks and produced water tanks at nearby well pads and working/breathing losses modeled by EPA's TANKS 4.0, loading to the combustor when the VRU is down is projected as follows:

Condensate Flash Gas	826.97 tpy	188.8 lb/hr
Produced Water Flash Gas	14.24 tpy	3.25 lb/hr
Working/Breathing Losses	3.04 tpy	0.69 lb/hr
Total	**844.24 tpy**	**192.7 lb/hr**

As shown in the emissions calculation spreadsheet, the density and heat content of the produced water flash gas and the condensate flash gas are as follows. It is assumed that working/breathing losses from the condensate tanks is the same as the flash gas from these tanks.

Condensate Flash Gas	Gas Density: 0.110 lb/scf	HHV: 2290 BTU/scf
Produced Water Flash Gas	Gas Density: 0.085 lb/scf	HHV: 1747 BTU/scf

Using this data, the heat loading to the combustor is determined as follows:

Condensate Flash Gas and Working Breathing Losses:
189.5 lb/hr/0.11 lb/scf = 1723 scf/hr and 3.95 MMBTU/Hr

Produced Water Flash Gas:
3.25 lb/hr/0.085 lb/scf = 38 scf/hr and 0.067 MMBTU/Hr

The total heat loading to the combustor (4.01 MMBTU/Hr) is well within the 10.0 MMBTU/Hr capacity of the combustor and capable of managing flash gas from any slugs of condensate that may enter the system.

The overall flow to the combustor is 1761 scf/hr (42,264 scf/day) at 2278 BTU/scf.

As noted in the Project Overview, it is anticipated that the VRU will be un-available for a maximum of 200 hours per year. Thus, annual flow to the combustor (excluding any loading due to condensate slugs generating un-anticipated excess flash gas) is 0.352 MMSCF/yr. To accommodate any overloads to the VRU, this number has been doubled to 0.704 MMSCF/yr within this application.

VOC Emissions

VOC content of this combined vapor stream is 69.8%. With a 98% capture and control efficiency of all VOCs going to the combustor, hourly VOC emissions are 2.69 lb/hr [192.7 lb/Hr x 0.698 x 0.02] or 0.54 tpy (based on a doubling of the anticipated 200 hours per year as described above). This hourly and annual VOC emission rate has been entered into the preceding emissions spreadsheet.

HAP Emissions

HAPs represent approximately 3.4% of the VOC in gas going to the combustor. Thus, based on the VOC emissions calculated above, anticipated HAP emissions are 0.09 lb/hr and 0.02 tpy.

GHG Emissions

As noted above, the maximum loading to the combustor is modeled at 192.7 lb/hr. Methane represents approximately 10.2% (weight) of the combined gas stream to the combustor or 19.66 lb/Hr. At a 2% incomplete combustion, non-combusted methane is 0.39 lb/hr or 0.08 tpy. These amounts are presented in the combustor calculation sheet in lieu of the AP-42 emission factors which are not appropriate for a gas stream of this composition.

Condensate Truck Loading Lost Emissions Per AP-42

Per AP-42, Chapter 5.2.2.1.1, the uncontrolled loading loss emission factor L_L can be estimated as follows:

$$L_L = 12.46[SPM/T]$$

Where:

L_L = uncontrolled loading loss in pounds per 1000 gallons of liquid loaded
S= saturation factor (0.6)
P=true vapor pressure of liquid loaded: 3.1 psia (see attached condensate analysis report)
M= Molecular weight of vapor in lb/lb-mole 66.64 (see attached condensate analysis report)
T= temperature of bulk liquid loaded in deg R or 460+deg F (70 Deg F)

Thus, $L_L = 12.46[0.6 \times 3.1 \times 66.64]/[460+60]$
$L_L = 2.97$ lb/1000 gallons loaded

Based on sample data of breathing vapor (attached), these emissions are 99.6% VOCs. It is assumed that vapor composition from truck loading is the same as that from the tank breathing vapors.

Given a maximum loading of 100 BBL (4200 gallons) a day, uncontrolled VOC emissions are estimated at 11.09 lb of VOC per day [4.20 x 2.97 x .996]. There is no control on tank truck loading. With all daily loading taking place within 1 hour, the average hourly un-controlled emission rate is therefore estimated at 12.42 lb/hr.

Maximum annual throughput is 1,260,000 gallons (30,000 barrels) per year. Thus, un-captured/un-controlled VOC emissions are conservatively estimated at 3727 pounds per year [1260 x 2.97 x .996] or 1.86 tons per year.

Based on the attached analysis of a representative tank's breathing emissions, HAPs represent 6.8 percent of the emissions. Thus, daily HAPs emissions equal 4.20 x 2.97 x 0.068 or 0.85 lb/hr. Annual maximum HAPs emissions are estimated at 255 lb/yr [1260 x 2.97 x 0.068] or 0.13 tpy.

There are no significant VOC or HAP emissions anticipated from the loading of produced water.

April 29, 2014

FESCO, Ltd.
1100 FESCO Avenue - Alice, Texas 78332

For: Jay-Bee Oil & Gas, Inc.
1720 Route 22 East
Union, New Jersey 07083

Sample: RPT 8-1
Separator Hydrocarbon Liquid
Sampled @ 340 psig & 65 °F

Date Sampled: 04/07/14 Job Number: 42794.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.011	0.003	0.004
Carbon Dioxide	0.025	0.011	0.014
Methane	7.015	3.036	1.384
Ethane	7.995	5.461	2.956
Propane	9.072	6.384	4.919
Isobutane	2.654	2.218	1.896
n-Butane	7.473	6.018	5.341
2,2 Dimethylpropane	0.192	0.188	0.170
Isopentane	4.335	4.049	3.845
n-Pentane	5.799	5.369	5.144
2,2 Dimethylbutane	0.319	0.341	0.338
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.532	0.557	0.564
2 Methylpentane	3.616	3.833	3.831
3 Methylpentane	2.379	2.481	2.521
n-Hexane	6.324	6.642	6.701
Heptanes Plus	42.259	53.409	60.372
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

Specific Gravity	0.7441	(Water=1)
°API Gravity	58.66	@ 60°F
Molecular Weight	116.2	
Vapor Volume	20.33	CF/Gal
Weight	6.20	Lbs/Gal

Characteristics of Total Sample:

Specific Gravity	0.6583	(Water=1)
°API Gravity	83.46	@ 60°F
Molecular Weight	81.3	
Vapor Volume	25.69	CF/Gal
Weight	5.48	Lbs/Gal

Base Conditions: 14.850 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: XG
Processor: JCdjv
Cylinder ID: W-2408

David Dannhaus 361-661-7015

TANKS DATA INPUT REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.025	0.011	0.014
Nitrogen	0.011	0.003	0.004
Methane	7.015	3.036	1.384
Ethane	7.995	5.461	2.956
Propane	9.072	6.384	4.919
Isobutane	2.654	2.218	1.896
n-Butane	7.666	6.206	5.511
Isopentane	4.335	4.049	3.845
n-Pentane	5.799	5.369	5.144
Other C-6's	6.846	7.212	7.254
Heptanes	13.266	15.122	16.031
Octanes	12.697	15.144	16.932
Nonanes	4.935	6.806	7.697
Decanes Plus	8.665	13.799	16.337
Benzene	0.113	0.081	0.108
Toluene	0.613	0.525	0.695
E-Benzene	0.534	0.526	0.697
Xylenes	1.436	1.407	1.875
n-Hexane	6.324	6.642	6.701
2,2,4 Trimethylpentane	0.000	0.000	0.000
Totals:	100.000	100.000	100.000

Characteristics of Total Sample:

Specific Gravity	0.6583	(Water=1)
°API Gravity	83.46	@ 60°F
Molecular Weight	81.3	
Vapor Volume	25.69	CF/Gal
Weight	5.48	Lbs/Gal

Characteristics of Decanes (C10) Plus:

Specific Gravity	0.7794	(Water=1)
Molecular Weight	153.3	

Characteristics of Atmospheric Sample:

°API Gravity	70.79	@ 60°F
Reid Vapor Pressure (ASTM D-5191)	5.28	psi

QUALITY CONTROL CHECK			
	Sampling Conditions	Test Samples	
Cylinder Number	------	W-2408*	W-2423
Pressure, PSIG	340	299	297
Temperature, °F	65	66	66

* Sample used for analysis

FESCO, Ltd.

Job Number: 42794.002

TOTAL EXTENDED REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.011	0.003	0.004
Carbon Dioxide	0.025	0.011	0.014
Methane	7.015	3.036	1.384
Ethane	7.995	5.461	2.956
Propane	9.072	6.384	4.919
Isobutane	2.654	2.218	1.896
n-Butane	7.473	6.018	5.341
2,2 Dimethylpropane	0.192	0.188	0.170
Isopentane	4.335	4.049	3.845
n-Pentane	5.799	5.369	5.144
2,2 Dimethylbutane	0.319	0.341	0.338
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.532	0.557	0.564
2 Methylpentane	3.616	3.833	3.831
3 Methylpentane	2.379	2.481	2.521
n-Hexane	6.324	6.642	6.701
Methylcyclopentane	0.537	0.486	0.556
Benzene	0.113	0.081	0.108
Cyclohexane	0.956	0.831	0.989
2-Methylhexane	3.063	3.637	3.774
3-Methylhexane	2.577	3.022	3.175
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	1.532	1.725	1.868
n-Heptane	4.601	5.422	5.669
Methylcyclohexane	2.764	2.838	3.337
Toluene	0.613	0.525	0.695
Other C-8's	7.205	8.736	9.764
n-Octane	2.728	3.569	3.831
E-Benzene	0.534	0.526	0.697
M & P Xylenes	0.616	0.611	0.804
O-Xylene	0.820	0.796	1.071
Other C-9's	3.468	4.696	5.383
n-Nonane	1.467	2.109	2.314
Other C-10's	2.979	4.434	5.175
n-decane	0.771	1.208	1.349
Undecanes(11)	2.240	3.420	4.048
Dodecanes(12)	1.277	2.107	2.529
Tridecanes(13)	0.746	1.320	1.606
Tetradecanes(14)	0.349	0.660	0.814
Pentadecanes(15)	0.160	0.324	0.404
Hexadecanes(16)	0.078	0.169	0.213
Heptadecanes(17)	0.037	0.085	0.108
Octadecanes(18)	0.018	0.043	0.055
Nonadecanes(19)	0.007	0.017	0.022
Eicosanes(20)	0.002	0.005	0.006
Heneicosanes(21)	0.001	0.003	0.003
Docosanes(22)	0.001	0.001	0.002
Tricosanes(23)	0.000	0.001	0.001
Tetracosanes(24)	0.000	0.001	0.001
Pentacosanes(25)	0.000	0.000	0.000
Hexacosanes(26)	0.000	0.000	0.000
Heptacosanes(27)	0.000	0.000	0.000
Octacosanes(28)	0.000	0.000	0.000
Nonacosanes(29)	0.000	0.000	0.000
Triacontanes(30)	0.000	0.000	0.000
Hentriacontanes Plus(31+)	0.000	0.000	0.000
Total	100.000	100.000	100.000

