JAY-BEE OIL & GAS, INC.

APPLICATION FOR GENERAL PERMIT

P3 Well Pad Production Facility
Pleasants County, West Virginia

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

APPLICATION FOR G70-D GENERAL PERMIT

Jay-Bee Oil & Gas, Inc.
P3 Well Pad Production Facility
Pleasants 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 25 4
Phone (304) 926-0475
Fax (304) 926-0479
www.dep.wv.gov

G70-D 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 Rd**

City: Cairo	State: WV	ZIP Code: 26337

Facility Name: **P3 Well Pad Production Facility**

Operating Site Physical Address: **Access road off Arvilla Rd.**
If none available, list road, city or town and zip of facility.

City: **Friendly**	Zip Code: **26146**	County: **Pleasants**

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: **39.440460**
Longitude: **-81.060782**

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

CERTIFICATION OF INFORMATION

This G70-D 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-D Registration Application will be returned to the applicant. Furthermore, if the G70-D 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-D 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: Shane Dowell, 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: Natural gas production and separation of liquids followed by dehydration and transfer to a gathering line, owned and operated by others.	
Directions to the facility: From Clarksburg: Follow Rt 50 west to Bunnel Run Rd; Bunnell Run to left on Old US 50; Right turn on Highland Rd; Continue onto Bonds Creek Rd; Continue onto Freeland-Hebron Rd; Right turn on Middle Island-McKim Shawnee Rd; Continue onto Herron Rd; Slight left to Wick Rd; Continue onto Arvilla Rd; approx. 4.7 mile to well access road (Elkhorn Ln.) on right.	
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, OOOO and/or OOOOa [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)** – 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-D 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/Rail Car 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	
☒ Pneumatic Pump Data Sheet – Attachment R	
☒ Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment S	
☒ Emission Calculations (please be specific and include all calculation methodologies used) – Attachment T	
☒ Facility-wide Emission Summary Sheet(s) – Attachment U	
☒ Class I Legal Advertisement – Attachment V	
☒ 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).

The Source Determination Rule for the oil and gas industry was published in the Federal Register on June 3, 2016 and will become effective on August 2, 2016. EPA defined the term "adjacent" and stated that equipment and activities in the oil and gas sector that are under common control will be considered part of the same source if they are located on the same site or on sites that share equipment and are within ¼ mile of each other.

Is there equipment and activities in the same industrial grouping (defined by SIC code)?
Yes ☒ No ☐

Is there equipment and activities under the control of the same person/people?
Yes ☐ No ☒

Is there equipment and activities located on the same site or on sites that share equipment and are within ¼ mile of each other?
Yes ☐ No ☒

