JAY-BEE OIL & GAS, INC.

APPLICATION FOR GENERAL PERMIT MODIFICATION

Maddie Mae Well Pad Production Facility
Tyler County, West Virginia

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

APPLICATION FOR G70-B GENERAL PERMIT MODIFICATION

Jay-Bee Oil & Gas, Inc.

Maddie Mae 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
Fax (304) 926-0479
www.dep.wv.gov

G70-B GENERAL PERMIT REGISTRATION APPLICATION

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION, RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF NATURAL GAS PRODUCTION FACILITIES LOCATED AT THE WELL SITE

☐CONSTRUCTION
☒MODIFICATION
☐RELOCATION

☐CLASS I ADMINISTRATIVE UPDATE
☐CLASS II ADMINISTRATIVE UPDATE

SECTION 1. GENERAL INFORMATION

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

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

Applicant's Mailing Address: **3570 Shields Hill Road**

City: **Cairo**	State: **WV**	ZIP Code: **26337**

Facility Name: **Maddie Mae Well Pad**

Operating Site Physical Address: **Off of Indian Creek Road**
If none available, list road, city or town and zip of facility.

City: **Middlebourne**	Zip Code: **26149**	County: **Tyler**

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: **39.43781**
Longitude: **-80.80614**

SIC Code: **1311** NAICS Code: **211111**	DAQ Facility ID No. (For existing facilities) **095-00060**

CERTIFICATION OF INFORMATION

This G70-B 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 the 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, 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 G70-B Registration Application will be returned to the applicant. Furthermore, if the G70-B forms are not utilized, the application will be returned to the applicant. No substitution of forms is allowed.**

I hereby certify that 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 Division of Air Quality immediately.

I hereby certify that all information contained in this G70-B 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.

Responsible Official Signature: _____
Name and Title: **Office Manager** Phone: **304/628-3119** Fax:
Email: **sdowell@jaybeeoil.com** Date:

If applicable:
Authorized Representative Signature: _____
Name and Title: Phone: Fax:
Email: Date:

If applicable:
Environmental Contact
Name and Title: Phone: Fax:
Email: Date:

OPERATING SITE INFORMATION
Briefly describe the proposed new operation and/or any change(s) to the facility: **Addition of a back-up vapor control system (enclosed combustor) for times when the VRU is down for maintenance or repair.**
Directions to the facility: **From the West Union exit on Route US 50, west of Clarksburg, proceed west on SR 18 through town. Upon leaving West Union, proceed approximately 18.8 miles to the junction with CR 1/3 (Indian Creek Road on the right. From SR 18 and Indian Creek (CR-13) intersection, take Indian Creek east for 1.6 miles. Turn right onto lease road. Follow to the well pad entrance.**
ATTACHMENTS AND SUPPORTING DOCUMENTS
I have enclosed the following required documents:
Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22). ☒ Check attached to front of application. ☐ I wish to pay by electronic transfer. Contact for payment (incl. name and email address): ☐ I wish to pay by credit card. Contact for payment (incl. name and email address): ☒$500 (Construction, Modification, and Relocation) ☐$300 (Class II Administrative Update) ☐$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO [1] ☐$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH [2] [1] Only one NSPS fee will apply. [2] Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ. *NSPS and NESHAP fees apply to new construction or if the source is being modified.*
☒ Responsible Official or Authorized Representative Signature (if applicable)
☒ Single Source Determination Form **(must be completed in its entirety)** – Attachment A
☐ Siting Criteria Waiver (if applicable) – Attachment B ☒ Current Business Certificate – Attachment C
☒ Process Flow Diagram – Attachment D ☒ Process Description – Attachment E
☒ Plot Plan – Attachment F ☒ Area Map – Attachment G
☒ G70-B Section Applicability Form – Attachment H ☒ Emission Units/ERD Table – Attachment I
☒ Fugitive Emissions Summary Sheet – Attachment J
☒ Gas Well Affected Facility Data Sheet (if applicable) – Attachment K
☒ Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment L
☒ Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment M
☒ Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N
☒ Tanker Truck Loading Data Sheet (if applicable) – Attachment O
☐ Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment P
☐ Pneumatic Controllers Data Sheet – Attachment Q
☒ Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment R
☒ Emission Calculations (please be specific and include all calculation methodologies used) – Attachment S
☒ Facility-wide Emission Summary Sheet(s) – Attachment T
☒ Class I Legal Advertisement – Attachment U
☒ One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments

All attachments must be identified by name, divided into sections, and submitted in order.

SECTION II

Attachments

ATTACHMENT A

Single Source Determination Form

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

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

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

Is there a facility owned by or associated with the natural gas industry located within one (1) mile of the proposed facility? Yes x No ☐

If Yes, please complete the questionnaire on the following page (Attachment A).

Please provide a source aggregation analysis for the proposed facility below:

This Jay-Bee Oil & Gas facility receives and manages raw natural gas and associated produced fluids from the three on-site wells. After separation of the liquids, the gas is be injected into gathering lines for transportation to Jay-Bee's Big Moses 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 planned modification to this facility will not impact the relationship between the Maddie Mae and other Jay-Bee facilities in the area.

The Maddie Mae Well Pad Production Facility and the receiving Big Moses Compressor Station 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 over one mile from the Maddie Mae Well Pad, with no clear line of sight and properties owned by others in between. Additionally, as the gas can flow also flow to other compressor stations further away, there is no dependency of the Maddie Mae Well Pad Production Facility on this compressor station should Big Moses station be unavailable. Operation of this compressor station is not dependent upon the Maddie Mae Well Pad as it also receives gas from other well pads. Most importantly, the distance between the planned Maddie Mae Well Pad Production facility and the Big Moses Compressor Station does not rise to the definition of contiguous or adjacent.

The closest Jay-Bee facility to the Maddie Mae Well Pad Production Facility is its T1-03 Well Pad. As with the compressor station 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 4100 feet (0.78 miles) apart. Additionally, they 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.

Single Source Determination Form has been completed for aggregation determination Maddie Mae and T1-03.

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

Answer each question with a detailed explanation to determine contiguous or adjacent properties which are under a common control and any support facilities. This section must be completed in its entirety.

Provide a map of contiguous or adjacent facilities (production facilities, compressor stations, dehydration facilities, etc.) which are under common control and those facilities that are not under common control but are support facilities. Please indicate the SIC code, permit number (if applicable), and the distance between facilities in question on the map.

Are the facilities owned by the same parent company or a subsidiary of the parent company? Provide the owners identity and the percentage of ownership of each facility. **Jay-Bee Oil & Gas 100% of both**	Yes ☒	No ☐
Does an entity such as a corporation have decision making authority over the operation of a second entity through a contractual agreement or voting interest? Please explain.	Yes ☐	No ☒
Is there a contract for service relationship between the two (2) companies or, a support/dependency relationship that exists between the two (2) companies? Please explain.	Yes ☐	No ☒
Do the facilities share common workforces, plant managers, security forces, corporate executive officers or board executives?	Yes ☒	No ☐
Will managers or other workers frequently shuttle back and forth to be involved actively at both facilities?	Yes ☒	No ☐
Do the facilities share common payroll activities, employee benefits, health plans, retirement funds, insurance coverage, or other administrative functions? Please explain. **Both are owned by Jay-Bee and share common personnel**	Yes ☒	No ☐
Does one (1) facility operation support the operation of the other facility?	Yes ☐	No ☒
Is one (1) facility dependent on the other? If one (1) facility shuts down, what are the limitations on the other to pursue outside business? Please explain.	Yes ☐	No ☒
Are there any financial arrangements between the two (2) entities? **Both are owned by Jay-Bee**	Yes ☒	No ☐
Are there any legal or lease agreements between the two (2) facilities?	Yes ☐	No ☒
Do the facilities share products, byproducts, equipment, or other manufacturing or air pollution control device equipment? Please explain.	Yes ☐	No ☒
Do all the pollutant-emitting activities at the facilities belong to the same SIC Code? Please provide the SIC Codes. **3111**	Yes ☒	No ☐
Was the location of the new facility chosen primarily because of its proximity to the existing facility to integrate the operation of the two (2) facilities? Please explain.	Yes ☐	No ☒
Will materials be routinely transferred between the two (2) facilities? Please explain the amount of transfer and how often the transfers take place and what percentages go to the various entities.	Yes ☐	No ☒
Does the facility influence production levels or compliance with environmental regulations at other facilities? Who accepts the responsibility for compliance with air quality requirements? Please explain. **While both well pads are owned by Jay-Bee, they operate independently of each other. Jay-Bee is responsible for compliance with air quality requirements at both facilities**.	Yes ☐	No ☒

ATTACHMENT C

Current 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: 06/11/2010

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

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

This certificate is not transferrable 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 shall be construed as a 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.