May 2, 2014

FESCO, Ltd.
1100 Fesco Ave. - Alice, Texas 78332

For: Jay-Bee Oil & Gas, Inc.
1720 Route 22 East
Union, New Jersey 07083

Sample: RPT 8-1
Breathing Vapor
From 0 psig & 70 °F to 0 psig & 100 °F

Date Sampled: 04/07/14 Job Number: 42794.011

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT - GPA 2286

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.185	
Carbon Dioxide	0.018	
Methane	0.000	
Ethane	0.202	0.054
Propane	10.137	2.815
Isobutane	8.852	2.920
n-Butane	30.167	9.586
2-2 Dimethylpropane	0.370	0.142
Isopentane	15.123	5.574
n-Pentane	17.412	6.361
Hexanes	13.160	5.466
Heptanes Plus	4.374	1.881
Totals	100.000	34.799

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.547	(Air=1)
Molecular Weight	98.01	
Gross Heating Value	5251	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	2.412	(Air=1)
Compressibility (Z)	0.9539	
Molecular Weight	66.64	
Gross Heating Value		
Dry Basis	3921	BTU/CF
Saturated Basis	3853	BTU/CF

*Hydrogen Sulfide tested in laboratory by: Stained Tube Method (GPA 2377)
Results: <0.013 Gr/100 CF, <0.2 PPMV or <0.001 Mol %

Base Conditions: 14.850 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: MR
Processor: AL
Cylinder ID: ST# 21

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT - GPA 2286

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.185		0.078
Carbon Dioxide	0.018		0.012
Methane	0.000		0.001
Ethane	0.202	0.054	0.091
Propane	10.137	2.815	6.708
Isobutane	8.852	2.920	7.721
n-Butane	30.167	9.586	26.312
2,2 Dimethylpropane	0.370	0.142	0.401
Isopentane	15.123	5.574	16.374
n-Pentane	17.412	6.361	18.852
2,2 Dimethylbutane	0.570	0.240	0.737
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.805	0.332	1.041
2 Methylpentane	4.259	1.782	5.508
3 Methylpentane	2.477	1.019	3.203
n-Hexane	5.049	2.093	6.529
Methylcyclopentane	0.356	0.124	0.450
Benzene	0.078	0.022	0.091
Cyclohexane	0.432	0.148	0.545
2-Methylhexane	0.606	0.284	0.911
3-Methylhexane	0.569	0.261	0.856
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.649	0.285	0.966
n-Heptane	0.658	0.306	0.989
Methylcyclohexane	0.408	0.165	0.601
Toluene	0.071	0.024	0.098
Other C8's	0.379	0.178	0.627
n-Octane	0.082	0.042	0.141
Ethylbenzene	0.002	0.001	0.003
M & P Xylenes	0.020	0.008	0.032
O-Xylene	0.002	0.001	0.003
Other C9's	0.048	0.025	0.091
n-Nonane	0.007	0.004	0.013
Other C10's	0.005	0.003	0.011
n-Decane	0.002	0.001	0.004
Undecanes (11)	0.000	0.000	0.000
Totals	100.000	34.799	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	2.412	(Air=1)
Compressibility (Z)	0.9539	
Molecular Weight	66.64	
Gross Heating Value		
Dry Basis	3921	BTU/CF
Saturated Basis	3853	BTU/CF

5.28 RVP ≅ 3.1 psi true vapor pressure

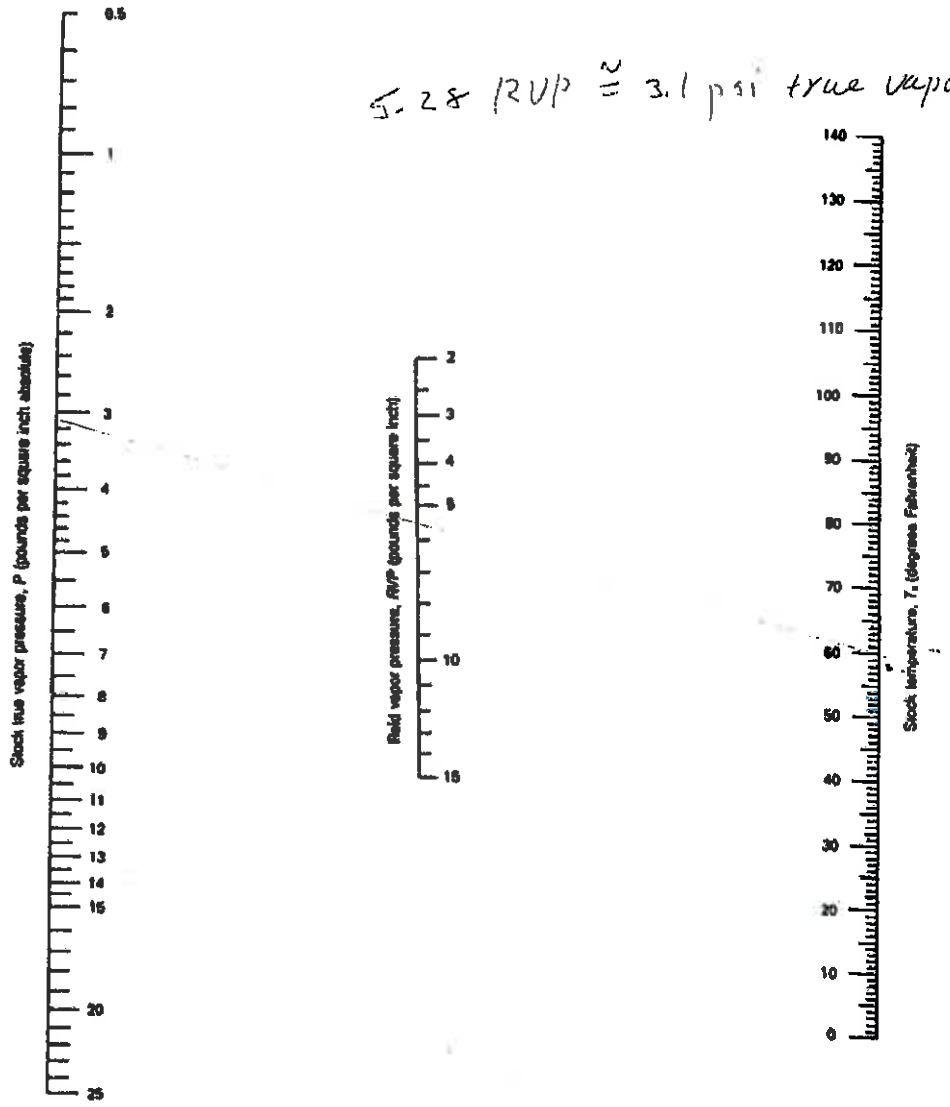


Figure 7.1-13a. True vapor pressure of crude oils with a Reid vapor pressure of 2 to 15 pounds per square inch.[4]

Attachment I
FUGITIVE EMISSIONS FROM UNPAVED HAULROADS

UNPAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)

		PM	PM-10
k =	Particle size multiplier	0.80	0.36
s =	Silt content of road surface material (%)	10	3
p =	Number of days per year with precipitation >0.01 in.	157	157

Item Number	Description	Number of Wheels	Mean Vehicle Weight (tons)	Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)
1	Produced Water Tanker Truck	18	27	10	0.9	1	630	None	0
2	Condensate Tanker Truck	18	27	10	0.9	1	300	None	0
3									
4									
5									
6									
7									
8									

Source: *AP-42 Fifth Edition – 13.2.2 Unpaved Roads*

$E = k \times 5.9 \times (s \div 12) \times (S \div 30) \times (W \div 3)^{0.7} \times (w \div 4)^{0.5} \times ((365 - p) \div 365) =$ lb/Vehicle Mile Traveled (VMT)

Where:

		PM	PM-10
k =	Particle size multiplier	0.80	0.36
s =	Silt content of road surface material (%)	10	3
S =	Mean vehicle speed (mph)	10	10
W =	Mean vehicle weight (tons)	27	27
w =	Mean number of wheels per vehicle	18	18
p =	Number of days per year with precipitation >0.01 in.	157	157

For lb/hr: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr

For TPY: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] × [Ton ÷ 2000 lb] = Tons/year

SUMMARY OF UNPAVED HAULROAD EMISSIONS

Item No.	PM				PM-10			
	Uncontrolled		Controlled		Uncontrolled		Controlled	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
1	6.52	2.05	6.52	2.05	0.88	0.28	0.88	0.28
2	6.52	0.98	6.52	0.98	0.88	0.13	0.88	0.13
3								
4								
5								
6								
7								
8								
TOTALS	13.04	3.03	13.04	3.03	1.76	0.41	1.76	0.41

FUGITIVE EMISSIONS FROM PAVED HAULROADS

INDUSTRIAL PAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)

I =	Industrial augmentation factor (dimensionless)	
n =	Number of traffic lanes	
s =	Surface material silt content (%)	
L =	Surface dust loading (lb/mile)	

Item Number	Description	Mean Vehicle Weight (tons)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)
1	None						
2							
3							
4							
5							
6							
7							
8							