ATTACHMENT B

SITING CRITERIA WAIVER

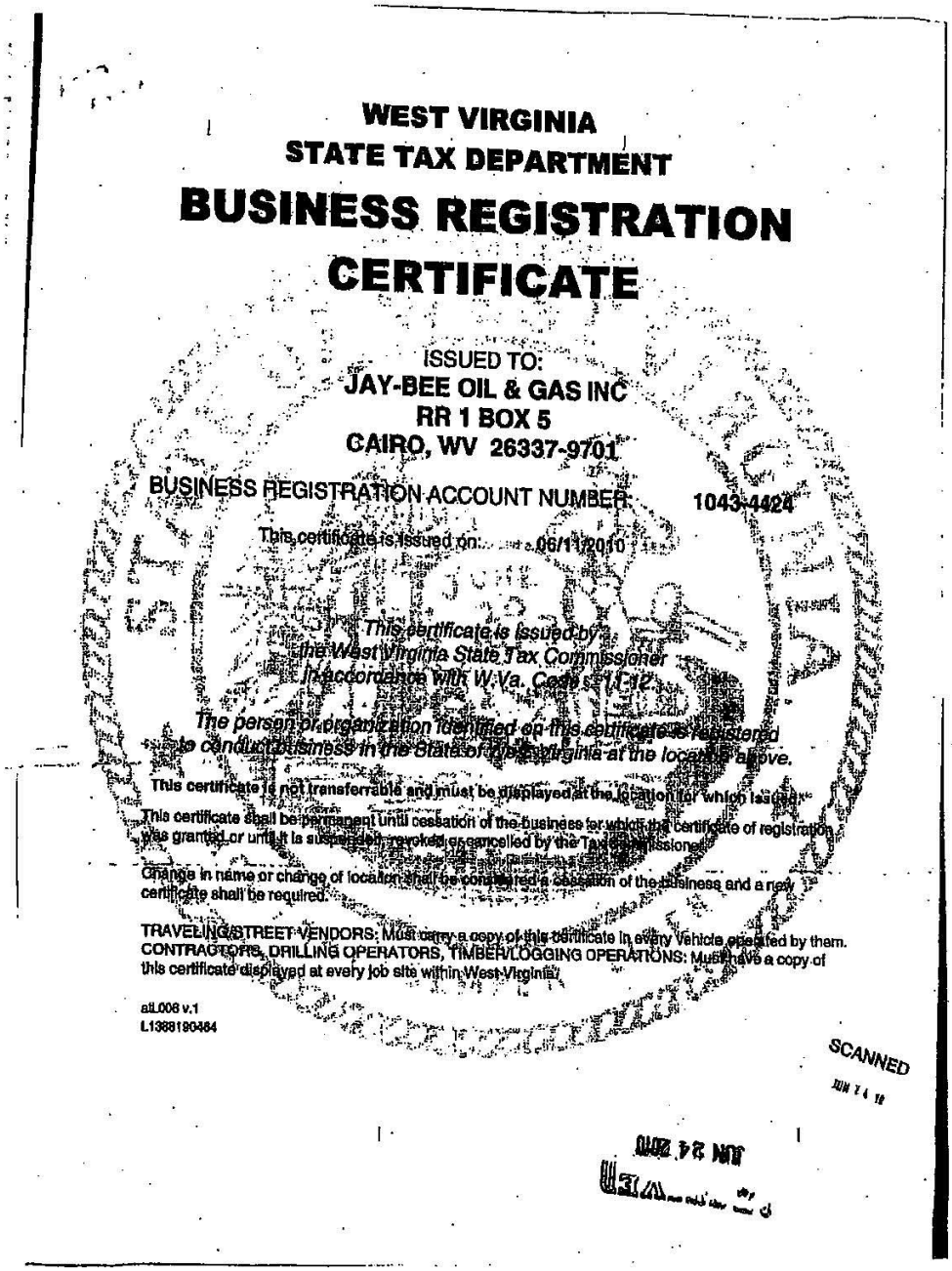
ATTACHMENT B - SITING CRITERIA WAIVER
If applicable, please complete this form and it must be notarized.

Not Applicable

ATTACHMENT C

Current Business Certificate

Attached Current WV Business Certificate



WEST VIRGINIA
STATE TAX DEPARTMENT

BUSINESS REGISTRATION CERTIFICATE

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

BUSINESS REGISTRATION ACCOUNT NUMBER: 1043-4424

This certificate is issued on: 06/11/2010

This certificate is issued by
The West Virginia State Tax Commissioner
In accordance with W.Va. Code § [illegible]

The person or organization identified on this certificate is registered 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 considered 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.