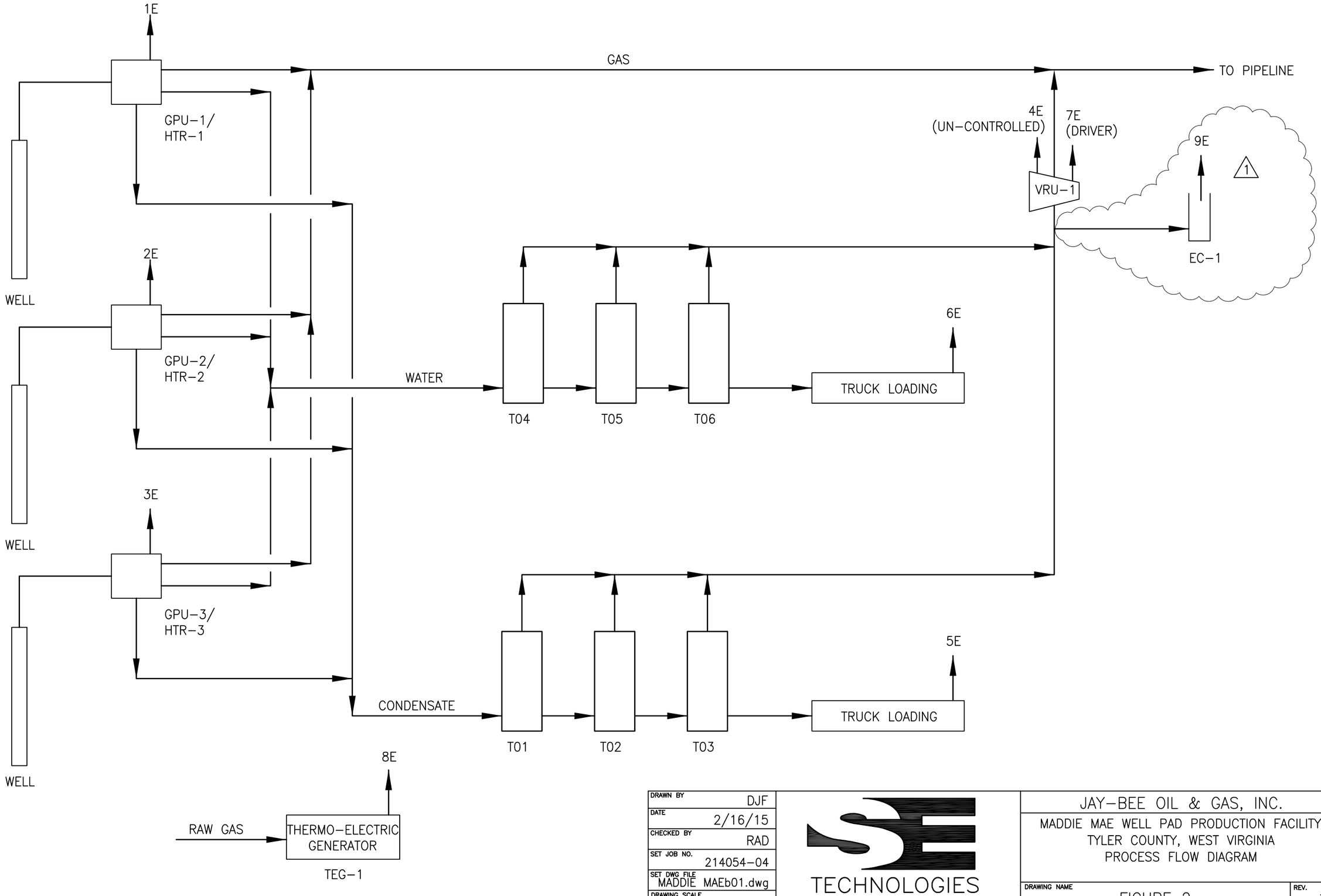
all.008 v.1
L1988190464

SCANNED

JUN 24 2010

ATTACHMENT D

Process Flow Diagram



DRAWN BY	DJF
DATE	2/16/15
CHECKED BY	RAD
SET JOB NO.	214054–04
SET DWG FILE	MADDIE MAEb01.dwg
DRAWING SCALE	N.T.S.

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

JAY–BEE OIL & GAS, INC.

MADDIE MAE WELL PAD PRODUCTION FACILITY
TYLER COUNTY, WEST VIRGINIA
PROCESS FLOW DIAGRAM

DRAWING NAME: FIGURE 2

REV. 1

Plot: env045 12/21/2015 13:12 G:\JAY–BEE OIL&GAS\214054\MADDIE MAE\MADDIE MAEb01.dwg

ATTACHMENT E

Process Description

Jay-Bee Oil & Gas, Incorporated
Maddie Mae Well Pad Production Facility
Attachment E
Process Description

Jay-Bee currently operates its Maddie Mae Well Pad Production Facility under General Permit Registration number G70-A149. The following describes current operations and planned modification to this facility. In accordance with WVDEP policy, this modification also includes conversion to the G70-B permit.

Natural gas and Produced Fluids (condensate and water) are received from two wells at this location at approximately 2500 psi and pass through Gas Processing Units (one per well) to avoid ice formation during subsequent pressure drops. These materials then pass through a three-way separator where gas, condensate and water are separated. The gas is routed to a gathering pipeline owned and operated by others.

Both the condensate and Produced Water are accumulated in six 210 BBL tanks (three for Condensate and three for Produced Water), pending truck transportation by others. The Condensate is transported to a regional processing facility and the Produced Water to a regional disposal facility. Flash, working and breathing losses from these tanks is currently routed to a Vapor Recovery Unit (VRU) with the captured vapors routed back to the raw gas discharge line. In accordance with the G70-A and G70-B permit registration, a maximum capture and control efficiency of only 95% is claimed for the VRU.

Jay-Bee is seeking approval for installation of an enclosed combustor as a back-up for the VRU to capture and destroy tank emissions for those times when the VRU is not available (e.g. engine and compressor maintenance). Refinements were also made on truck loading emissions due to availability of more accurate date for emission measurements. **No other changes are being requested at this time.**

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

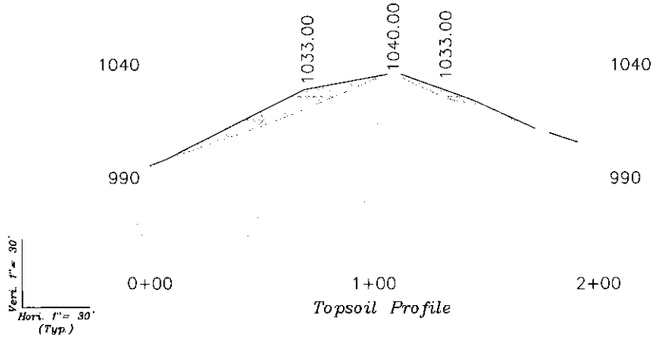
There are no gas-fired compressor engines, other than a single engine for the vapor recovery unit (VRU), or dehydration units proposed for this facility.

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

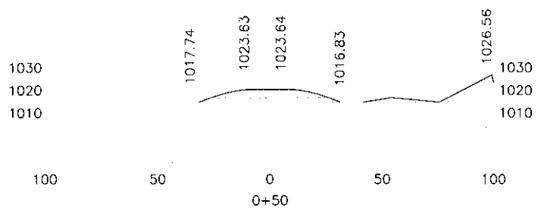
The proposed change to the tank emissions control methodology will actually control the tank emissions to a greater degree than the VRU, actually reduce overall VOC and HAPs emissions. However, the presence of a permanent combustor warrants the modification being through a Modification rather than a Class II Administrative Update. It is also our understanding that in order for both control devices to be addressed within the confines of the G70-B permit registration, the application must show the emissions for both control units as if they were the only control. Thus, for permitting purposes, the enclosed application shows 2% of the potential tank emissions as un-captured/uncontrolled emissions from the combustor in addition to the 5% of potential uncaptured/uncontrolled tank emissions from the current VRU.

ATTACHMENT F

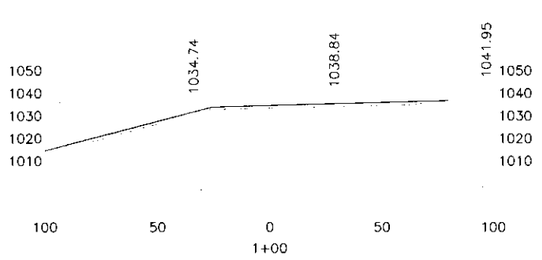
Plot Plan



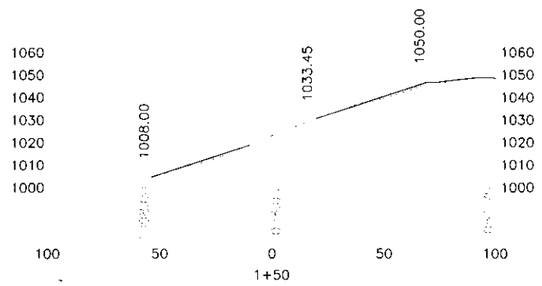
Topsoil Profile



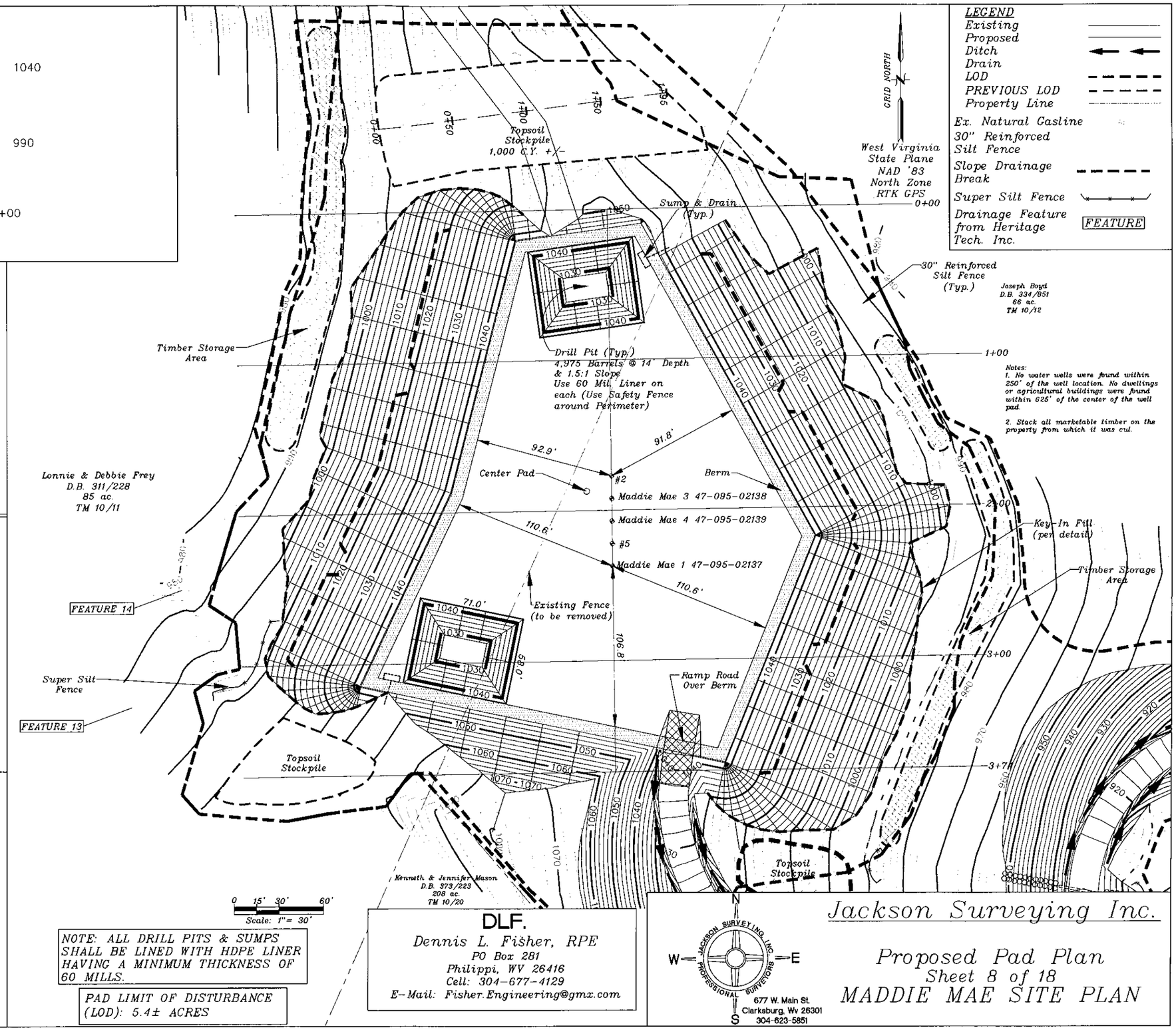
Topsoil Cross Section



Topsoil Cross Section



Topsoil Cross Section



NOTE: ALL DRILL PITS & SUMPS SHALL BE LINED WITH HDPE LINER HAVING A MINIMUM THICKNESS OF 60 MILLS.