Source: *AP-42 Fifth Edition – 11.2.6 Industrial Paved Roads*

$E = 0.077 \times I \times (4 \div n) \times (s \div 10) \times (L \div 1000) \times (W \div 3)^{0.7}$ = lb/Vehicle Mile Traveled (VMT)

Where:

I =	Industrial augmentation factor (dimensionless)	
n =	Number of traffic lanes	
s =	Surface meterial silt content (%)	
L =	Surface dust loading (lb/mile)	
W =	Average vehicle weight (tons)	

For lb/hr: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr

For TPY: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] × [Ton ÷ 2000 lb] = Tons/year

SUMMARY OF PAVED HAULROAD EMISSIONS

Item No.	Uncontrolled		Controlled	
	lb/hr	TPY	lb/hr	TPY
1				
2				
3				
4				
5				
6				
7				
8				
TOTALS				

ATTACHMENT J

Class I Legal Advertisement

Affidavit Notice Will Be Submitted Upon Receipt

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Jay-Bee Oil & Gas, Inc. has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70A General Permit Registration for its Sleepy Well Pad Production Facility located off of Walnut For (CR 13/1) near Middlebourne, WV in Tyler County., West Virginia (Lat.39.475506, Long. -80.73868)

The applicant estimates the potential to discharge the following regulated air pollutants:

3.13 tons of Nitrogen Oxides per year
3.82 tons of Carbon Monoxide per year
32.93 tons of Volatile Organics per year
0.02 tons of Sulfur Dioxide per year
3.26 tons of Particulate Matter per year
0.08 tons of Formaldehyde per year
0.94 tons of n-Hexane
3,256 tons of Greenhouse Gases per year

Startup of operation is planned to begin on or about the 20th day of November, 2015. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.

Dated this the **(Day)** day of **(Month)**, **(Year)**.

By: Mr. Shane Dowell
Office Manager
Jay-Bee Oil & Gas, Inc.

ATTACHMENT N

Material Safety Data Sheets

devon

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**Produced water (sweet)**
Version #	01
Revision date	04-27-2010
CAS #	Mixture
Synonym(s)	Crude Oil Separated Water, Salt Water Brine, Salt Water, Formation Water
Manufacturer/Supplier	Devon US Operations 20 North Broadway Oklahoma City, OK 73102-8260 Telephone: (405) 235-3611 - Devon Canadian Operations Calgary, AB. T2P 4H2 2000, 400 – 3rd Avenue SW. Telephone: (403) 232-7100
Emergency	Emergency Chemtrec: Within the USA (800) 424-9300 Outside the USA (703) 527-3887 Devon Canada Emergency Phone: (403) 232-7100

2. Hazards Identification

Physical state	Liquid.
Appearance	Dirty colored liquid with a faint hydrocarbon odor.
Emergency overview	WARNING! Causes eye irritation. This product may contain a small amount of hydrocarbons with a trace amount of benzene which may cause cancer and heritable genetic damage.
OSHA regulatory status	This preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments. This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Eye contact. Skin contact. Ingestion. Inhalation.
Eyes	Causes eye irritation.
Skin	Prolonged or repeated skin contact may cause irritation. Human and animal studies show that benzene is absorbed through the skin. However, absorption through the skin is normally low because benzene evaporates rapidly. In most cases, any skin contact would also involve significant inhalation exposure.
Inhalation	No inhalation hazard under normal conditions. If misting occurs: may cause mild mucous membrane irritation of the nose, throat, and upper respiratory tract. Produced water may contain benzene which may cause cancer and cause blood disorders.
Ingestion	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. The product may contain benzene which may cause cancer and cause blood disorders
Chronic effects	Contains benzene. Human epidemiology studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-producing system and serious blood disorders, including leukemia. Animal tests suggest that prolonged and/or repeated overexposure to benzene may damage the embryo/fetus. The relevance of these animal studies to humans has not been fully established.
Potential environmental effects	Not expected to be harmful to aquatic organisms.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Water	7732-18-5	80-95
Calcium chloride	10043-52-4	0-20
Potassium Chloride	7447-40-7	0-20

Sodium chloride	7647-14-5	0-20
Benzene	71-43-2	<0.1

Composition comments May contain small amounts of condensate or crude oil as a contaminate. All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First Aid Measures

First aid procedures

Eye contact In case of contact, immediately flush eyes with fresh water for at least 15 minutes while holding the eyelids open. Remove contact lenses if worn. Get medical attention if irritation persists.

Skin contact Remove contaminated clothing and shoes. Wash affected area with mild soap and water. Get medical attention if irritation develops and persists.

Inhalation If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.

Ingestion Rinse mouth thoroughly. Get medical attention if any discomfort occurs.

General advice If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire Fighting Measures

Flammable properties This product is not flammable; however sufficient hydrocarbon vapors may accumulate from oil or natural gas condensate floating on the surface of the produced water to cause a flash fire. The fire should burn out fairly rapidly depending on the amount of oil and natural gas condensate floating on the surface of the produced water.

Extinguishing media

Suitable extinguishing media Dry chemical powder. Foam. Carbon dioxide (CO2).

Protection of firefighters

Protective equipment and precautions for firefighters A fire would be associated with vapors related to oil or natural gas condensate floating on the surface of the produced water. Water maybe ineffective on flames and may even spread the fire but should be used to cool pressurized containers in the fire.

Special protective equipment for fire-fighters Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with full face-piece operated in positive pressure mode. Use approved gas detectors in confined spaces.

Specific methods Promptly isolate the scene by removing persons from the vicinity of the incident if there is a fire. Do not extinguish flames at leak because of the possibility of a uncontrolled re-ignition exists. If it is safe to do so, cut off fuel supply and/or allow fire to burn out. The fire should burn out fairly rapidly depending on the amount of oil and natural gas condensate floating on the surface of the produced water. If leak or spill has not ignited, water spray or ventilation can be used to disperse the vapors.

Hazardous combustion products Sodium oxides. Carbon oxides.

6. Accidental Release Measures

Personal precautions Keep away from sources of ignition - No smoking. The vapors should dissipate fairly rapidly depend on the amount of oil and natural gas condensate floating on the surface of the produced water. Stay upwind. Keep unnecessary personnel away. See Section 8 of the MSDS for Personal Protective Equipment.

Environmental precautions Prevent further leakage or spillage if safe to do so. Do not allow to enter drains, sewers or watercourses.

Methods for containment Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Prevent entry into waterways, sewer, basements or confined areas.

Methods for cleaning up Recover by pumping (use an explosion-proof motor or hand pump) or by sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Where feasible and appropriate, remove contaminated soil or flush with fresh water. On water spills utilize absorbent material to remove oil and natural gas liquid from the surface of the water.

Other information Avoid excess skin contact with spilled material.

7. Handling and Storage

Handling

Handle as a flammable liquid. Tank headspaces should always be regarded as potentially flammable and care should be taken to avoid static electrical discharge and all ignition sources during filling, discharging and sampling from storage tanks. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion. Keep away form heat, sparks, and open flame. Electrical equipment should be approved for classified area. Wear appropriate personal protective equipment (see section 8). Special precautions should be taken when entering or handling equipment in this type of produced water service because of possible radioactive contamination. All equipment should be checked for radioactivity or opened to the atmosphere and have forced ventilation applied for at least 4 hours prior to entry or handling. Avoid direct skin contact with any surface. Avoid generation of dust, smoke, fumes, etc. in the work area, or if they cannot be avoided, a tested and certified radionuclide dust respirator should be worn. Smoking, eating or drinking should be prohibited when working with the equipment. Workers should wash thoroughly with soap and water and discard contaminated clothing after entering or handling the equipment. Workers should wash hands and face before eating, drinking and smoking.

Storage

Keep containers in well-ventilated area away from flame, sparks, excessive temperatures and open flames. Keep the containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition. Do not enter storage areas and confined spaces without adequate ventilation. Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s). Vapors containing benzene may accumulate during storage and transport.

8. Exposure Controls / Personal Protection

Occupational exposure limits

ACGIH

Components	Type	Value
Benzene (71-43-2)	STEL	2.5 ppm
	TWA	0.5 ppm

U.S. - OSHA

Components	Type	Value
Benzene (71-43-2)	Ceiling	25 ppm
	STEL	5 ppm
	TWA	1 ppm

Canada - Alberta

Components	Type	Value
Benzene (71-43-2)	STEL	8 mg/m3
		2.5 ppm
	TWA	1.6 mg/m3
		0.5 ppm

Canada - British Columbia

Components	Type	Value
Benzene (71-43-2)	STEL	2.5 ppm
	TWA	0.5 ppm

Canada - Ontario

Components	Type	Value
Benzene (71-43-2)	STEL	2.5 ppm
	TWA	0.5 ppm
Calcium chloride (10043-52-4)	TWA	5 mg/m3

Canada - Quebec

Components	Type	Value
Benzene (71-43-2)	STEL	15.5 mg/m3
		5 ppm
	TWA	3 mg/m3
		1 ppm

Engineering controls Ensure adequate ventilation, especially in confined areas.

Personal protective equipment

Eye / face protection If eye contact is likely, safety glasses with side shields or chemical type goggles should be worn.

Skin protection	No special garments required. Wash contaminated clothing prior to reuse. Avoid unnecessary skin contamination with material. Use of chemical resistant gloves is advised to prevent skin contact.
Respiratory protection	No personal respiratory protective equipment normally required.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Handle in accordance with good industrial hygiene and safety practice.

9. Physical & Chemical Properties

Appearance	Dirty colored liquid with a faint hydrocarbon odor.
Color	Varies from clear to dark brown.
Odor	Faint. Hydrocarbon-like.
Odor threshold	Not available.
Physical state	Liquid.
Form	Liquid.
pH	4.9 - 8.5
Melting point	Not available.
Freezing point	< 32 °F (< 0 °C)
Boiling point	212 °F (100 °C) Approx.
Flash point	Variable organic oil and dissolved gases are flammable.
Evaporation rate	0.36
Flammability	Not available.
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Vapor pressure	13.6 mm Hg @ 68°F (20°C)
Vapor density	< 1
Specific gravity	1.1 @ 68°F (20°C)
Solubility (water)	Complete
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.