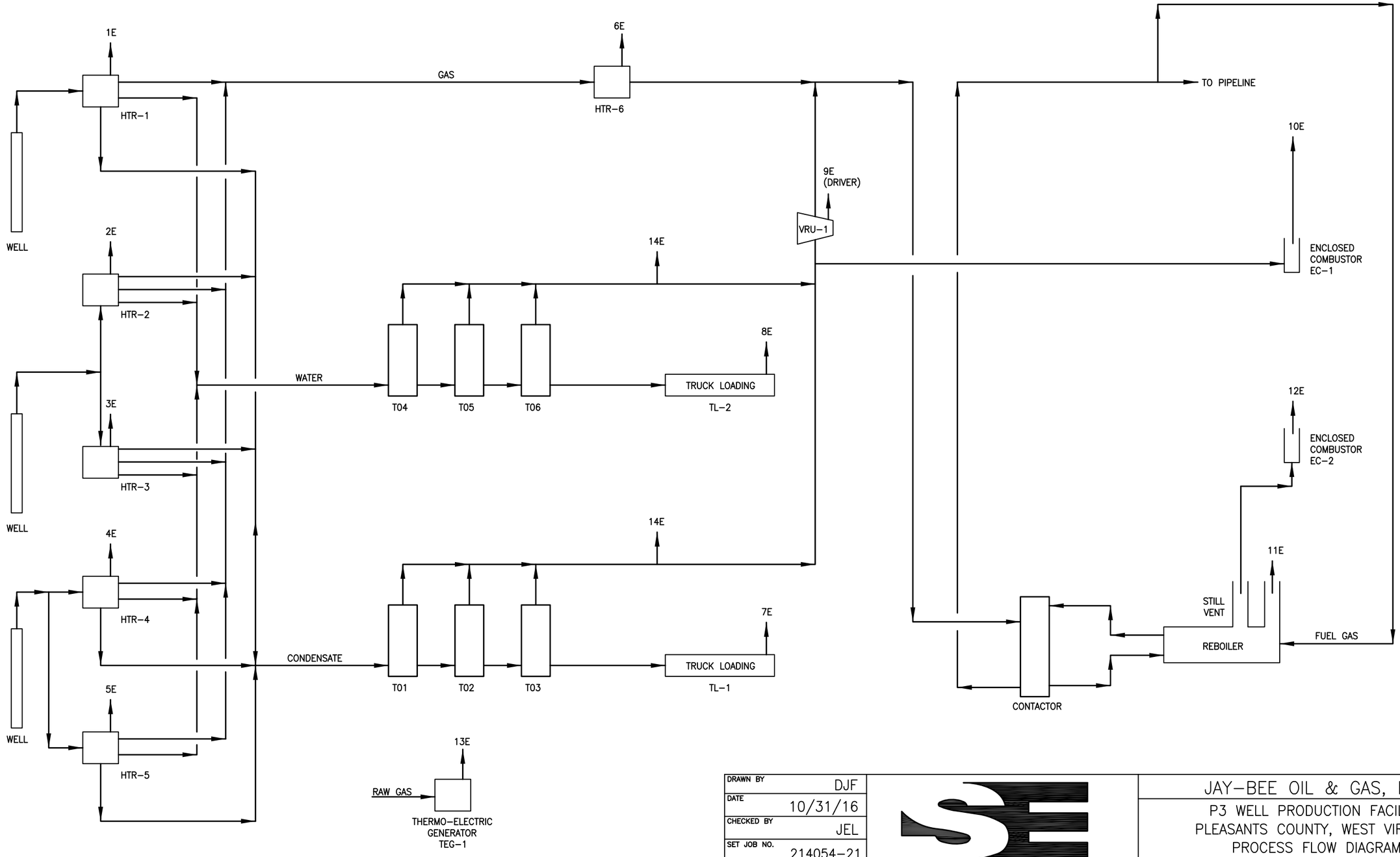
all.008 v.1
L1388190484

SCANNED

JUN 24 2010

ATTACHMENT D

Process Flow Diagram



DRAWN BY	DJF
DATE	10/31/16
CHECKED BY	JEL
SET JOB NO.	214054-21
SET DWG FILE	P3 FDb01.dwg
DRAWING SCALE	N.T.S.

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

JAY-BEE OIL & GAS, INC.

P3 WELL PRODUCTION FACILITY
PLEASANTS COUNTY, WEST VIRGINIA
PROCESS FLOW DIAGRAM

DRAWING NAME	REV.
FIGURE 3	0

ATTACHMENT E

Process Description

ATTACHMENT E – PROCESS DESCRIPTION

At this facility, natural gas and produced fluids (condensate and water) will be received from three wells and passed through gas processing units (GPU) (one per Marcellus well and two per Utica well), to prevent ice formation during subsequent pressure drops, then pass through a three-way separator where condensate and water are separated from the gas. The gas is then dehydrated and transferred to a gathering pipeline owned and operated by others. All gas-fired equipment will use natural gas produced on site as fuel.

Condensate and produced water will be collected in six (6) 210 BBL tanks (three for condensate and three for produced water), pending truck transportation by others. The condensate will be transported to a regional processing facility and the produced water will be transported to a regional disposal facility. Flash, working and breathing losses from these tanks will be routed to a vapor recovery unit (VRU) with the captured vapors routed back to the raw gas discharge line. An enclosed combustor will be utilized as a backup control device for times when the VRU is not available, and will also be utilized if a large slug of condensate production generates flash gas in excess of the capacity of the VRU. A capture and control efficiency of 98% is being applied for this overall combination of controls.

The dehydration unit will generate emissions from the still vent and re-boiler. There is no flash tank. Vapors from the still vent will be comprised of water and various low molecular weight hydrocarbons. Still vent vapors will be routed to an enclosed combustor. A capture and control efficiency of 98% is being applied for the combustor. Although needs are anticipated to be minimal, supplemental re-boiler fuel is available from the dehydrated gas stream prior to injection into the sales line. Water condensing in the still vent column will be routed to the wastewater tanks.