PAD LIMIT OF DISTURBANCE (LOD): 5.4± ACRES

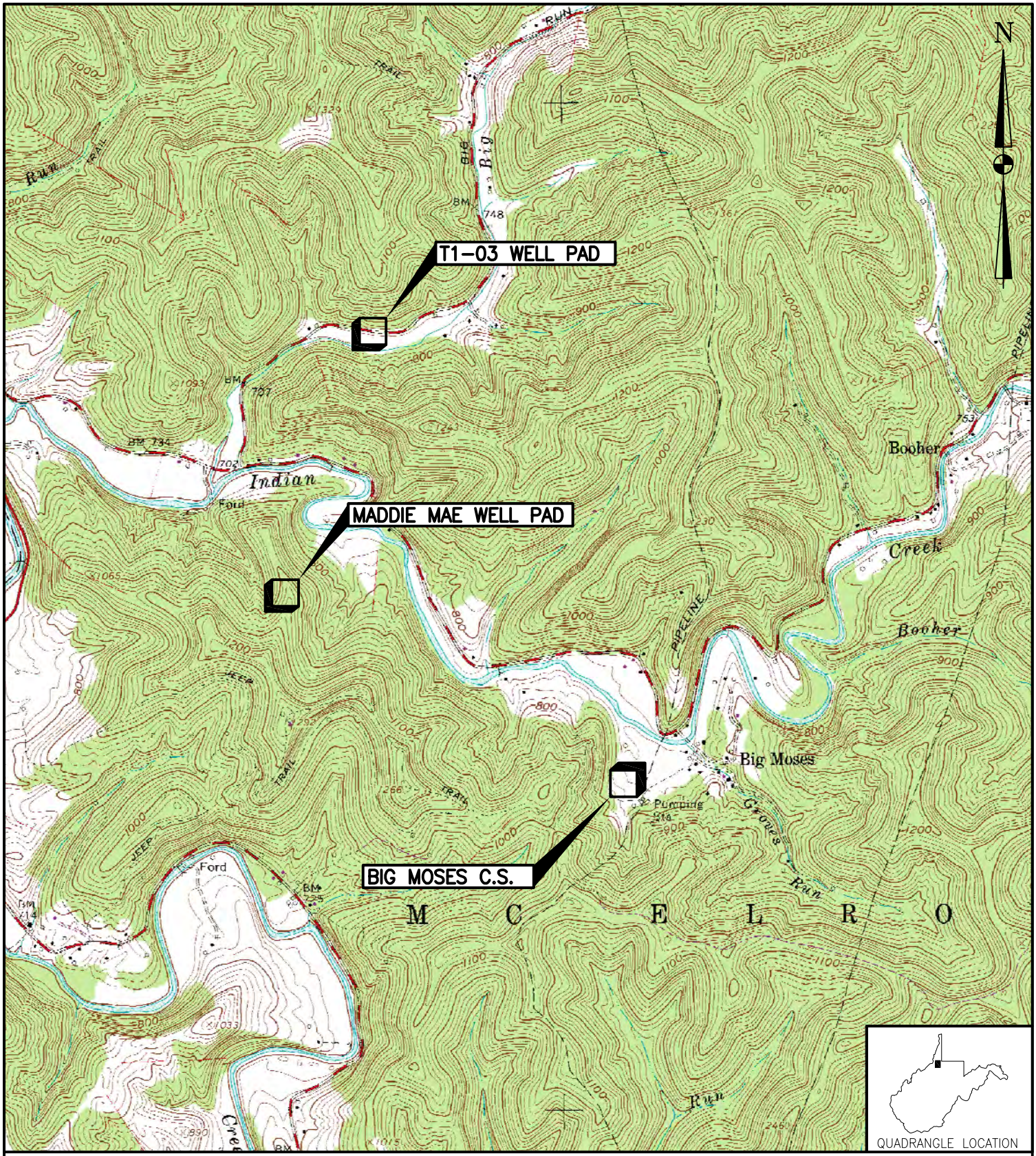
DLF.
Dennis L. Fisher, RPE
PO Box 281
Philippi, WV 26416
Cell: 304-677-4129
E-Mail: Fisher.Engineering@gmx.com

Jackson Surveying Inc.
677 W. Main St.
Clarksburg, Wv 26301
304-623-5851

Proposed Pad Plan
Sheet 8 of 18
MADDIE MAE SITE PLAN

ATTACHMENT G

Area Map



REFERENCE: USGS 7.5' QUADRANGLE MAP OF: SHIRLEY, WEST VIRGINIA; DATED 1961, PHOTOREVISED 1989.

DRAWN BY	DJF
DATE	2/13/15
CHECKED BY	RAD
SET JOB NO.	214054-04
SET DWG FILE	MADDIE MAEm01.dwg
DRAWING SCALE	1"=2000'

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

JAY-BEE OIL & GAS, INC.

MADDIE MAE WELL PAD PRODUCTION FACILITY
TYLER COUNTY, WEST VIRGINIA
SITE LOCATION MAP

DRAWING NO.	REV.
FIGURE 1	0

DRAWN BY	DJF
DATE	12/22/15
CHECKED BY	LM
SET JOB NO.	214054
SET DWG FILE	MADDIE MAE 300 FT RADm01.dwg
DRAWING SCALE	1"=300'

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

JAY BEE OIL AND GAS

MADDIE MAE WELL PAD PRODUCTION FACILITY
TYLER COUNTY, WEST VIRGINIA
300 FT. RADIUS

DRAWING NAME	REV.
FIGURE	0

Plot: env045 12/23/2015 11:48 G:\JAY-BEE OIL&GAS\214054\MADDIE MAE\MADDIE MAE 300 FT RADm01.dwg

ATTACHMENT H

G-70B Section Applicability Form

ATTACHMENT H – G70-B SECTION APPLICABILITY FORM

General Permit G70-B Registration
Section Applicability Form

General Permit G70-B was developed to allow qualified applicants to seek registration for a variety of sources. These sources include gas well affected facilities, storage vessels, gas production units, in-line heaters, heater treaters, glycol dehydration units and associated reboilers, pneumatic controllers, centrifugal compressors, reciprocating compressors, reciprocating internal combustion engines (RICEs), tank truck loading, fugitive emissions, 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-B 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.

GENERAL PERMIT G70-B APPLICABLE SECTIONS	
☒ Section 5.0	Gas Well Affected Facility (NSPS, Subpart OOOO)
☒ Section 6.0	Storage Vessels Containing Condensate and/or Produced Water[1]
□ Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO)
☒ Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO and/or NESHAP Subpart HH
☒ Section 9.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
□ Section 10.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO)
□ Section 11.0	Centrifugal Compressor Affected Facility (NSPS, Subpart OOOO)[2]
☒ Section 12.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO)[2]
☒ Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines, Microturbines
☒ Section 14.0	Tanker Truck Loading[3]
□ Section 15.0	Glycol Dehydration Units[4]

1 Applicants that are subject to Section 6 may also be subject to Section 7 if the applicant is subject to the NSPS, Subpart OOOO control requirements or the applicable control device requirements of Section 8.

2 Applicants that are subject to Section 11 and 12 may also be subject to the applicable RICE requirements of Section 13.

3 Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 8.

4 Applicants that are subject to Section 15 may also be subject to the requirements of Section 9 (reboilers). Applicants that are subject to Section 15 may also be subject to control device and emission reduction device requirements of Section 8.

ATTACHMENT I

Emissions Units/ERD Table

ATTACHMENT I – EMISSION UNITS / EMISSION REDUCTION DEVICES (ERD) TABLE

Include ALL emission units and air pollution control devices/ERDs that will be part of this permit application review. Do not include fugitive emission sources in this table. Deminimis storage tanks shall be listed in the Attachment L table. This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed	Manufac. Date[3]	Design Capacity	Type[4] and Date of Change	Control Device(s)[5]	ERD(s)[6]
GPU-1	1E	Gas Processing Unit	2015		1.5 MMBTU/Hr	Existing	None	
GPU-2	2E	Gas Processing Unit	2015		1.5 MMBTU/Hr	Existing	None	
GPU-3	3E	Gas Processing Unit	2015		1.5 MMBTU/Hr	Existing	None	
T01	4E	Condensate Tank	2015		210 BBL	Existing	VRU-1/EC-1	
T02	4E	Condensate Tank	2015		210 BBL	Existing	VRU-1/EC-1	
T03	4E	Condensate Tank	2015		210 BBL	Existing	VRU-1/EC-1	
T04	4E	Produce Water Tank	2015		210 BBL	Existing	VRU-1/EC-1	
T05	4E	Produced Water Tank	2015		210 BBL	Existing	VRU-1/EC-1	
T06	4E	Produced Water Tank	2015		210 BBL	Existing	VRU-1/EC-1	
TL-1	5E	Condensate Truck Loading	2015		30,000 BBL/yr	Existing	None	
TL-2	6E	Produced Water Truck Loading	2015		63,600 BBL/yr	Existing	None	
CE-1	7E	VRU Driver	2015	4/10/14	84 Hp	Existing	1C	
TEG-1	8E	Thermoelectric Generator	2015		4.4 KW/Hr	Existing	None	
EC-1	**9E**	**Enclosed Combustor**	**2016**			**NEW**	**N/A**	

[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] When required by rule
[4] New, modification, removal, existing
[5] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.
[6] For ERDs use the following numbering system: 1D, 2D, 3D,... or other appropriate designation.

ATTACHMENT J

Fugitive Emissions Summary Sheets

ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

Sources of fugitive emissions may include loading operations, equipment leaks, blowdown emissions, etc.
Use extra pages for each associated source or equipment if necessary.

Source/Equipment:

Leak Detection Method Used	☒ Audible, visual, and olfactory (AVO) inspections	☐ Infrared (FLIR) cameras	☐ Other (please describe)	☐ None required

Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)		
					VOC	HAP	GHG (CO_2e)
Pumps	☐ Yes ☐ No	0		☐ Gas ☐ Liquid ☐ Both			
Valves	☐ Yes ☐ No	52	EPA	☐ Gas ☐ Liquid ☒ Both	0.477	0.017	1.628
Safety Relief Valves	☐ Yes ☐ No	18	EPA	☐ Gas ☐ Liquid ☒ Both	0.034	0.001	2.714
Open Ended Lines	☐ Yes ☒ No	3	EPA	☒ Gas ☐ Liquid ☐ Both	0.009	<0.001	<0.001
Sampling Connections	☐ Yes ☐ No	0		☐ Gas ☐ Liquid ☐ Both			
Connections (Not sampling)	☐ Yes ☐ No	22	EPA	☐ Gas ☐ Liquid ☒ Both	0.186	0.007	0.181
Compressors	☐ Yes ☐ No	1	API	☒ Gas ☐ Liquid ☐ Both	0.016	0.001	0.073
Flanges	☐ Yes ☐ No	56	API	☐ Gas ☐ Liquid ☒ Both	0.040	0.001	2.124
Other[1]	☐ Yes ☒ No	3	Low Bleed Pneumatic Controllers EPA	☒ Gas ☐ Liquid ☐ Both	0.195	0.007	16.342
Other[1]	☒ Yes ☐ No	2	Tank Truck Loading	☐ Gas ☒ Liquid ☐ Both			

Other[1]	☐ Yes ☒ No		VRU Compressor Blowdown	☒ Gas ☐ Liquid ☐ Both	0.01	<0.01	<0.01

[1] Other equipment types may include compressor seals, relief valves, diaphragms, drains, meters, etc.