10. Chemical Stability & Reactivity Information

Chemical stability	Stable.
Conditions to avoid	Keep away from heat, sparks and open flame.
Hazardous decomposition products	Carbon Dioxide. Water vapor. May produce oxides of sulfur. Incomplete combustion may generate carbon monoxide.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Components	Test Results
Calcium chloride (10043-52-4)	Acute Oral LD50 Rat: 1000 mg/kg
	Acute Other LD50 Mouse: 42 mg/kg
Benzene (71-43-2)	Acute Inhalation LC50 Mouse: 9980 mg/l
	Acute Inhalation LC50 Rat: 10000 mg/l 7 Hours
	Acute Oral LD50 Mouse: 4700 mg/kg
	Acute Oral LD50 Rat: 3306 mg/kg
	Acute Other LD50 Mouse: 340 mg/kg

Components	Test Results
Benzene (71-43-2)	Acute Other LD50 Mouse: 0.000001 ml/kg
	Acute Other LD50 Rat: 2.89 mg/kg
Potassium Chloide (7447-40-7)	Acute Oral LD50 Rat: 2600 mg/kg

Toxicological information This product may contain detectable but varying quantities of the naturally occurring radioactive substance radon 222. The amount in the gas itself is not hazardous, but since radon rapidly decays (t1/2 = 3.82 days) to form other radioactive elements including lead 210, polonium 210, and bismuth 210, equipment may be radioactive. The radon daughters are solids and therefore may attach to dust particles or form films and sludges in equipment. Inhalation, ingestion or skin contact with radon daughters can lead to the deposition of radioactive material in the lungs, bone, blood forming organs, intestinal tract, kidney and colon. Occupational exposure to radon and radon daughters has been associated with an increased risk of lung cancer in underground uranium miners. Follow the special precautions listed in handling and storage section of this document (see section 7).

Local effects Causes eye irritation. May cause skin irritation. May cause discomfort if swallowed.

Sensitization Not a skin sensitizer.

Chronic effects No additional adverse health effects noted.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

ACGIH Carcinogens

Benzene (CAS 71-43-2) A1 Confirmed human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

Benzene (CAS 71-43-2) 1 Carcinogenic to humans.

US NTP Report on Carcinogens: Known carcinogen

Benzene (CAS 71-43-2) Known carcinogen.

US OSHA Specifically Regulated Substances: Cancer hazard

Benzene (CAS 71-43-2) Cancer hazard.

Epidemiology No epidemiological data is available for this product.

Mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Neurological effects No data available.

Reproductive effects Contains no ingredient listed as toxic to reproduction

Teratogenicity No known human teratogenic effect.

Further information This product has no known adverse effect on human health.

12. Ecological Information

Ecotoxicological data

Components	Test Results
Calcium chloride (10043-52-4)	EC50 Water flea (Daphnia magna): 52 mg/l 48 hours
	LC50 Fathead minnow (Pimephales promelas): 3930 - 5360 mg/l 96 hours
Benzene (71-43-2)	EC50 Water flea (Daphnia magna): 8.76 - 15.6 mg/l 48 hours
	EC50 Water flea (Daphnia magna): 8.76 - 15.6 mg/l 48 Hours
	LC50 Rainbow trout,donaldson trout (Oncorhynchus mykiss): 5 mg/l 96 Hours
Potassium Chloide (7447-40-7)	EC50 Water flea (Daphnia magna): 83 mg/l 48 hours
	LC50 Western mosquitofish (Gambusia affinis): 435 mg/l 96 hours
Sodium chloride (7647-14-5)	EC50 Water flea (Daphnia magna): 340.7 - 469.2 mg/l 48 hours
	LC50 American eel (Anguilla rostrata): 0 - 27260 mg/l 96 hours

Ecotoxicity Not expected to be harmful to aquatic organisms.

Environmental effects An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Persistence and degradability None known.

Bioaccumulation / Accumulation	No data available.
Partition coefficient (n-octanol/water)	Not available.
Mobility in environmental media	No data available.

13. Disposal Considerations

Disposal instructions	Do not allow this material to drain into sewers/water supplies. This product, in its present state, when discarded or disposed of, is not a hazardous waste according to Federal regulations (40 CFR 261.4 (b)(4)). Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.
Waste from residues / unused products	Not applicable.
Contaminated packaging	Offer rinsed packaging material to local recycling facilities.

14. Transport Information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

TDG

Not regulated as dangerous goods.

15. Regulatory Information

US federal regulations

This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

Benzene (CAS 71-43-2)	0.1 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Benzene (CAS 71-43-2)	Listed.

CERCLA (Superfund) reportable quantity (lbs)

Benzene 10

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	No

Drug Enforcement Agency (DEA)	Not controlled
WHMIS status	Controlled
WHMIS classification	D2B - Other Toxic Effects-TOXIC

WHMIS labeling

State regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - California Hazardous Substances (Director's): Listed substance

Benzene (CAS 71-43-2)	Listed.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Benzene (CAS 71-43-2)	Listed.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Benzene (CAS 71-43-2)	Listed: February 27, 1987 Carcinogenic.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997 Developmental toxin.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997 Male reproductive toxin.

US - Massachusetts RTK - Substance: Listed substance

Benzene (CAS 71-43-2)	Listed.

US - New Jersey Community RTK (EHS Survey): Reportable threshold

Benzene (CAS 71-43-2)	500 LBS

US - New Jersey RTK - Substances: Listed substance

Benzene (CAS 71-43-2)	Listed.

US - Pennsylvania RTK - Hazardous Substances: Listed substance

Benzene (CAS 71-43-2)	Listed.

US - Pennsylvania RTK - Hazardous Substances: Special hazard

Benzene (CAS 71-43-2)	Special hazard.

16. Other Information

Further information	HMIS® is a registered trade and service mark of the NPCA.
HMIS® ratings	Health: 1 Flammability: 1 Physical hazard: 0
NFPA ratings	Health: 1 Flammability: 1 Instability: 0
Disclaimer	The information in the sheet was written based on the best knowledge and experience currently available.
Issue date	04-27-2010

EP ENERGY

1. Identification

Product Name: Natural Gas Condensates

MSDS Number: A0021.sds
Synonyms: Liquids, Natural Gas; Sweet and Sour; (includes natural gasoline component)
Product Use: Natural gas production liquids

EP Energy
1001 Louisiana Street
Houston, Texas 77002

Information: (713) 997-1000 or 855-269-0826
CHEMTREC: (800) 424-9300

2. Hazard(s) Identification

Note: This product has not been tested by EP Energy to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information on the product components.

Potential Health Effects from Overexposure:

Acute Effects:

Eyes: Slight to moderate eye irritation. Contact may cause eye burns or injury. H_2S is irritating and may cause pain and an increased production of tears.

Skin: Harmful if absorbed through skin. Contact may cause irritation and possibly dermatitis.

Inhalation: Irritating to mucous membrane and respiratory tract. Can act as a simple asphyxiant. May cause dizziness or asphyxiation without warning. Overexposure may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, CNS depression, coma and respiratory arrest. H_2S is a mucous membrane and respiratory tract irritant. High concentrations of H_2S, even briefly, may cause dizziness, drowsiness, tremors, pulmonary edema, and death. H_2S acts as a chemical asphyxiant by paralyzing the respiratory center. Lower concentrations of H_2S will produce symptoms such as headache, dizziness, excitement, staggering gait, diarrhea and dysuria. H_2S is fibrogenic to the lungs following acute exposures complicated by bronchitis obliterans.

Ingestion: Stomach irritation, gastritis, headache, nausea, drowsiness, loss of consciousness, convulsions, cyanosis, pneumonitis, pulmonary edema and CNS depression, capillary hemorrhaging of the lung and internal organs. Aspiration hazard if vomiting occurs.

Chronic Effects:
Cancer hazard. Contains chemicals which may have reproductive toxicity, teratogenetic or mutagenic effects. Due to presence of benzene and n-hexane, long-term exposure may increase the risk of anemia, leukemia and nervous system damage. Liver or kidney injury may occur. May cause central nervous system disorders and/or damage. Frequent or prolonged contact may lead to dermatitis. In regards to H_2S exposure, CNS injury can be immediate and significant. Chronic low exposures to H_2S may cause conjunctivitis, photophobia, bronchitis and headaches.

Additional Medical and Toxicological Information:
Contact with full strength or dilute formulations of this product may aggravate pre-existing dermatitis or respiratory disorders in certain individuals. n-butane has been shown to cause mild cardiac sensitization in laboratory test animals. H_2S exposure may aggravate pre-existing lung ailments, gastrointestinal, cardiovascular and nervous disorders.

3. Composition/Information

Note: Composition will vary with geographic location, geologic formation, temperature and pressure.

Components	CAS No.	Wt%[1]
Propane	74-98-6	20-60
Ethane	74-84-0	1-60
n-Pentane	109-66-0	5-25
n-Hexane	110-54-3	2-13
Heptane	142-82-5	1-10
Octane	111-65-9	1-10
n-Butane	106-97-8	2-5
Cyclohexane	110-82-7	1-5
Toluene	108-88-3	0.1-5
Ethyl benzene	100-41-4	0.1-5
Xylenes	1330-20-7	0.1-5
Benzene	71-43-2	0-2
Hydrogen Sulfide	7783-06-4	Varies

4. First-Aid Measures

Eye Contact: Immediately flush gently with large amounts of luke warm water, holding eyelids open, for at least 15 minutes. Seek medical attention. If eye is exposed to hot liquid, cover eyes with cloth and seek immediate medical attention.

Skin Contact: Remove and isolate contaminated clothing and shoes. Flush skin with water. Seek medical attention if irritation persists or there is a large area of contact. Decontaminate clothing before reuse. In case of hot liquid exposure, do not remove clothing or treat, wash only unburned area and seek immediate medical attention.