Please provide an explanation of the sources of fugitive emissions (e.g. pigging operations, equipment blowdowns, pneumatic controllers, etc.):

Please indicate if there are any closed vent bypasses (include component):
No

Specify all equipment used in the closed vent system (e.g. VRU, ERD, thief hatches, tanker truck loading, etc.)
Tanks, VRU, Enclosed Combustor and associated piping.

ATTACHMENT K

Gas Well Affected Facility Data Sheet

ATTACHMENT K – 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).

API Number	Date of Flowback	Date of Well Completion	Green Completion and/or Combustion Device
47-095-02137	5-4-2015	5-6-2015	VRU and Combustion
47-095-01238	5-4-2015	5-6-2015	VRU and Combustion
47-095-02139	5-4-2015	5-6-2015	VRU and Combustion

Note: If future wells are planned and no API number is available please list as PLANNED.
If there are existing wells that commenced construction prior to August 23, 2011, please acknowledge as existing.

This is the same API (American Petroleum Institute) 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 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.

ATTACHMENT L

Storage Vessels Data Sheet(s)

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 **Maddie Mae Tank Farm**	2. Tank Name **Tanks 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)* **2015**	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) **1500**
14. Number of tank turnovers per year **53 (max)**	15. Maximum tank fill rate (gal/min) **16**
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) VRU
☐ 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: **2015**

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 **Maddie Mae Tank Farm**	2. Tank Name **Tanks 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)* **2015**	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 63,800 BBL per year throughput for Tanks T04 and 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) **20**
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)
VRU
☐ 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	0.121	0.53					0.121	0.53	W&B losses from
(Un-controlled)									Water tanks is
									negligible.
Tanks T04-T06 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: **2015**

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**		

Jay-Bee Oil & Gas, Incorporated
Maddie Mae Well Pad Production Facility
Condensate Tank Emissions

Utilizing direct measurements of the Gas to Oil (GOR) ratio and flash gas composition from a nearby Jay-Bee well pad (T103-6), 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 of Condensate. Working and Breathing losses were calculated using EPA's Tanks 4.0 to be 3.04 tpy VOCs and 0.01 tpy HAPs (est.). RVP 6 Gasoline was used as a surrogate. As the RVP of the condensate at atmospheric pressure was measured at 5.28, this was deemed appropriate. Thus, total uncontrolled tank emissions are projected to be 583.3 tpy of VOCs and 19.0 tpy of HAPs. As emissions from these tanks are anticipated to be continuous, this is equivalent to 133.2 pounds per hour VOCs and 4.34 pounds per hour HAPs.

The largest component to the HAPs is Hexane. Using the process described above, potential un-controlled n-Hexane emissions were determined to be 17.4 tons per year or 3.97 pounds per hour.

Methane is also be emitted at a maximum rate of 82.1 tpy (18.74 lb/hr) from the condensate tanks. Using the GHG factor of 25 for Methane, the CO_{2e} uncontrolled emission rate is 2053 tpy. This is equivalent to 468.6 lb/hr of CO_{2e}.

During operation of the VRU, emissions are 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-B General Permit. Thus, when in operation, emissions will be controlled to 6.66 pounds per hour of VOCs and 0.22 pounds per hour of HAPs. Methane emissions will be controlled to 23.4 lb/hr while n-Hexane will be controlled to 0.20 pounds per hour.

The proposed Enclosed Combustor will control organic vapor emissions to at least 98%. Actual control efficiency is anticipated to be higher, but only 98% is claimed as allowed under the G70-B General Permit. Thus, when in operation, organic emissions from the combustor will be controlled to 2.66 pounds per hour of VOCs and 0.09 pounds per hour of HAPs. Methane emissions will be controlled to 9.37 lb/hr while n-Hexane will be controlled to 0.08 pounds per hour.

VRU Emissions

The VRU is permitted to operate continuously, except for brief intervals for preventive maintenance. It is conservatively estimated that the VRU will capture and control 95% of potential emissions. Thus, total potential condensate tank emissions are calculated as follows:

VOCs

6.66 lb/hr (Controlled) x 8760 = 58,342 lb/yr or 29.17 tpy

HAPs
0.22 lb/Hr (Controlled) x 8760 = 1,927 lb/yr or 0.96 tpy

n-Hexane
0.20 lb/Hr (Controlled) x 8760 = 1,752 lb/yr or 0.87 tpy

Methane
23.4 lb/Hr (Controlled) x 8760 = 205,247 lb/yr or 102.6 tpy

Enclosed Combustor Emissions
In order to include the enclosed combustor into the G70-B permit, it is assumed that the combustor will operate full time. Thus, it is conservatively estimated that the combustor will capture and control 98% of potential emissions. Total potential tank emissions via the combustor are therefore calculated as follows:

VOCs
2.66 lb/hr (Controlled) x 8760 = 23,302 lb/yr or 11.66 tpy

HAPs
0.09 lb/Hr (Controlled) x 8760 = 788 lb/yr or 0.38 tpy

n-Hexane
0.08 lb/Hr (Controlled) x 8760 = 701 lb/yr or 0.35 tpy

Methane
9.37 lb/Hr (Controlled) x 8760 = 82,081 lb/yr or 41.1 tpy

Gas Flow to Combustor
Total gas flow to the combustor from the condensate tanks is derived from the condensate flash calculation spreadsheets (826.9 tpy total organics) plus working and breathing losses for the condensate tanks (3.0 tpy) for a total of 829.9 tpy. Using the density of the condensate vapor shown in the Excel spreadsheet (0.111 lb/scf), an annual gas flow to the combustor of 14.95 MMSCF/yr or 40,967 scfd was determined.

Using the HHV of 2313 BTU/scf of the condensate tank flash vapors as a conservative surrogate, this results in a maximum heat loading of 3.95 MMBTU/Hr.

Jay-Bee Oil & Gas - Maddie Mae

Flash Emission Calculations - Condensate

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

Date Sampled: 04/07/14

Date Analyzed: 04/21/14

Sample: RPT 8-1

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: 14.85 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	2.376	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

Certified: FESCO, Ltd. - Alice, Texas

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

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	0.736	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	0.189	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	6.708
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

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

Identification

User Identification:	Maddie Mae Well Pad
City:	Huntington
State:	West Virginia
Company:	Jay-Bee Oil & Gas, Inc.
Type of Tank:	Vertical Fixed Roof Tank
Description:	210 BBL Condensate Tanks - Emissions from a Single Tank

Tank Dimensions

Shell Height (ft):	15.00
Diameter (ft):	10.00
Liquid Height (ft) :	14.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	8,225.29
Turnovers:	51.06
Net Throughput(gal/yr):	420,000.00
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

Maddie Mae Well Pad - 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)

Maddie Mae Well Pad - Vertical Fixed Roof Tank
Huntington, West Virginia

Annual Emission Calcaulations	
Standing Losses (lb):	451.6638
Vapor Space Volume (cu ft):	399.2441
Vapor Density (lb/cu ft):	0.0373
Vapor Space Expansion Factor:	0.1508
Vented Vapor Saturation Factor:	0.5512
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	399.2441
Tank Diameter (ft):	10.0000
Vapor Space Outage (ft):	5.0833
Tank Shell Height (ft):	15.0000
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):	5.0000
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:	0.5512
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	3.0220
Vapor Space Outage (ft):	5.0833

Working Losses (lb):	1,572.6372
Vapor Molecular Weight (lb/lb-mole):	69.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	3.0220
Annual Net Throughput (gal/yr.):	420,000.0000
Annual Turnovers:	51.0620
Turnover Factor:	0.7542
Maximum Liquid Volume (gal):	8,225.2880
Maximum Liquid Height (ft):	14.0000
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	2,024.3010

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

Emissions Report for: Annual

Maddie Mae Well Pad - Vertical Fixed Roof Tank
Huntington, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 6)	1,572.64	451.66	2,024.30

^^ For one tank only.
Total emissions =
2,024.30*3 = 6,072.90

Jay-Bee Oil & Gas, Incorporated
Maddie Mae Well Pad Production Facility
Produced Water Tank Emissions

Utilizing direct measurements of the Gas to Water (GOW) ratio and flash gas composition from a nearby Jay-Bee well pad (Schulberg), the attached calculation spreadsheet was used to determine un-controlled VOC and HAP flash emissions from the Produced Water tanks of 0.53 tpy and 0.04 tpy respectively for the currently permitted maximum annual throughput of 63,600 BBL/Yr. Working and Breathing losses were deemed negligible. Thus, total uncontrolled produced water tank emissions are projected to be 0.53 tpy of VOCs and 0.04 tpy of HAPs. As emissions from these tanks are anticipated to be continuous, this is equivalent to 0.121 pounds per hour VOCs and 0.009 pounds per hour HAPs.

The largest component to the HAPs is Hexane. Using the process described above, potential un-controlled n-Hexane emissions were determined to be 0.02 tons per year and <0.01 pounds per hour.

Methane is also be emitted at a maximum rate of 0.69 tpy (0.16 lb/hr) from the water tanks. Using the GHG factor of 25 for Methane, the CO_{2e} uncontrolled emission rate is 17.25 tpy. This is equivalent to 3.94 lb/hr of CO_{2e}.

During operation of the VRU, emissions are 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-B General Permit. Thus, when in operation, emissions will be controlled to <0.01 pounds per hour of VOCs and <0.01 pounds per hour of HAPs. Methane and n-hexane emissions will be controlled to 0.20 lb/hr and <0.01 lb/hr respectively.

The proposed Enclosed Combustor will control organic vapor emissions to at least 98%. Actual control efficiency is anticipated to be higher, but only 98% is claimed as allowed under the G70-A General Permit. Thus, when in operation, organic emissions from the combustor will also be controlled to <0.01 pounds per hour of VOCs, HAPs and n-Hexane. Methane will be controlled to 0.08 lb/hr.

VRU Emissions
The VRU is permitted to operate continuously, except for brief intervals for preventive maintenance. It is conservatively estimated that the VRU will capture and control 95% of potential emissions. Thus, total potential tank emissions are calculated as follows:

VOCs
0.006 lb/hr (Controlled) x 8760 = 53 lb/yr or 0.03 tpy

HAPs
0.0005 lb/Hr (Controlled) x 8760 = 4 lb/yr or <0.01 tpy

Methane
0.20 lb/Hr (Controlled) x 8760 = 1,725 lb/yr or 0.86 tpy

Enclosed Combustor Emissions
In order to include the enclosed combustor into the G70-B permit, it is assumed that the combustor will operate full time. It is conservatively estimated that the combustor will capture and control 98% of potential emissions. Total potential tank emissions via the combustor are less than 0.01 lb/hr and less than 0.01 tpy for VOCs, HAPS and n-Hexane. Total potential tank emissions for Methane are calculated as follows:

Methane
0.08 lb/Hr (Controlled) x 8760 = 690 lb/yr or 0.35 tpy

Gas Flow to Combustor
Total gas flow to the combustor from the water tanks is derived from the water flash calculation spreadsheets (1.44 tpy total organics). Using the density of the vapor from the water tanks shown in the Excel spreadsheet (0.069 lb/scf), an annual gas flow to the combustor of 0.042 MMSCF/yr or 114 scfd was determined.

Using the HHV of 1431 BTU/scf for the water tank flash vapors as a conservative surrogate, this results in a maximum heat loading of 0.007 MMBTU/Hr.

Jay-Bee Oil & Gas - Maddie Mae

Flash Emission Calculations - Produced Water

Using Gas-Water Ratio Method

Un-Controlled

Site specific data				
Gas-Water-ratio	=	0.41	scf/bbl	Using GOW from comparable well pads
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	1.4376	E_{TOT}
VOC	**0.5261**	Sum of C3+
Nitrogen	9.34E-03	
Carbon Dioxide	4.09E-02	
Methane	6.90E-01	
Ethane	1.71E-01	
Propane	1.12E-01	
Isobutane	6.21E-02	
n-Butane	6.89E-02	
2,2 Dimethylpropane	0.00E+00	
Isopentane	5.46E-02	
n-Pentane	3.88E-02	
2,2 Dimethylbutane	4.90E-03	
Cyclopentane	5.75E-04	
2,3 Dimethylbutane	3.00E-03	
2 Methylpentane	1.74E-02	
3 Methylpentane	1.06E-02	
n-Hexane	2.09E-02	HAP
Methylcyclopentane	3.46E-03	
Benzene	4.26E-03	HAP
Cyclohexane	4.97E-03	
2-Methylhexane	9.65E-03	
3-Methylhexane	8.54E-03	
2,2,4 Trimethylpentane	0.00E+00	
Other C7's	9.72E-03	
n-Heptane	1.29E-02	
Methylcyclohexane	1.16E-02	
Toluene	9.36E-03	HAP
Other C8's	1.89E-02	
n-Octane	7.16E-03	
Ethylbenzene	4.31E-04	HAP
M & P Xylenes	4.80E-03	HAP
O-Xylene	8.05E-04	HAP
Other C9's	1.51E-02	
n-Nonane	3.57E-03	
Other C10's	4.67E-03	
n-Decane	8.19E-04	
Undecanes (11)	1.57E-03	

September 14, 2012

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

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

Date Sampled: 08/21/2012

Date Analyzed: 08/27/2012

Job Number: J25159

Sample: Schulberg 1-HF

FLASH LIBERATION OF SEPARATOR WATER		
	Separator	**Stock Tank**
Pressure, psig	155	0
Temperature, °F	NA	70
Gas Water Ratio (1)	------	0.41
Gas Specific Gravity (2)	------	0.680
Separator Volume Factor (3)	1.000	1.000

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

Piston No.: WF-306

Base Conditions: 14.65 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

David Dannhaus 361-661-7015

September 14, 2012

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

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

Sample: Schulberg 1-HF
Gas Evolved from Separator Water Flashed
From 155 psig & NA °F to 0 psig & 70 °F

Date Sampled: 08/21/2012 Job Number: 25159.001

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.575	
Carbon Dioxide	1.602	
Methane	74.187	
Ethane	9.798	2.605
Propane	4.384	1.201
Isobutane	1.841	0.599
n-Butane	2.043	0.640
2-2 Dimethylpropane	0.000	0.000
Isopentane	1.305	0.475
n-Pentane	0.928	0.334
Hexanes	1.149	0.471
Heptanes Plus	2.168	0.952
Totals	100.000	7.278

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.616	(Air=1)
Molecular Weight	104.16	
Gross Heating Value	5424	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	0.660	(Air=1)
Compressibility (Z)	0.9946	
Molecular Weight	24.76	
Gross Heating Value		
Dry Basis	1426	BTU/CF
Saturated Basis	1402	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

Certified: FESCO, Ltd. - Alice, Texas

Analyst: MR
Processor: MFG
Cylinder ID: FL-9

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.575		0.650
Carbon Dioxide	1.602		2.845
Methane	74.187		48.024
Ethane	9.798	2.605	11.888
Propane	4.384	1.201	7.800
Isobutane	1.841	0.599	4.318
n-Butane	2.043	0.640	4.791
2,2 Dimethylpropane	0.000	0.000	0.000
Isopentane	1.305	0.475	3.799
n-Pentane	0.928	0.334	2.702
2,2 Dimethylbutane	0.098	0.041	0.341
Cyclopentane	0.014	0.006	0.040
2,3 Dimethylbutane	0.060	0.024	0.209
2 Methylpentane	0.347	0.143	1.207
3 Methylpentane	0.211	0.086	0.734
n-Hexane	0.419	0.171	1.457
Methylcyclopentane	0.071	0.024	0.241
Benzene	0.094	0.026	0.298
Cyclohexane	0.102	0.035	0.346
2-Methylhexane	0.166	0.077	0.671
3-Methylhexane	0.147	0.067	0.594
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.169	0.073	0.676
n-Heptane	0.221	0.101	0.894
Methylcyclohexane	0.203	0.081	0.804
Toluene	0.175	0.058	0.651
Other C8's	0.298	0.137	1.316
n-Octane	0.108	0.055	0.498
Ethylbenzene	0.007	0.003	0.030
M & P Xylenes	0.078	0.030	0.334
O-Xylene	0.013	0.005	0.056
Other C9's	0.206	0.104	1.049
n-Nonane	0.048	0.027	0.246
Other C10's	0.057	0.033	0.325
n-Decane	0.010	0.006	0.057
Undecanes (11)	0.017	0.010	0.109
Totals	100.000	7.276	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	0.860	(Air=1)
Compressibility (Z)	0.9948	
Molecular Weight	24.78	
Gross Heating Value		
Dry Basis	1426	BTU/CF
Saturated Basis	1402	BTU/CF

ATTACHMENT M

Natural Gas Fired Fuel Burning Units Data Sheet(s)

ATTACHMENT M – SMALL HEATERS AND REBOILERS NOT SUBJECT TO 40CFR60 SUBPART DC
DATA SHEET

Complete this data sheet for each small heater and reboiler not subject to 40CFR60 Subpart Dc at the facility. ***The Maximum Design Heat Input (MDHI) must be less than 10 MMBTU/hr.***

Emission Unit ID#[1]	Emission Point ID#[2]	Emission Unit Description (manufacturer, model #)	Year Installed/ Modified	Type[3] and Date of Change	Maximum Design Heat Input (MMBTU/hr)[4]	Fuel Heating Value (BTU/scf)[5]
GPU-1	1E	Pride of the Hills GPU	2015	EXISTING	1.5	1263
GPU-2	2E	Pride of the Hills GPU	2015	EXISTING	1.5	1263
GPU-3	3E	Pride of the Hills GPU	2015	EXISTING	1.5	1263
TEG-1	8E	Pride of the Hills GPU	2015	EXISTING	0.0133	1263

1 Enter the appropriate Emission Unit (or Source) identification number 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 Enter design heat input capacity in MMBtu/hr.

5 Enter the fuel heating value in BTU/standard cubic foot.

ATTACHMENT N

Internal Combustion Engine Data Sheet(s)

ATTACHMENT N – INTERNAL COMBUSTION ENGINE DATA SHEET

Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form.*

Emission Unit ID#[1]	CE-1		
Engine Manufacturer/Model	Cummins G5.9		
Manufacturers Rated bhp/rpm	84 @ 1800		
Source Status[2]	ES		
Date Installed/ Modified/Removed/Relocated[3]	2015		
Engine Manufactured /Reconstruction Date[4]	After 3/1/2012		
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable)[5]	☒40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources
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		
Hourly Fuel Throughput	526.4 ft^3/hr 6.32 gal/hr	ft^3/hr gal/hr	ft^3/hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	4.62 $MMft^3$/yr 55,440 gal/yr	$MMft^3$/yr gal/yr	$MMft^3$/yr gal/yr
Fuel Usage or Hours of Operation Metered	Yes ☒ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

Calculation Methodology[9]	Pollutant[10]	Hourly PTE (lb/hr)[11]	Annual PTE (tons/year)[11]	Hourly PTE (lb/hr)[11]	Annual PTE (tons/year)[11]	Hourly PTE (lb/hr)[11]	Annual PTE (tons/year)[11]
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	GHG (CO_2e)	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. Microturbine generator engines should be designated MT-1, MT-2, MT-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	Relocated Source
REM	Removal of Source		

3 Enter the date (or anticipated date) of the engine's installation (construction of source), modification, relocation 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 IIII/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 as appropriate.

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

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

2SLB	Two Stroke Lean Burn	4SRB	Four Stroke Rich Burn
4SLB	Four Stroke Lean Burn		

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	OxCat	Oxidation Catalyst
SCR	Lean Burn & Selective Catalytic Reduction		

8 Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas /Production Gas	D	Diesel

9 Enter the Potential Emissions Data Reference designation using the following codes. Attach all reference data used.

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*.

11 PTE for engines shall be calculated from manufacturer's data unless unavailable.

Engine Air Pollution Control Device
(Emission Unit ID# CE-1, use extra pages as necessary)

Air Pollution Control Device Manufacturer's Data Sheet included?
Yes ☒ No ☐

☒ NSCR ☐ SCR ☐ Oxidation Catalyst

Provide details of process control used for proper mixing/control of reducing agent with gas stream: N/A

Manufacturer: **Miratech**	Model #: **VX-RE-08XC**
Design Operating Temperature: 1000 ºF	Design gas volume: **430 + scfm**
Service life of catalyst: **2+ years, depending on site conditions**	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: **430 acfm at 1078 ºF**	Operating temperature range for NSCR/Ox Cat: **From 750 ºF to 1250 ºF**
Reducing agent used, if any: **None**	Ammonia slip (ppm): **N/A**

Pressure drop against catalyst bed (delta P): **3.0 inches of H_2O**

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions: **Part of the routine maintenance inspection to warn or alert operations of emissions control degradation is a task called the post-PM emissions check.**

Is temperature and pressure drop of catalyst required to be monitored per 40CFR63 Subpart ZZZZ?
☐ Yes ☒ No

How often is catalyst recommended or required to be replaced (hours of operation)?
Because there are so many factors that impact life of a catalyst, the vendor does not recommend "hours of operation prior to replacement." The routine post-PM emissions check task (every 60 days or 1440 hrs of operation, whichever comes first) determines when the catalyst needs to be serviced or replaced.