Inhalation: If atmosphere is safe, move victim to fresh air. If breathing has stopped and airway is clear, provide artificial respiration. i. Do not use mouth-to-mouth method if victim ingested or inhaled the substance. Provide artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult, if qualified. Seek immediate medical attention.

Ingestion: DO NOT INDUCE VOMITING. If spontaneous vomiting occurs, place on the left side with head down to prevent aspiration of liquid into the lungs. Give 1-2 glasses of water if patient is alert and able to swallow. Have exposed individual rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person. Do not leave victim unattended. Monitor for breathing difficulties. Seek immediate medical attention.

Medical Providers: Medical providers are urged to contact a Regional Poison Center at 800-222-1222.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents.

At high concentrations, H_2S may produce pulmonary edema, respiratory depression, and/or respiratory paralysis.

Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (l)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

5. Fire-Fighting Measures

Flammable Properties:
Flash Point: -45 °F to -170 °F
Flammable Limits in Air % by Vol.:
Lower (LFL): 1.4-3.0 % Upper (UFL): 7.6-12.5 %
Auto-ignition Temperature: 495-850 °F

NFPA Ratings: Health: 2 Flammability: 4 Reactivity: 0

General Fire Hazards:
Extremely flammable. Easily ignited by heat, sparks or flames or other sources of ignition. Flowing condensates can be ignited by self-generated static electricity. Containers should be grounded and bonded. Vapors from liquefied gas are initially heavier than air and spread along ground. Vapors may reach an ignition source, and flashback. Runoff to sewer may create fire or explosion hazard downstream from the source. Gases may form explosive mixtures with air. BLEVE'S (Boiling Liquid Expanding Vapor Explosions) can occur when a liquid in a pressurized container is heated to temperatures beyond its boiling point. This can lead to failure of the container and damage to the surrounding area.

Hazardous combustion/decomposition products may include carbon monoxide, carbon dioxide, hydrocarbons, nitrogen oxides, and sulfur oxides. Hydrogen sulfide may be present. Downwind personnel must be evacuated.

Extinguishing Media:
Suitable extinguishing media: Class B fire extinguisher, dry chemical, foam or carbon dioxide. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. For large fires, use unmanned hoses.

Unsuitable extinguishing media: Water should not be used as an extinguishing media, but should be used as a spray to keep surroundings area cool.

Fire Fighting Instructions: DO NOT extinguish a leaking gas flame unless the leak can be stopped. Allow gas to burn out. Move containers from fire area if you can do it without risk. Use a smothering technique for extinguishing fire of this flammable liquid. Do not use a forced- water stream directly on condensate fires as this will scatter the fire. Use a water spray to cool fire-exposed containers and surrounding areas until well after fire is out. Do not direct water at source of leak or safety devices as icing may occur. Dike fire-control water for later disposal; do not scatter the material. Firefighters should wear self-contained breathing apparatus and full protective clothing. Refer to Section 8 for proper PPE selection.

Precautions for Fire Involving Tanks or Car/Trailer Loads: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions. Consider initial evacuation for 800 meters (1/2 mile) in all directions. ALWAYS stay away from tanks engulfed in flame. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. If unmanned hose

holders or monitor nozzles cannot be used, withdraw from area and let fire burn.

6. Accidental Release Measures

As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed spaces before re-entering.

Remove any ignition sources and protect from ignition. Water spray may reduce vapor, but may not prevent ignition in closed spaces. A vapor suppressing foam may be used to reduce vapors. Provide sufficient ventilation in the affected area(s) and wear appropriate personal protective equipment as indicated in Section 8 when handling spill material.

If the facility has an oil or hazardous substance contingency plan, activate its procedures For emergency information and procedures to follow in the case of an accidental release, call the Emergency Telephone Number(s) listed in Section 1.

In case of spillage, absorb with inert material and dispose of in accordance with applicable regulations. Use clean, non-sparking tools to collect absorbed materials. Dike far ahead of liquid spill for later disposal. Never discharge releases directly into sewers or surface waters. Advise authorities and the National Response Center (800-424-8802) if the release is to navigable waters. Clean up in accordance with all applicable regulations.

7. Handling and Storage

Handle in accordance with good industrial hygiene and safety practices. These practices include, but are not limited to, avoiding unnecessary exposure and prompt removal of material from eyes, skin, and clothing. If needed, take first aid actions as indicated in Section 4.

Handling: Handle as a flammable liquid. Keep away from heat, sparks and open flame. No smoking. May release or contain dangerous levels of H_2S. Use only with adequate ventilation. Wear appropriate personal protective equipment and use exposure controls as indicated in Section 8. Vent slowly to the atmosphere when opening. Avoid all contact with skin and eyes. Avoid breathing product dust or vapors. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Non-sparking tools should be used. Bond and ground containers before product transfer. Review all operations which have the potential of generating and accumulating electrostatic charge and/or flammable atmosphere including tank and container filling, cleaning, sampling gauging, switch loading, mixing, agitation and vacuum truck operations. Use appropriate mitigating procedures. Do not enter confined spaces without following proper entry procedures. Remove contaminated clothing immediately. Wash with soap and water after working with this product.

Scales, deposits and sludge from equipment associated with this product may have accumulation of Naturally Occurring Radioactive Materials (NORM).Equipment should be assessed for external gamma radiation.

Storage: Keep away from flame, sparks, excessive temperatures and open flame. No smoking. Maintain vessels closed and clearly labeled. Empty vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose these vessels to sources of ignition. This material may contain or release H_2S. In a tank or other closed container, the vapor space above this material may accumulate hazardous concentrations of H_2S. Do not enter confined spaces without following proper entry procedures. Ground all containers during transfer. Store away from incompatible materials. Use appropriate containment to avoid environmental contamination.

Incompatibilities: Keep away from strong oxidizers, ignition sources and heat.

8. Exposure Controls/Personal Protection

Components	CAS No.	Occupational Exposure Limits			Units
		OSHA[1]	ACGIH[1]	NIOSH[2]	
Ethane	74-84-0	N/A	1000[3]	N/A	ppm
Propane	74-98-6	1000	1000[3]	1000	ppm
n-Butane	106-97-8	N/A	1000[3]	800	ppm
n-Pentane	109-66-0	1000	600	120 610 Ceiling	ppm
n-Hexane	110-54-3	500	50[4]	50	ppm
Heptane	142-82-5	500	400 500 STEL	85 440 Ceiling	ppm
Octane	111-65-9	500	300	75 385 Ceiling	ppm
Cyclohexane	110-82-7	300	100	300	ppm
Toluene	108-88-3	200 300 Ceiling	20[4]	100 150 STEL	ppm
Ethyl benzene	100-41-4	100	20[4]	100 125 STEL	ppm
Xylenes	1330-20-7	100	100[4] 150 STEL	100 150 STEL	ppm
Petroleum distillates, naptha	8002-05-9	<1	500 ppm	N/A	350 mg/m^3
Hydrogen Sulfide	7783-06-4	20 Ceiling	15 STEL	10 Ceiling	ppm
Benzene	71-43-2	1 5 STEL	0.5[5] 2.5 STEL	0.1 1 STEL	ppm

[1]8-hour TWA unless otherwise specified.
[2]10-hour TWA unless otherwise specified.
[3]Exposure limit given as Aliphatic hydrocarbon gases: Alkanes [C_1-C_4].
[4]ACGIH has established a Biological Exposure Index (BEI) for this substance.
N/A: Not Applicable
STEL: 15-minute Short Term Exposure Limit
Ceiling: Concentration not to be exceeded at any time

Eye Protection: Safety glasses are required standard PPE. If contact with liquid condensates is possible, chemical splash goggles or face shield may be required. Ensure that eye wash station is operable and nearby.

Skin Protection: Fire Resistant Clothing (FRC) is required standard PPE. Where contact with liquid condensates is possible, use protective clothing and/or gloves made of nitrile rubber or polyvinyl alcohol (PVA). Wash with soap and water before eating, drinking or smoking. Wash contaminated clothing before reuse.

Inhalation: A NIOSH-approved respirator must be worn where controls do not maintain airborne concentrations below occupational exposure limits. Positive-pressure, full-face, self-contained breathing apparatus (SCBA) should be available for emergency use. HYDROGEN SULFIDE MAY BE PRESENT OR RELEASED. NIOSH-approved respiratory protection should be used when handling crude of high or unknown hydrogen sulfide content and to reduce airborne concentrations to allowable occupational exposure levels.

Engineering Controls: Provide adequate general and local exhaust ventilation to: (1) Maintain airborne chemical concentrations below applicable exposure limits, (2) Prevent accumulation of flammable vapors and formation of explosive atmospheres, and (3) Prevent formation of oxygen deficient atmospheres, especially in confined spaces.

9. Physical and Chemical Properties

Values given are typical of similar products. There are no test results for this mixture.

Appearance:	Brown to clear liquid	**% Volatile by Volume:**	100
Odor:	Petroleum-like, gasoline-like or rotten eggs	**Viscosity:**	Not available
Boiling Point:	Varies widely based on hydrocarbon content	**Melting Point:**	-122 °F
Freezing Point:	Not available	**Vapor Density (Air = 1):**	3-4 (natural gasoline)
Vapor Pressure:	Not available	**pH:**	Not available
Solubility in H_2O:	Negligible	**Evaporation Rate: (Ethyl Ether = 1)**	> 1
Specific Gravity @ 60° F & 1 atm:	0.6-0.8	**Molecular Wt.:**	Not available

10. Stability and Reactivity

Stability: Stable under normal conditions of use and normal temperature conditions
Hazardous Polymerization: Will not occur.
Conditions to Avoid/Incompatibilities: Strong oxidizing agents, strong acids, chlorine, fluorine, bromine and metal catalysts, heat, sparks, flame and build-up of static electricity.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and sulfur dioxide.

11. Toxicological Information

Toxicological data does not exist for this mixture. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffers Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline. This substance may have a potential for sensitization. Exposure to light hydrocarbons in the same boiling range as this product have been associated in animal studies with effects to the central nervous system, peripheral nervous system, liver, and kidneys. The significance of these animal models to predict similar human response is uncertain. Observing good work practices and personal hygiene procedures can minimize potential risks to humans. Harmful if swallowed. May cause cancer.