How often is performance test required?
☐ Initial
☐ Annual
☐ Every 8,760 hours of operation
☐ Field Testing Required
☒ No performance test required. If so, why (please list any maintenance required and the applicable sections in NSPS/GACT**: Per 40 CFR 60.4243(a)(iii), an owner or operator of a stationary SI internal combustion engine less than 100 HP, must keep a maintenance plan and records of conducted maintenance to demonstrate compliance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions, but no performance testing is required for an owner or operator**

ATTACHMENT O

Tanker Truck Loading Data Sheet(s)

ATTACHMENT O – TANKER TRUCK LOADING DATA SHEET

Complete this data sheet for each new or modified bulk liquid transfer area or loading rack at the facility. This is to be used for bulk liquid transfer operations to tanker trucks. Use extra pages if necessary.

Truck Loadout Collection Efficiencies

The following applicable capture efficiencies of a truck loadout are allowed:

- For tanker trucks passing the MACT level annual leak test – 99.2%
- For tanker trucks passing the NSPS level annual leak test – 98.7%
- For tanker trucks not passing one of the annual leak tests listed above – 70%

Compliance with this requirement shall be demonstrated by keeping records of the applicable MACT or NSPS Annual Leak Test certification for ***every*** truck and railcar loaded/unloaded. This requirement can be satisfied if the trucking company provided certification that its entire fleet was compliant. This certification must be submitted in writing to the Director of the DAQ. These additional requirements must be noted in the Registration Application.

Emission Unit ID#:	Emission Point ID#:	Year Installed/Modified: 2015
Emission Unit Description: Tank Un-Loading Area		
Loading Area Data		
Number of Pumps: 1 (on truck)	Number of Liquids Loaded: 2	Max number of trucks loading at one (1) time: 1
Are tanker trucks pressure tested for leaks at this or any other location? ☐ Yes ☐ No ☒ Not Required If Yes, Please describe:		
Provide description of closed vent system and any bypasses.		
Are any of the following truck loadout systems utilized? ☐ Closed System to tanker truck passing a MACT level annual leak test? ☐ Closed System to tanker truck passing a NSPS level annual leak test? ☐ Closed System to tanker truck not passing an annual leak test and has vapor return?		

Projected Maximum Operating Schedule (for rack or transfer point as a whole)

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	4	4	4	4
Days/week	6	6	6	6

Bulk Liquid Data (use extra pages as necessary)

Liquid Name	**Condensate**	**Produced Water**	
Max. Daily Throughput (1000 gal/day)	**8.40**	**10.08**	
Max. Annual Throughput (1000 gal/yr)	**1,260**	**2,671.2**	
Loading Method[1]	**SUB**	**SP**	
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**	
Max. Collection Efficiency (%)	**n/a**	**n/a**	

Max. Control Efficiency (%)		**n/a**	**n/a**	
Max.VOC Emission Rate	Loading (lb/hr)	**27.8**	**0.11**	
	Annual (ton/yr)	**2.09**	**0.05**	
Max.HAP Emission Rate	Loading (lb/hr)	**1.37**	**n/a**	
	Annual (ton/yr)	**0.10**	**n/a**	
Estimation Method[5]		**EPA**	**EPA**	

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 VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration

5 EPA EPA Emission Factor in AP-42 MB Material Balance
TM Test Measurement based upon test data submittal O Other (describe)

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: 3.6 psia (per AP-42 conversion of RVP to TVP)
M= Molecular weight of vapor in lb/lb-mole 64.35 (see attached breathing vapor analysis report)
T= temperature of bulk liquid loaded in deg R or 460+deg F (60 Deg F)

Thus, $L_L = 12.46[0.6 \times 3.6 \times 64.35]/[460+60]$
$L_L = 3.33$ lb/1000 gallons loaded

Based on sample data of breathing vapor (attached), these emissions are 99.4% 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 200 BBL (8,400 gallons) a day, uncontrolled VOC emissions are estimated at 27.8 lb of VOC per day [8,4 x 3.33 x 0.994]. With all daily loading taking place within 1 hour, the average hourly un-controlled emission rate is therefore also estimated at 27.8 lb/hr VOCs. Emissions from truck loading are un-controlled.

Maximum annual throughput is 1,260,000 gallons (30,000 barrels) per year. Thus, un-captured/un-controlled VOC emissions are conservatively estimated at 4171 pounds per year [1260 x 3.33 x .994] or 2.09 tons per year.

Based on the attached analysis of a representative tank's breathing emissions, HAPs represent 4.9 percent of the emissions. Thus, daily HAPs emissions equal 1.37 lb/hr [8.40 x 3.33 x 0.049]. Annual maximum HAPs emissions are estimated at 205.6 lb/yr [1260 x 3.33 x 0.049] or 0.10 tpy.

.

Produced Water
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: 0.3 psia (water at 60 Deg. F)
M= Molecular weight of vapor in lb/lb-mole 24.78 (flash gas of comparable water sample)
T= temperature of bulk liquid loaded in deg R or 460+deg F (60 Deg F)

Thus, $L_L = 12.46[0.6 \times 0.3 \times 24.78]/[460+60]$
$L_L = 0.11$ lb/1000 gallons loaded

Based on sample data of breathing vapor (attached), these emissions are 36.59% 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 240 BBL (10,080 gallons) a day, uncontrolled VOC emissions are estimated at 0.42 lb of VOC per day [10.08 x 0.11 x .366]. With all daily loading taking place within 4 hours, the average hourly un-controlled emission rate is estimated at 0.11 lb/hr VOCs. Emissions from truck loading are un-controlled.

Maximum annual throughput is 2,671,200 gallons (63,600 barrels) per year. Thus, un-captured/un-controlled VOC emissions are conservatively estimated at 107.5 pounds per year [2,671.2 x 0.11 x .366] or 0.05 tons per year.

.

ATTACHMENT R

Air Pollution Control Device Sheet(s)

ATTACHMENT R – AIR POLLUTION CONTROL DEVICE / EMISSION REDUCTION DEVICE SHEETS

Complete the applicable air pollution control device sheets for each flare, vapor combustor, thermal oxidizer, condenser, adsorption system, vapor recovery unit, BTEX Eliminator, Reboiler with and without Glow Plug, etc. at the facility. Use extra pages if necessary.

Emissions calculations must be performed using the most conservative control device efficiency.

The following five (5) rows are only to be completed if registering an alternative air pollution control device.	
Emission Unit IDs: **T01-T06**	Make/Model: **Condensate and Water Tanks**
Primary Control Device ID: **VRU**	Make/Model: Arrow/VRC2
Control Efficiency (%): **95**	APCD/ERD Data Sheet Completed: ☒ Yes ☐ No
Secondary Control Device ID: **EC-1**	Make/Model: **HY-BON CH 10.0**
Control Efficiency (%): **98**	APCD/ERD Data Sheet Completed: ☒ Yes ☐ No

VAPOR COMBUSTION
(Including Enclosed Combustors)

General Information

Control Device ID#: EC-1	Installation Date: ☒ New ☐ Modified ☐ Relocated	
Maximum Rated Total Flow Capacity scfh scfd	Maximum Design Heat Input (from mfg. spec sheet) 10.0 MMBTU/hr	Design Heat Content BTU/scf

Control Device Information

Type of Vapor Combustion Control?

☒ Enclosed Combustion Device ☐ Elevated Flare ☐ Ground Flare
☐ Thermal Oxidizer

Manufacturer: **HY-BON Engineering** Model: **CH 10.0**	Hours of operation per year? **8760 (Potential)**

List the emission units whose emissions are controlled by this vapor control device (Emission Point ID# **4E**)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
T01	**Condensate Tank**	T04	**Produced Water Tank**
T02	**Condensate Tank**	T05	**Produced Water Tank**
T03	**Condensate Tank**	T06	**Produced Water Tank**

If this vapor combustor controls emissions from more than six (6) emission units, please attach additional pages.

Assist Type (Flares only)	Flare Height	Tip Diameter	Was the design per §60.18?
☐ Steam ☐ Air ☐ Pressure ☒ Non	**11 feet**	**2 feet**	☒ Yes ☐ No Provide determination.

Waste Gas Information

Maximum Waste Gas Flow Rate **30** (scfm)	Heat Value of Waste Gas Stream **1000-2400 BTU/ft^3**	Exit Velocity of the Emissions Stream **78 (ft/s) max**

Provide an attachment with the characteristics of the waste gas stream to be burned.

Pilot Gas Information

Number of Pilot Lights **1**	Fuel Flow Rate to Pilot Flame per Pilot **63 scfh**	Heat Input per Pilot **80,000 BTU/hr**	Will automatic re-ignition be used? ☒ Yes ☐ No

If automatic re-ignition is used, please describe the method. The unit will try to re-ignite up to 25 times. After that, it will go into manual mode which means someone will need to manually start. Gas flow is shut off if it fails to ignite.

Is pilot flame equipped with a monitor to detect the presence of the flame? ☒ Yes ☐ No	If Yes, what type? ☒ Thermocouple ☐ Infrared ☐ Ultraviolet ☐ Camera ☐ Other:

Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty. *(If unavailable, please indicate).* **Combustor burner, pilot, and air inlet arrestor must be checked for foreign debris (dust, sand, etc.) and cleaned at least quarterly.**

Additional information attached? ☒ Yes ☐ No
Please attach copies of manufacturer's data sheets, drawings, flame demonstration per §60.18 or §63.11(b) and performance testing.

VAPOR RECOVERY UNIT

General Information

Emission Unit ID#: **VRU**	Installation Date: **April 2015 (Existing Device)** ☐ New ☐ Modified ☐ Relocated

Device Information

Manufacturer: Arrow
Model: VRC2

List the emission units whose emissions are controlled by this vapor recovery unit (Emission Point ID# **4E**)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
T01	**Condensate Tank**	**T04**	**Produced Water Tank**
T02	**Condensate Tank**	**T05**	**Produced Water Tank**
T03	**Condensate Tank**	**T06**	**Produced Water Tank**

If this vapor recovery unit controls emissions from more than six (6) emission units, please attach additional pages.

Additional information attached? ☒ Yes ☐ No
Please attach copies of manufacturer's data sheets, drawings, and performance testing.

The registrant may claim a capture and control efficiency of 95 % (which accounts for 5% downtime) for the vapor recovery unit.

The registrant may claim a capture and control efficiency of 98% if the VRU has a backup flare that meet the requirements of Section 8.1.2 of this general permit.

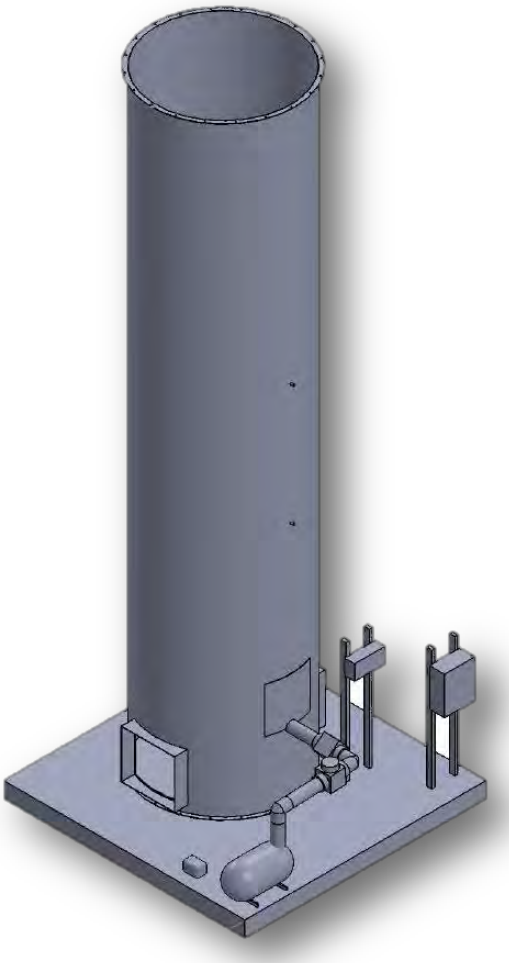
The registrant may claim a capture and control efficiency of 98% if the VRU has a backup VRU.

HY-BON EDI
Vent Gas Management

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

100 Ayers Blvd.
Belpre, OH 45714
740-401-4000
ediplungerlift.com

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.



- 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

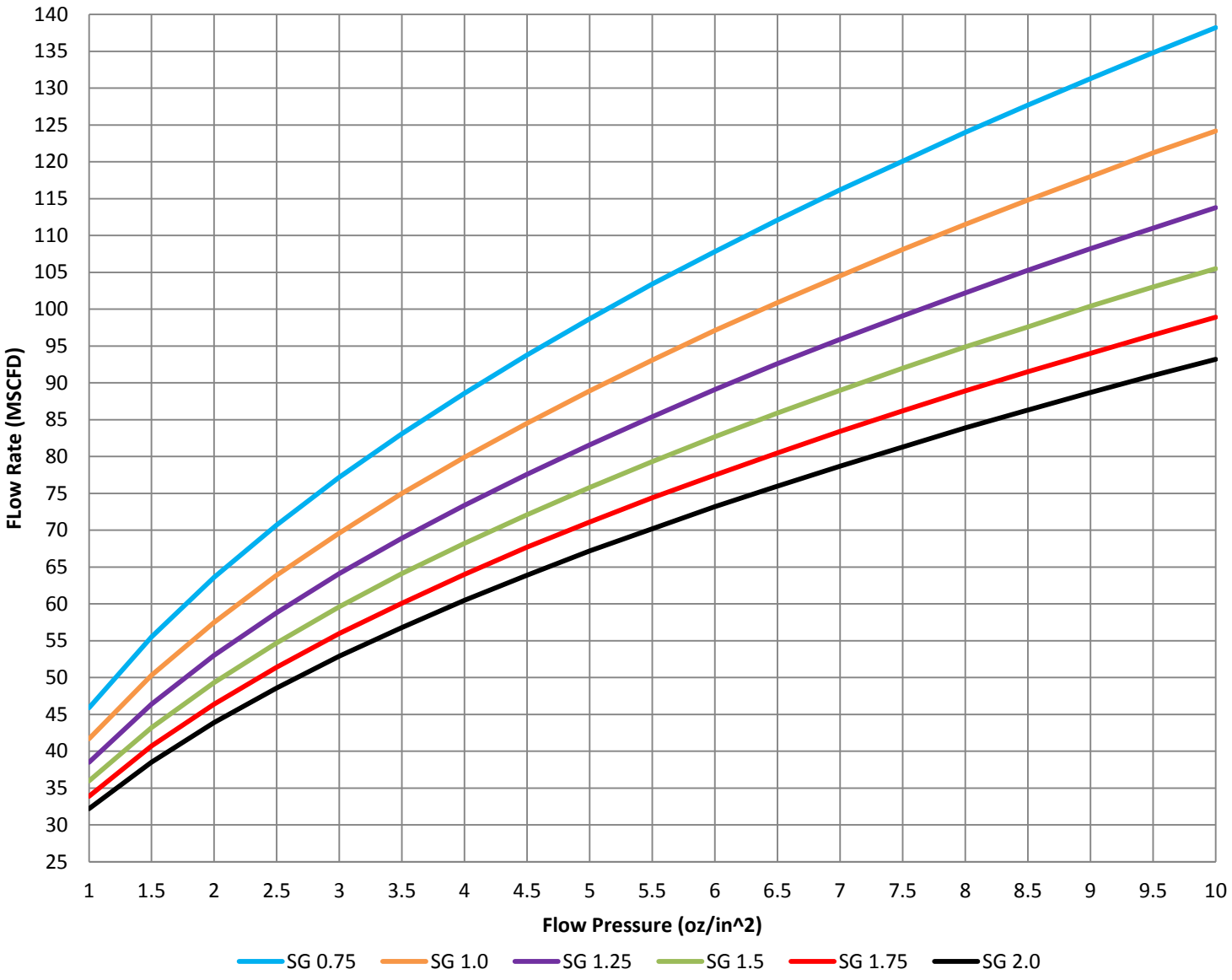
GENERAL PROPERTIES	
TYPE	Enclosed Tank Battery Flare
AMBIENT TEMPERATURE	-20 °F to +100 °F
PILOT FUEL REQUIREMENTS	Propane or Site Gas @5psi of natural gas = 13.3 SCFM @5psi of propane = 12.5 SCFM
BURNER SIZE	10.0 million BTU/hr
INLET PRESSURE REQUIRMENTS	Minimum 0.5 oz/in^2 (~1.0 inches w.c.)
TURN DOWN 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

Revision #3: 09/04/2015

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

100 Ayers Blvd.
Belpre, OH 45714
740-401-4000
ediplungerlift.com

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



USA COMPRESSION

USA Compression Partners, LLC

Unit Information Sheet

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 informtion included in the attached catalyst specification sheet.

ATTACHMENT S

Emission Calculations

Jay-Bee Oil & Gas, Inc.

Maddie Mae 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	89.4	0.05	0.000	0.013	0.000	0.001	0.017	0.024
HTR-1	GPU #1	0.15	0.13	181.2	0.01	0.001	0.011	0.003	0.000	0.000	0.003
HTR-2	GPU #2	0.15	0.13	181.2	0.01	0.001	0.011	0.003	0.000	0.000	0.003
HTR-3	GPU #3	0.15	0.13	181.2	0.01	0.001	0.011	0.003	0.000	0.000	0.003
TEG-1	Thermoelectric Generator	0.00	0.00	1.6	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]			23.9	6.64			0.20			0.20
EC-1	Condensate Tanks + Water Tanks [5]	0.28	1.47	474.5	2.65	0.000	0.014	0.11	0.000	0.000	0.11
TL-1 + TL-2	Truck Loading [3]				27.90						1.37
---	Truck Traffic Fugitive Dust						26.07				
---	Fittings Fugitive Emissions			5.3	0.17						
Total		0.91	2.22	1,138	37.44	0.00	26.13	0.32	0.00	0.02	1.71

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	0.005	0.07	0.11
HTR-1	GPU #1	0.66	0.55	794	0.04	0.004	0.05	0.01	0.000	0.0005	0.01
HTR-2	GPU #2	0.66	0.55	794	0.04	0.004	0.05	0.01	0.000	0.0005	0.01
HTR-3	GPU #3	0.66	0.55	794	0.04	0.004	0.05	0.01	0.000	0.0005	0.01
TEG-1	Thermoelectric Generator	0.01	0.00	7	0.00	0.000	0.00	0.00	0.000	0.0000	0.00
---	Blowdowns [1]										
T01-T06	Condensate Tanks + Water Tanks [2]			104	29.06			0.88			0.96
EC-1	Condensate Tanks + Water Tanks [5]	0.64	3.34	1091	11.61	0.00	0.03	0.48	0.000	0.000	0.74
TL-1 + TL-2	Truck Loading [3]				2.14						0.10
---	Truck Traffic Fugitive Dust						2.10				
---	Fittings Fugitive Emissions			23	0.76						
Total		3.43	6.62	3,997	43.89	0.01	2.34	1.40	0.005	0.08	1.94
	Current Permit	2.79	3.28	2,952	45.54	0.01	2.31	1.35	0.00	0.08	1.65
	Increase/Decrease	**0.64**	**3.34**	**1044.37**	**-1.65**	**0.00**	**0.03**	**0.05**	**0.00**	**0.00**	**0.29**

[1] Blowdown Calculations in original application.

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

[3] Truck loading is un-controlled.

[4] Emission presented herein for VOCs and Formaldehyde represent un-controlled Mfg. specs. + 15%. The Catalyst Warranty had 0% reduction for these parameters

[5] Condensate and water tank emissions are alternately controlled by an Enclosed Combustor at 98%. The entries for VOC, n-hexane, HAPs and CO2e represents emissions of organics based on a 98% capture and control efficiency.