BENZENE: This product contains benzene, which can cause degeneration in blood forming bone marrow leading to anemia which may further degrade to leukemia, a type of cancer. Acute benzene poisoning causes central nervous system depression. Chronic exposure affects the hematopoietic system causing blood disorders including anemia and pancytopenia. Mutagenic and clastogenic in mammalian and non-mammalian test systems. Reproductive or developmental toxicant only at doses that are maternally toxic based on tests with animals.

HYDROGEN SULFIDE: This product may contain or release hydrogen sulfide, which may be fatal if inhaled. Greater than 15-20 ppm continuous exposure can cause mucous membrane and respiratory tract irritation. 50-500 ppm can cause headache, nausea, dizziness, loss of reasoning and balance, difficulty breathing, fluid in the lungs and possible loss of consciousness. Greater than 500 ppm can cause rapid or immediate unconsciousness due to respiratory paralysis and death by suffocation unless removed from exposure and successfully resuscitated. Inhalation of a single breath at a concentration of 1000 ppm (0.1%) can cause immediate unconsciousness and death. Hydrogen sulfide is corrosive when moist. Skin contact may cause burns. There is a rapid loss of sense of smell on exposure to gas concentrations above 50 ppm. At high concentrations, individuals may not even recognize the odor before becoming unconscious.

Carcinogenicity:

Component (CAS No.)	ACGIH[1]	IARC Monographs[2]	US NTP	OSHA Regulated
Benzene (71-43-2)	A1	1	Yes	Yes
Ethyl benzene (100-41-4)	A3	2B	No	No
Toluene (108-88-3)	A4	3	No	No
Xylene (1330-20-7)	A4	3	No	No

[1]ACGIH Carcinogens: A1 = Confirmed human carcinogen, A2 = Suspected human carcinogen, A3 = Confirmed animal carcinogen with unknown relevance to humans, A4 = Not classifiable as a human carcinogen, A5 = Not suspected as a human carcinogen
[2]IARC Monographs: 1 = Carcinogenic to humans, 2A = Probably carcinogenic to humans, 2B = Possibly carcinogenic to humans, 3 = Not classifiable as to carcinogenicity to humans, 4 = Probably not carcinogenic to humans

12. Ecological Information

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations. May be hazardous to waterways/wildlife.

13. Disposal Information

Do not dispose of waste into sewer. Do not allow this material to drain into sewers/water supplies. If discarded, this material meets the criteria of

being an "ignitable" waste. If hydrogen sulfide, benzene, toluene and/or xylene are present in the waste, the waste may be considered a hazardous U-listed waste. Under RCRA, it is the responsibility of the user to determine, at the time of disposal, if the material meets federal, state, or local criteria to be defined as a hazardous waste.

14. Transport Information

Proper Shipping Name: Petroleum products, n.o.s (condensate)
UN/Identification No: UN 1268
Hazard Class: 3
Packing Group: II
ERG#: 128

Proper Shipping Name: Gasoline
UN/Identification No: UN1203
Hazard Class: 3
Packing Group: II
ERG#: 128

Additional Info: Dependent on the product's properties, the shipper may elect to classify as Gasoline UN1203 or Petroleum Crude Oil UN1267 - reference 49 CFR 172.101 for further description.

15. Regulatory Information

EPA SARA TITLE III

Section 302 EPCRA Extremely Hazardous Substances (EHS)

Product Component	*CAS No.*	*Wt%*	*RQ, lb*	*TPQ, lb*
Hydrogen Sulfide	7783-06-4	0.1-2	100	500

Section 304 CERCLA Hazardous Substances

Product Component	*CAS No.*	*Wt%*	*RQ, lb*
Benzene	71-43-2	0-5	10
Toluene	108-88-3	0.1-5	1000
Xylene	1330-20-7	0.1-5	100
Cyclohexane	110-82-7	0.1-5	1000
Hydrogen Sulfide	7783-06-4	0.1-2	100
Ethylbenzene	100-41-4	0.1-5	1000
n-Hexane	110-54-3	1-10	5000

Section 311/312 Hazard Categorization

Acute:	*Chronic:*	*Fire:*	*Pressure:*	*Reactive:*
Yes	Yes	Yes	Yes	No

Section 313 EPCRA Toxic Substances

Product Component	*CAS No.*	*Wt.%*
Benzene	71-43-2	0-5
Toluene	108-88-3	0.1-5
Xylene	1330-20-7	0.1-5
Cyclohexane	110-82-7	0.1-5
Hydrogen Sulfide	7783-06-4	0.1-2
Ethylbenzene	100-41-4	0.1-5
N-Hexane	110-54-3	1-10

EPA TSCA
All components are either on the U.S. EPA TSCA Inventory List, or are not regulated under TSCA.

Key: RQ = Reportable Quantity
TPQ = Threshold Planning Quantity (EHS)

CALIFORNIA PROPOSITION 65 WARNING

Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm may be found in crude oil and petroleum products. Although it is possible to sufficiently refine a crude oil or its end products to remove the potential for cancer, we are advising that one or more of the listed chemicals may be present in some detectable quantities. Read and follow directions and use care when handling crude oil and petroleum products.

16. Other Information

Last Revision: 08/01/2012, Date Prepared: 10/27/1985

THIS INFORMATION RELATES ONLY TO THE SPECIFIC MATERIAL DESIGNATED AND MAY NOT BE VALID FOR SUCH MATERIAL USED IN COMBINATION WITH ANY OTHER MATERIALS OR IN ANY PROCESS. SUCH INFORMATION IS TO THE BEST OF THIS COMPANY'S KNOWLEDGE AND BELIEVED ACCURATE AND RELIABLE AS OF THE DATE INDICATED. HOWEVER, NO REPRESENTATION, WARRANTY OR GUARANTEE IS MADE AS TO THE ACCURACY, RELIABILITY OR COMPLETENESS. IT IS THE USER'S RESPONSIBILITY TO SATISFY THEMSELVES AS TO THE SUITABILITY AND COMPLETENESS OF SUCH INFORMATION FOR THEIR OWN PARTICULAR USE.

Key/Legend:
ACGIH - American Conference of Governmental Industrial Hygienists
ADR - Agreement on Dangerous Goods by Road
CAA - Clean Air Act
CAS - Chemical Abstracts Service Registry Number
CDG - Carriage of Dangerous Goods By Road and Rail Manual
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CFR - Code of Federal Regulations
CNS - Central Nervous System
EINECS - European Inventory of Existing Chemical Substances Registry Number
ERG - Emergency Response Guidebook
EPCRA - Emergency Planning and Community Right-to-Know Act
GHS - Globally Harmonized System of Classification and Labeling of Chemicals
IARC - International Agency for Research on Cancer
IATA - International Air Transport Association
ICAO - International Civil Aviation Organization
IMDG - International Maritime Dangerous Goods Code
IMO - International Maritime Organization
MSDS - Material Safety Data Sheet
N/E - Not Established
NTP - National Toxicology Program
OSHA - Occupational Safety and Health Administration
PEL - Permissible Exposure Limit
PPE - Personal Protective Equipment
RCRA - Resource Conversation and Recovery Act
RID - Regulations Concerning the International Transport of Dangerous Goods by Rail
RQ - Reportable Quantities
SARA - Superfund Amendments and Reauthorization Act of 1986
SDS - Safety Data Sheet
TCC - Tag Closed Cup
TDG - Transportation of Dangerous Goods
TLV - Threshold Limit Value
TSCA - Toxic Substance Control Act
UN/NA - United Nations / North American Number
UNECE - United Nations Economic Commission for Europe
US DOT - United States Department of Transportation
US EPA - United States Environmental Protection Agency
Vol. - Volume
WHMIS - Workplace Hazardous Materials Information System

This is the end of MSDS A0021.sds

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **MOBIL DTE OIL EXTRA HEAVY**
Product Description: Base Oil and Additives
Product Code: 201560501595, 600205-00, 970010
Intended Use: Circulating oil

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

No Reportable Hazardous Substance(s) or Complex Substance(s).

SECTION 3 HAZARDS IDENTIFICATION

This material is not considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL HEALTH EFFECTS

Low order of toxicity. Excessive exposure may result in eye, skin, or respiratory irritation. High-pressure injection under skin may cause serious damage.

NFPA Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0
HMIS Hazard ID:	Health:	0	Flammability:	1	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use

adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Smoke, Fume, Aldehydes, Sulfur oxides, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: >227°C (441°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders. For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers. Keep away from incompatible materials.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits/standards for materials that can be formed when handling this product: When mists/aerosols can occur the following are recommended: 5 mg/m³ - ACGIH TLV (inhalable fraction), 5 mg/m³ - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Form: Clear
Color: Amber
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.89
Flash Point [Method]: >227°C (441°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 316°C (600°F)
Vapor Density (Air = 1): > 2 at 101 kPa
Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 °C
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: 146.2 cSt (146.2 mm2/sec) at 40 °C | 14.4 cSt (14.4 mm2/sec) at 100°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -12°C (10°F)
DMSO Extract (mineral oil only), IP-346: < 3 %wt

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on test data for structurally similar materials.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

Additional information is available by request.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC
2 = NTP SUS
3 = IARC 1
4 = IARC 2A
5 = IARC 2B
6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY
Biodegradation:
Base oil component – Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL
Base oil component – Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS
Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

REGULATORY DISPOSAL INFORMATION
RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrositivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT): Not Regulated for Land Transport

LAND (TDG): Not Regulated for Land Transport

SEA (IMDG): Not Regulated for Sea Transport according to IMDG-Code

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purposes, this material is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

Complies with the following national/regional chemical inventory requirements:: AICS, DSL, EINECS, ENCS, IECSC, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY: This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
PHOSPHORODITHOIC ACID, O,O-DI C1-14-ALKYL ESTERS, ZINC SALTS (2:1) (ZDDP)	68649-42-3	15

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 06: Notification Procedures - Header was modified.
Section 13: Disposal Considerations - Disposal Recommendations was modified.
Section 10 Stability and Reactivity - Header was modified.
Section 13: Disposal Recommendations - Note was modified.
Section 09: Phys/Chem Properties Note was modified.
Section 09: Boiling Point C(F) was modified.
Section 08: Comply with applicable regulations phrase was modified.
Section 08: Personal Protection was modified.
Section 08: Hand Protection was modified.

Section 09: Vapor Pressure was modified.
Section 07: Handling and Storage - Handling was modified.
Section 07: Handling and Storage - Storage Phrases was modified.
Section 11: Dermal Lethality Test Data was modified.
Section 11: Oral Lethality Test Data was modified.
Section 05: Hazardous Combustion Products was modified.
Section 06: Accidental Release - Spill Management - Water was modified.
Section 09: Relative Density - Header was modified.
Section 09: Flash Point C(F) was modified.
Section 09: Viscosity was modified.
Section 09: Viscosity was modified.
Section 14: Sea (IMDG) - Header was modified.
Section 14: Air (IATA) - Header was modified.
Section 14: LAND (TDG) - Header was modified.
Section 14: LAND (DOT) - Header was modified.
Section 15: List Citation Table - Header was modified.
Section 14: LAND (DOT) - Default was modified.
Section 14: LAND (TDG) Default was modified.
Section 14: Sea (IMDG) - Default was modified.
Section 14: Air (IATA) - Default was modified.
Section 15: National Chemical Inventory Listing - Header was modified.
Section 15: National Chemical Inventory Listing was modified.
Section 16: Code to MHCs was modified.
Section 08: Exposure limits/standards was modified.
Hazard Identification: OSHA - May be Hazardous Statement was modified.
Section 06: Notification Procedures was modified.
Section 09: Oxidizing Properties was modified.
Section 01: Company Contact Methods Sorted by Priority was modified.
Section 06: Protective Measures was added.
Section 06: Accidental Release - Protective Measures - Header was added.

Internal Use Only
MHC: 0B, 0B, 0, 0, 0, 0 PPEC: A

DGN: 2007114XUS (1013921)

ATTACHMENT O

Emissions Summary Sheets

G70-A EMISSIONS SUMMARY SHEET

Emission Point ID No.	Emission Point Type[1]	Emission Unit Vented Through This Point		Air Pollution Control Device		All Regulated Pollutants - Chemical Name/CAS[2]	Maximum Potential Uncontrolled Emissions[3]		Maximum Potential Controlled Emissions[4]		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used[5]
		ID No.	Source	ID No.	Device Type	(Speciate VOCs & HAPS)	lb/hr	ton/yr	lb/hr	ton/yr		
1E	Upward Vertical Stack	GPU-1	GPU-1	None		NOx	0.15	0.66	0.15	0.66	Gas	EE
						CO	0.13	0.55	0.13	0.55	Gas	EE
						VOC	0.01	0.04	0.01	0.04	Gas	EE
						PM	0.01	0.05	0.01	0.05	Solid	EE
						HCOH	<0.01	<0.01	<0.01	<0.01	Gas	EE
						Total HAPs	<0.01	0.01	<0.01	0.01	Gas	EE
						CO2e	181.2	794	181.2	794	Gas	EE
2E	Upward Vertical Stack	GPU-2	GPU-2	None		NOx	0.15	0.66	0.15	0.66	Gas	EE
						CO	0.13	0.55	0.13	0.55	Gas	EE
						VOC	0.01	0.04	0.01	0.04	Gas	EE
						PM	0.01	0.05	0.01	0.05	Solid	EE
						HCOH	<0.01	<0.01	<0.01	<0.01	Gas	EE
						Total HAPs	<0.01	0.01	<0.01	0.01	Gas	EE
						CO2e	181.2	794	181.2	794	Gas	EE
3E	Upward Vertical Stack	GPU-3	GPU-3	None		NOx	0.15	0.66	0.15	0.66	Gas	EE
						CO	0.13	0.55	0.13	0.55	Gas	EE
						VOC	0.01	0.04	0.01	0.04	Gas	EE
						PM	0.01	0.05	0.01	0.05	Solid	EE
						HCOH	<0.01	<0.01	<0.01	<0.01	Gas	EE
						Total HAPs	<0.01	0.01	<0.01	0.01	Gas	EE
						CO2e	181.2	794	181.2	794	Gas	EE
4E	Fugitive	VRU-1/EC-1	Un-Captured/ Un-Controlled Tank Emissions	VRU-1 / EC-1	VRU	NOx					Gas	EE
						CO					Gas	EE
						VOC	135.2	589.7	6.76	28.80	Gas	EE
						PM					Solid	EE
						HCOH					Gas	EE
						Total HAPs	4.52	19.8	0.23	0.98	Gas	EE
						CO2e	496	2173	24.8	106	Gas	EE

5E	Fugitive	TL-1	Condensate Truck Loading	None		NOx					Gas	EE
						CO					Gas	EE
						VOC	12.42	1.86	12.42	1.86	Gas	EE
						PM					Solid	EE
						HCOH					Gas	EE
						Total HAPs	0.85	0.13	0.85	0.13	Gas	EE
						CO2e					Gas	EE
6E	Fugitive	TL-2	Water Truck Loading	None		NOx					Gas	EE
						CO					Gas	EE
						VOC	<0.01	<0.01	<0.01	<0.01	Gas	EE
						PM					Solid	EE
						HCOH					Gas	EE
						Total HAPs	<0.01	<0.01	<0.01	<0.01	Gas	EE
						CO2e					Gas	EE
7E	Upward Vertical Stack	CE-1	Engine	1C	NSCR	NOx	2.11	9.25	0.19	0.81	Gas	EE
						CO	2.71	11.87	0.37	1.62	Gas	EE
						VOC	0.05	0.21	0.05	0.21	Gas	EE
						PM	0.01	0.06	0.01	0.06	Solid	EE
						HCOH	0.02	0.07	0.02	0.07	Gas	EE
						Total HAPs	0.02	0.11	0.02	0.11	Gas	EE
						CO2e	89.4	391	89.4	391	Gas	EE
8E	Upward Vertical Stack	TEG-1	Thermo-electric generator	None		NOx	<0.01	0.01	<0.01	0.01	Gas	EE
						CO	<0.01	0.01	<0.01	0.01	Gas	EE
						VOC	<0.01	<0.01	<0.01	<0.01	Gas	EE
						PM	<0.01	<0.01	<0.01	<0.01	Solid	EE
						HCOH	<0.01	<0.01	<0.01	<0.01	Gas	EE
						Total HAPs	<0.01	<0.01	<0.01	<0.01	Gas	EE
						CO2e	2	7	2	7	Gas	EE
9E	Upward Vertical Stack	EC-1	Enclosed Combustor (Back-up for VRU)			NOx	0.34	0.35	0.34	0.35	Gas	EE
						CO	1.54	0.54	1.54	0.54	Gas	EE
						VOC	2.83	1.15	2.83	1.15	Gas	EE
						PM	<0.01	0.02	<0.01	0.02	Solid	EE
						HCOH	<0.01	<0.01	<0.01	<0.01	Gas	EE
						Total HAPs	0.09	<0.01	0.09	<0.01	Gas	EE
						CO2e	557	350	557	350	Gas	EE

The EMISSION SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSIONS SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases

[3] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[4] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).4C

[5] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; M = modeling; O = other (specify).

ATTACHMENT P

Other Supporting Documentation

Sleepy Well Pad Production Facility
Attachment P
Regulatory Analysis

Both State and Federal environmental regulations governing air emissions apply to the planned Sleepy Well Pad Production Facility. The West Virginia Department of Environmental Protection (WVDEP) has been delegated the authority to implement certain federal air quality requirements for the state. Air quality regulations that potentially affect the modification are discussed herein.

1.1 PSD and NSR

The facility will be a minor source with respect to Prevention of Significant Deterioration (PSD) regulations as it will not have the potential to emit more than the annual emission thresholds of any PSD regulated pollutant with the voluntary restrictions (e.g., catalytic converter on the engine).

The facility is within an area designated as attainment for all criteria pollutants. Consequently, the facility is not subject to the New Source Review (NSR) regulations. Consequently, NSR requirements are not applicable to this project.

1.2 Title V Operating Permit Program

West Virginia has incorporated provisions of the federal Title V operating permit program. Thresholds for inclusion under the Title V program are 10 tpy of any single Hazardous Air Pollutant (HAP) or 25 tons of any combination of HAP and/or 100 tpy of all other regulated pollutants. Additionally, facilities regulated under certain New Source Performance Standards (NSPS) require facilities to have Title V permits.

The expanded facility will remain a minor source. Additionally, the NSPS regulating this facility does not trigger a Title V permit. Hence, a Title V permit will not be required for the Sleepy Well Pad Production Facility.

1.3 Aggregation

Source aggregation determinations are typically made based on the following criteria:

- Whether the facilities are under common control,
- Whether the facilities belong to the same Major Group (i.e. the first two digit code) as described in the Standard Industrial Classification Manual, 1972, as amended by the 1977 Supplement;
- Whether the facilities are located on one or more contiguous or adjacent properties; and the distance between all pollutant emitting activities,
- Whether the facilities can operate independently

Only if all criteria are met does a permitting authority aggregate the facilities into a single source.

This facility will receive and manage raw natural gas and associated produced fluids from the three on-site wells. After separation of the liquids, the gas will be injected into gathering lines for transportation to either Jay-Bee's Big Moses Compressor Station or its Ketel Compressor Station for compression, dehydration and injection into a pipeline system for transportation to a regional natural gas processing plant owned and operated by others.

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, Big Moses Compressor station is just under 5.0 miles from the Sleepy Well Pad, with no clear line of sight and properties owned by others in between. The Ketel Compressor Station is just over 3.0 miles away, again with properties owned by others in between. As the gas can flow to either compressor station, there is no dependency of the well pad on either compressor station. Additionally, operation of either compressor station is not dependent upon the Sleepy Well Pad as both also receive gas from other well pads. Most importantly, the distance between the planned Sleepy Well Pad Production facility and these compressor stations 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/or Ketel Compressor Stations.