Jay-Bee Oil &Gas ,LLC
ENGINE EMISSIONS

Maddie Mae 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 4strokerich lb/mmbtu	Comment
Oxides of Nitrogen, NOx	1.000	0.19	0.81	84	4.44		
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	1,996		
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	0.0046			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

Maddie Mae Well Pad Production Facility
Tyler County, WV

Potential Emission Rates

Source HTR-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

Maddie Mae Well Pad Production Facility
Tyler County, WV

Potential Emission Rates

Source HTR-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

Maddie Mae Well Pad Production Facility
Tyler County, WV

Potential Emission Rates

Source HTR-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

Maddie Mae 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**	

Jay-Bee Oil &Gas ,LLC

Maddie Mae Well Pad Production Facility
Tyler County, WV

otential Emission Rate

Enclosed Combustor Pilot

Burner Duty Rating	80.0	Mbtu/hr
Burner Efficiency	99.0	%
Gas Heat Content (HHV)	1263.0	Btu/scf
Total Gas Consumption	1535.6	scfd
H2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.0079	lbs/hr	0.035	TPY
CO	0.0067	lbs/hr	0.029	TPY
CO2	9.5	lbs/hr	41.6	TPY
CO2e	10	lbs/hr	42	TPY
VOC	0.0004	lbs/hr	0.002	TPY
SO2	0.0000	lbs/hr	0.000	TPY
H2S	0.0000	lbs/hr	0.000	TPY
PM10	0.0006	lbs/hr	0.003	TPY
CHOH	0.0000	lbs/hr	0.000	TPY
Benzene	0.0000	lbs/hr	0.000	TPY
N-Hezane	0.0001	lbs/hr	0.001	TPY
Toluene	0.0000	lbs/hr	0.000	TPY
Total HAPs	0.0001	lbs/hr	0.001	TPY

AP-42 Factors Used (Tables 1.4.1-1.4.3)

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

Maddie Mae Well Pad Production Facility
Tyler County, WV

Potential Emission Rates

Source EC-1

Enclosed Vapor Combustor - Control of Tank Emissions

Destruction Efficiency	98.0	%		
Gas Heat Content (HHV)	2313.1	Btu/scf		
Max Flow to T-E	0.041	MMSCFD	7.730	MMCF/Yr
Max BTUs to Flare	3.962	MMBTU/Hr	17,880	MMBTU/Yr

NOx	0.27	lbs/hr	0.61	tpy
CO	1.47	lbs/hr	3.31	tpy
CO2	463.13	lbs/hr	1,045.0	tpy
CO2e	464.90	lb/hr	1,048.9	tpy
VOC	2.65	lb/hr	11.61	tpy
CH4	0.03	lbs/hr	0.1300	tpy
N2O	0.0009	lbs/hr	0.0020	tpy
PM	0.0130	lb/hr	0.0294	tpy
Benzene	0.0000	lb/hr	0.0000	tpy
CHOH	0.0001	lb/hr	0.0003	tpy
n-Hexane	0.1100	lb/hr	0.4800	tpy
Toluene	0.0000	lb/hr	0.0000	tpy
Total HAP	0.1102	lb/hr	0.7400	tpy

Notes: VOC, Total HAP, N-Hexane and CH4 emissions are taken from the Condensate and Produced Water Tank Emissions sheet in the Calculations Section.

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**
AP-42 Table 1.4-2	**PM**	**7.6**	**lb/MMSCF**
AP-42 Table 1.4-3	**Benzene**	**0.0021**	**lb/MMSCF**
AP-42 Table 1.4-3	**Toluene**	**0.0034**	**lb/MMSCF**
AP-42 Table 1.4-3	**Hexane**	**1.8**	**lb/MMSCF**
AP-42 Table 1.4-3	**CHOH**	**0.075**	**lb/MMSCF**

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

Maddie Mae Well Pad Production Facility
Tyler County, WV

Condensate Tank Flash Vapor 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	0.032	0.009	0.000	0.022			-		0.0003	
Carbon Dioxide, CO2	0.093	0.041	0.001	0.103			-		0.0009	
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	21.006	3.370	0.116	8.458	191.0	212.2	2.002		0.2096	
Ethane, C2H6	26.977	8.112	0.280	20.358	436.7	477.4	4.500		0.2676	7.176
Propane	25.650	11.311	0.391	28.386	593.8	645.4	6.110	28.386	0.2520	7.030
Iso-Butane	5.272	3.064	0.106	7.690	158.2	171.4	1.633	7.690	0.0512	1.715
Normal Butane	11.899	6.916	0.239	17.357	358.3	388.2	3.685	17.357	0.1150	3.731
Iso Pentane	3.281	2.367	0.082	5.941	121.4	131.3	1.250	5.941	0.0328	1.195
Normal Pentane	3.198	2.307	0.080	5.791	118.5	128.2	1.219	5.791	0.0320	1.152
Hexane	1.776	1.531	0.053	3.841	78.2	84.5	0.804	3.841	0.0175	0.726
Heptane	0.816	0.818	0.028	2.052	41.6	44.9	0.428	2.052	0.0081	0.374
	100.000	39.846	1.376		2,097.7	2,283.4	21.630	71.059	0.9872	23.100

Gas Density (STP) = 0.111

Ideal Gross (HHV)	2,283.4
Ideal Gross (sat'd)	2,244.3
GPM	-
Real Gross (HHV)	2,313.1
Real Net (LHV)	2,124.9

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

Maddie Mae Well Pad Production Facility
Tyler County, WV

Water Tank Flash Vapor 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	0.575	0.161	0.006	0.652			-		0.0057	
Carbon Dioxide, CO2	1.602	0.705	0.024	2.855			-		0.0160	
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	74.187	11.902	0.411	48.188	674.7	749.3	7.070		0.7404	
Ethane, C2H6	9.798	2.946	0.102	11.929	158.6	173.4	1.634		0.0972	2.606
Propane	4.384	1.933	0.067	7.827	101.5	110.3	1.044	7.827	0.0431	1.202
Iso-Butane	1.841	1.070	0.037	4.332	55.2	59.9	0.570	4.332	0.0179	0.599
Normal Butane	2.043	1.187	0.041	4.808	61.5	66.6	0.633	4.808	0.0197	0.641
Iso Pentane	1.305	0.942	0.033	3.812	48.3	52.2	0.497	3.812	0.0131	0.475
Normal Pentane	0.928	0.670	0.023	2.711	34.4	37.2	0.354	2.711	0.0093	0.334
Hexane	1.149	0.990	0.034	4.009	50.6	54.6	0.520	4.009	0.0114	0.470
Heptane	2.188	2.192	0.076	8.877	111.6	120.4	1.147	8.877	0.0218	1.004
	100.000	24.699	0.853		1,296.4	1,424.0	13.469	36.376	0.9954	7.331

Gas Density (STP) = 0.069

Ideal Gross (HHV)	1,424.0
Ideal Gross (sat'd)	1,399.9
GPM	-
Real Gross (HHV)	1,430.5
Real Net (LHV)	1,302.3

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

Maddie Mae 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.
FUGITIVE EMISSIONS

Maddie Mae 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:	16	0.02700 scf/hr	18.4	0.005	0.020	0.000	0.000	0.015	0.0651	1.628
Light Liquid:	36	0.05000 scf/hr	100.0	0.104	0.457					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:	18	0.04000 scf/hr	18.4	0.008	0.034	0.000	0.001	0.025	0.1085	2.714
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:	16	0.00300 scf/hr	18.4	0.001	0.002	0.000	0.000	0.002	0.0072	0.181
Light Liquid:	6	0.00700 scf/hr	100.0	0.042	0.184					0.000
Heavy Liquid (Oil):	-	0.00030 scf/hr	100.0	0.000	0.000					0.000
Flanges:										0.000
Gas:	38	0.00086 lb/hr	18.4	0.006	0.026	0.000	0.000	0.019	0.0850	2.124
Light Liquid:	18	0.00300 scf/hr	100.0	0.003	0.014					0.000
Heavy Liquid:		0.0009 scf/hr	100.0	0.000	0.000					0.000

Fugitive Calculations:

	lb/hr	t/y
VOC	**0.174**	**0.761**
CH4	**0.061**	**0.269**
CO2	**0.000**	**0.002**
CO2e	**5.265**	**23.06**

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 DATA INFORMATION

Specific Graivity of Air, @ 29.92 in. Hg and 60 -F, 28.963
One mole of gas occupies, @ 14.696 psia & 32 -I 359.2 cu ft. per lb-mole
One mole of gas occupies, @ 14.696 psia & 60 -I 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
Heptane	C7H16	100.205	3.4598	0.2639	3.789	5,101	5,503	22,000	23,000	52.41	17.468

ATTACHMENT T

Facility-wide Emission Summary Sheet(s)

ATTACHMENT T – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		GHG (CO_2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	0.19	0.81	0.37	16.2	0.05	0.21	0.000	0.002	0.013	0.06			89.4	391
HTR-1	0.15	0.66	0.13	0.55	0.01	0.04	0.001	0.004	0.011	0.05			181.2	794
HTR-2	0.15	0.66	0.13	0.55	0.01	0.04	0.001	0.004	0.011	0.05			181.2	794
HTR-3	0.15	0.66	0.13	0.55	0.01	0.04	0.001	0.004	0.011	0.05			181.2	794
TEG-1	0.00	0.01	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00			1.6	7
T01-T06					6.64	29.06							23.9	104
EC-1	0.28	0.64	1.47	3.34	2.65	11.61	0.000	0.00	0.014	0.03			474.4	1091
TL-1 + TL-2 (Truck Loading)					27.9	2.14								
Truck Traffic Fugitive Dust									26.07	2.10				
Fittings Fugitive Emissions					0.17	0.76							5.3	23
TOTAL	0.91	3.43	2.22	6.62	37.44	43.99	0.00	0.01	26.13	2.34			1,138	3,997

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.
According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

ATTACHMENT T – FACILITY-WIDE HAP CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	0.017	0.07	0.001	0.005							0.000	0.000	0.024	0.11
HTR-1	0.000	0.0005	0.000	0.000							0.003	0.01	0.003	0.01
HTR-2	0.000	0.0005	0.000	0.000							0.003	0.01	0.003	0.01
HTR-3	0.000	0.0005	0.000	0.000							0.003	0.01	0.003	0.01
TEG-1	0.000	0.000	0.000	0.000							0.000	0.000	0.000	0.00
T01-T06											0.20	0.88	0.20	0.96
EC-1	0.000	0.000	0.000	0.000							0.11	0.48	0.11	0.74
TL-1 + TL-2 (Truck Loading)													1.37	0.10
Truck Traffic Fugitive Dust														
Fittings Fugitive Emissions														
TOTAL	0.02	0.08	0.00	0.005							0.32	1.40	1.71	1.94

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.
According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

ATTACHMENT U

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 modification of its G70-A General Permit Registration and conversion to a G70-B General Permit Registration for its Maddie Mae Well Pad Production Facility located off of Indian Creek Road east of Middlebourne, WV in Tyler County, West Virginia (Lat.39.437815, Long. -80.806142).

The applicant estimates an increase in potential emissions of the following regulated air pollutants:

0.64 tons of Nitrogen Oxides per year
3.34 tons of Carbon Monoxide per year
0.03 tons of Particulate Matter per year
0.00 tons of Sulfur Dioxide per year
0.00 tons of Formaldehyde per year
0.00 tons of Benzene per year
0.05 tons of n-Hexane per year
0.29 tons of Total Hazardous Air Pollutants per year
1,044 tons of Greenhouse Gases per year

The applicant estimates a decrease in potential emissions of the following regulated air pollutants:

1.65 tons of Volatile Organics per year

Startup of operation is planned to begin on or about the 29th day of February, 2016. 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.