The closest Jay-Bee facility to the Sleepy Well Pad Production Facility is its Happy Well Pad. As with the compressor stations discussed above, this facility is under common ownership, under the same SIC code and may, from time to time, have a sharing of staff. However, these two well pads are approximately 4,100 feet (0.78 miles) apart. Additionally, they are not in line of site, do not utilize the same county roads to access and are not on contiguous or adjacent parcels. Lastly, there is no interconnection or interdependency between these two facilities. Gas from one well pad does not flow to the other. Accordingly, the operation of one well pad is not dependent upon the operation of the other. Thus, given the lack of dependency and the distance of separation, emissions from these two well pads should not be aggregated.

1.4 New Source Performance Standards

New Source Performance Standards (NSPS) regulations promulgated under 40 CFR 60 require new and reconstructed facilities to control emissions to the level achievable by Best-Available Control Technology (BACT). Specific NSPS requirements potentially applicable to the Sleepy Well Pad Production Facility are as follows:

- 40 CFR 60, Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units
- 40 CFR 60, Subpart KKK – Equipment Leaks of VOC from Onshore Natural Gas Processing Stations
- 40 CFR 60, Subpart LLL – Onshore Natural Gas Processing Stations: SO_2 Emissions

- 40 CFR 60, Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines
- 40 CFR 60, Subpart OOOO - Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution

1.4.1 Subpart Dc

This subpart limits SO2 and PM emissions from boilers and heaters fired by various fuels. While the primary thrust of this set of regulations it to control SOx and PM emissions from coal and oil-fired boilers and heaters, natural gas fired units are also covered under this rule. The planned Gas Processing Units have heat inputs that are well below the threshold of coverage for this rule (10 MMBTU/Hr). Thus, this rule does not apply.

1.4.2 Subpart KKK

This subpart limits VOC emissions from equipment at a natural gas processing station. The planned Sleepy Well Pad Production Facility does not meet the definition of a processing station under this rule. Hence, this rule does not apply.

1.4.3 Subpart LLL

This set of regulations governs emissions from processes used to remove sulfur gases from the field gas stream (sweetening unit) and subsequent sulfur recovery operations. The field gas that will be received by the Sleepy Well Pad Production Facility does not contain sufficient sulfur compounds to warrant a sweetening unit. Accordingly, not such equipment will be present. Hence, this rule does not apply.

1.4.4 Subpart IIII

This subpart governs emissions from new compression ignition internal combustion engines CI ICE) manufactured after July 11, 2005. There will be no compression ignition engines (e.g. diesel-fired emergency generator) at this station. Hence, this rule does not apply.

1.4.5 Subpart JJJJ

This subpart governs emissions from new stationary spark ignition internal combustion engines (SI ICE) manufactured after July 1, 2007. The driver for the Vapor Recovery Unit will be SI ICE units manufactured after this date. Accordingly, this rule applies to this engine. More specifically, 60.4233(d) stipulates that non-emergency natural gas-fired rich burn engines 25-100 HP must comply with the emission standards of 40 CFR 1048.101(c). According to this rule, there are only NOx and CO limitations for engines fueled by natural gas. Thus, NOx must be less than 3.8 g/kW-hr and CO must be less than 6.5 g/kW-hr. Given that 1 kW equals 1.341 Hp, this is equivalent to 2.8 g/bhp-hr for NOx and 4.8 g/bhp-hr for CO. The controlled engine emissions will meet this standard.

1.4.6 Subpart OOOO

This subpart governs emissions from a broad spectrum of operations in the oil and natural gas industries, including operations at natural gas well pads. The potentially applicable sections of this rule sets restrictions, recordkeeping and reporting requirements on emissions from storage vessels with potential VOC emissions greater than 6 tons per year, fugitive emissions,

reciprocating compressors and pneumatic controllers. This rule applies to the Sleepy Well Pad Production Facility.

One of the key components to this rule [40 CFR 60.5390(b)] applicable to the Sleepy Well Pad Production Facility is the requirement that all pneumatic controllers located between the well head and a processing plant must have a bleed rate of less than 6 scfh. All pneumatic controllers to be installed at Sleepy Well Pad Production Facility will meet these criteria.

This rule also stipulates that storage vessels with VOC emissions equal to or greater than 6 tpy must control those emissions by 95% by October 15, 2013. The condensate tanks at Sleepy will have an estimated *uncontrolled* VOC emission rate well in excess of this threshold. Thus, emissions from these tanks must be controlled by at least 95%. Jay-Bee Oil & Gas will meet this requirement through installation of a system that will capture vapors released from the tank and route them to a vapor recovery unit. This unit will control VOC emissions to at least 95%, fulfilling this regulatory requirement. However, as described in 40 CFR 60.5365(e), *the determination may take into account requirements under a legally and practically enforceable limit in an operating permit or other requirement established under a Federal, State, local or tribal authority.* The control systems proposed in this application will reduce VOC emissions from the tanks described above to rates well below the 6 tpy limit and operation of these controls will become part of the permit. Thus, the tanks at this facility will not be regulated under 40 CFR 60, Subpart OOOO.

1.5 National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAPs) promulgated under 40 CFR 63 regulate the emission of Hazardous Air Pollutants (HAPs) from certain industrial processes. In general, these rules apply to major sources of HAPs with a major source being defined as having the potential to emit more than 10 tpy of any individual HAP or 25 tpy of total HAPs. Emissions standards under these rules have been established as the Maximum Achievable Control Technology (MACT) for each source category. The following NESHAP source category standards are potentially applicable to the planned Sleepy Well Pad Production Facility:

- 40 CFR 63, Subpart ZZZZ – NESHAP from Stationary Reciprocating Internal Combustion Engines
- 40 CFR 63, Subpart DDDDD – NESHAP for Industrial, Commercial and Institutional Boilers and Process Heaters

1.5.1 Subpart ZZZZ

This Subpart governs emissions from a stationary reciprocating internal combustion engine (RICE) located both at major and area source of HAPs. The facility will not be a major source of HAPs, but will be considered an area source of HAPs. Hence, this rule is potentially applicable to the facility. In accordance with 40 CFR 63.6590(a)(2)(iii), the single engine at the planned Sleepy Well Pad Production Facility will not be considered an Existing Stationary RICE. Rather, it will be considered "new" engine. Thus, the engine will meet the requirements of this rule by meeting the requirements of NSPS, Subpart JJJJ as described above.

1.5.2 Subpart DDDDD

This Subpart applies to industrial boilers and process heaters of various sizes and fuel types located at facilities that are classified as a major source of HAPs. As the planned facility is not a major source of HAPs, this rule does not apply.

1.6 Chemical Accident Prevention

Subparts B-D of 40 CFR 68 present the requirements for the assessment and subsequent preparation of a Risk Management Plan (RMP) for a facility that stores more than a threshold quantity of a regulated substance listed in 40 CFR 68.130. If a facility stores, handles or processes one or more regulated substances in an amount greater than its corresponding threshold, the facility must prepare and implement an RMP. The Sleepy Well Pad Production Facility will potentially store more than 10,000 lbs of a flammable mixture containing several of the substances listed in Table 3 in 40 CFR 68.130. However, an RMP is not required as this facility qualifies for the exclusion provided for remote oil and gas production facilities (40 CFR 68.115).

1.7 West Virginia State Requirements

1.7.1 45 CSR 2

The purpose of 45CSR2 is to control smoke and particulate matter emissions from fuel burning units. The facility is subject to the opacity requirement of 45 CSR 2. Emissions from the facility cannot exceed 10% over any six minute period.

1.7.2 45 CSR 4

This regulation prohibits the emission of objectionable odors. Jay-Bee Oil & Gas is obligated to run the station in a manner that does not produce objectionable odors.

1.7.3 45 CSR 6

This rule establishes emission standards for particulate matter and other requirements for incineration of refuse not subject to or specifically exempted from federal regulation. The Vapor Recovery Unit (VRU) falls under Section 4.1 of this rule. PM emissions from the VRU must remain below the allowable limit calculated under this rule. The VRU must also meet the visible emissions requirements of this rule limiting visible emissions to 20% opacity
In addition, the combustor must also meet the visible emissions requirements of this rule limiting visible emissions to 20% opacity at all times, with the exception of 40% opacity, for a period or periods aggregating no more than eight (8) minutes during start-up

1.7.4 45 CSR 10

This regulation limits emissions of sulfur oxides. As the sulfur content of the Inlet Gas contains no measurable sulfur, emissions of sulfur oxides is negligible. Thus, while parts of this rule are applicable to the planned facility, no actions are required on the part of Jay-Bee Oil & Gas to

attain compliance. The various non-engine combustion units have a design heat input less than 10 MMBTU/Hr and are therefore exempt from the requirements of this rule.

1.7.5 45 CSR 13

The state regulations applicable to the permitting of the proposed construction are in Title 45 Series 13 of the Code of State Regulations. The proposed Sleepy Well Pad Production Facility has the potential to emit several regulated pollutants in excess of the thresholds that define a Stationary Source.

When taking into consideration the voluntary limit to operate the engines equipped with catalysts only when the catalytic converters are properly functioning, the facility's potential to emit is less than the thresholds that would classify the facility as a Major Source under 45 CSR 14.

1.7.6 45 CSR 16

This series of regulations is an incorporation, by reference, of the New Source Performance Standards codified under 40 CFR 60. As discussed under the federal regulations, the Sleepy Well Pad Production Facility is subject to the emission limitations, monitoring, testing and recordkeeping of Subpart JJJJ. The facility is also subject to Subpart OOOO.

1.7.7 45 CSR 30

The state regulations applicable to Title V operating permits are in Title 45 Series 30. The planned Sleepy Well Pad Production Facility, as noted above, does not have the potential to emit any regulated pollutant about the threshold that would define it as a major facility. Additionally, although the facility is subject to certain New Source Performance Standards, the NSPS applicable to this facility do not trigger the need to submit a Title V application and obtain a Title V permit. Hence this rule is not applicable.

1.7.8 Other Applicable Requirements

Through Series 34, WVDEP has adopted the National Emission Standards for Hazardous Air Pollutants for Source Categories. Both of these topics have been addressed above.