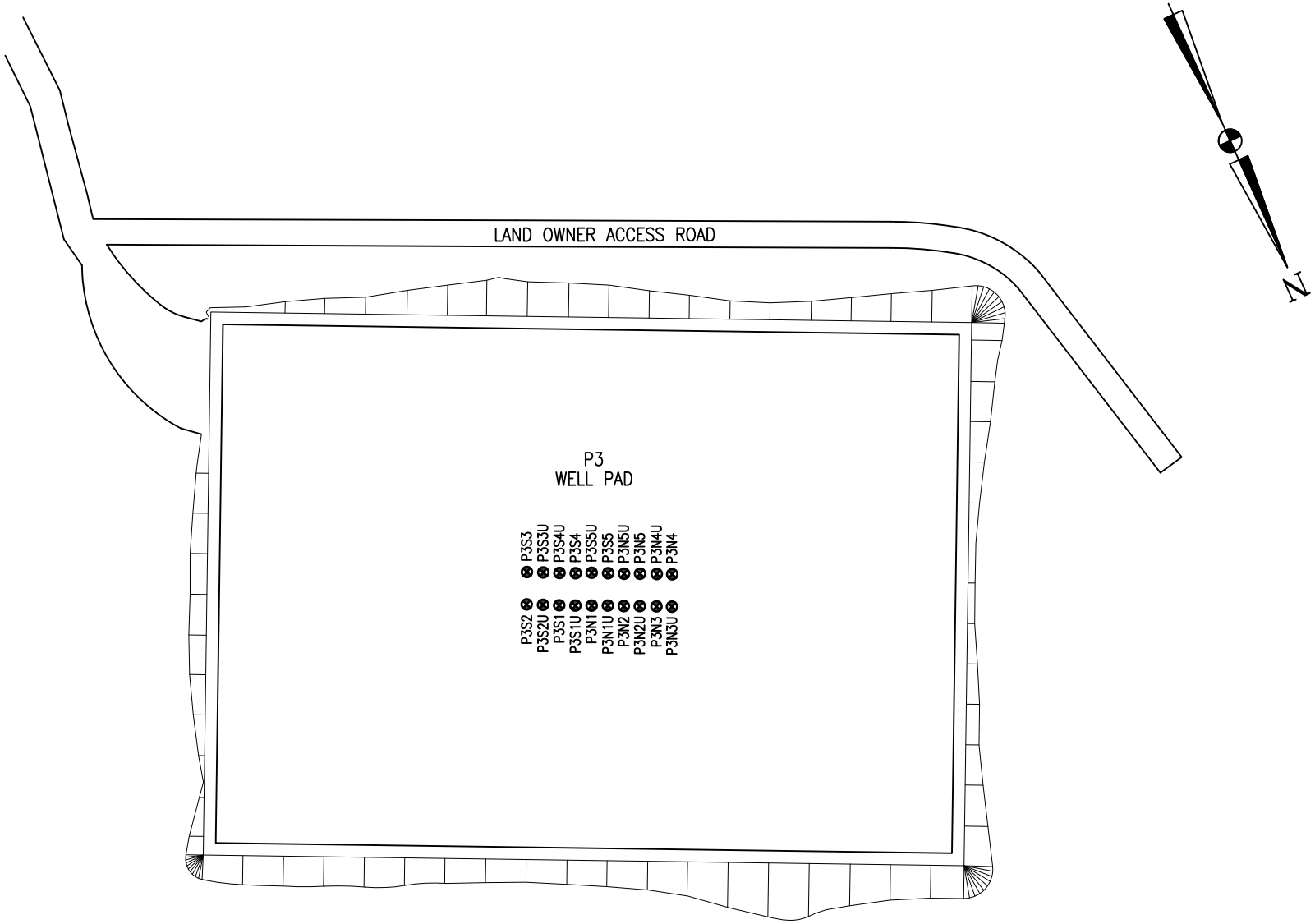
Lastly, Jay-Bee is seeking approval for installation of a Thermoelectric generator to meet the minor electric demands for various monitoring and data tracking equipment.

In summary, upon approval of this application, emission sources at this facility will include the following:

- Five Gas Processing Units (GPUs), each with a 1.5 MMBTU/hr heater (Sources 1E, 2E, 3E, 4E, and 5E).
- One Line Heater (Source 6E).
- Condensate Truck Loading (Max. 300 bbl/day) (Source 7E)
- Produced Water Truck Loading (Max. 636 bbl/day) (Source 8E)
- One Vapor Recovery Unit (VRU) with driver engine (Source 9E), controlling emissions from T01-T06.
- Backup Enclosed Combustor for VRU (Source 10E)
- Three Condensate Tanks (T01-T03)
- Three Produced Water Tanks (T04-T06)
- Dehydration Unit (Source 11E – reboiler vent and 12E – still vent)
- Enclosed Combustor for control of still vent (Source 12E)
- One Thermoelectric Generator (Source 13E)

ATTACHMENT F

Plot Plan



DRAWN BY	DJF
DATE	11/01/16
CHECKED BY	JEL
SET JOB NO.	214054-21
SET DWG FILE	P3 SITE LAYOUTb01.dwg
DRAWING SCALE	N.T.S.

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

JAY-BEE OIL & GAS, INC.

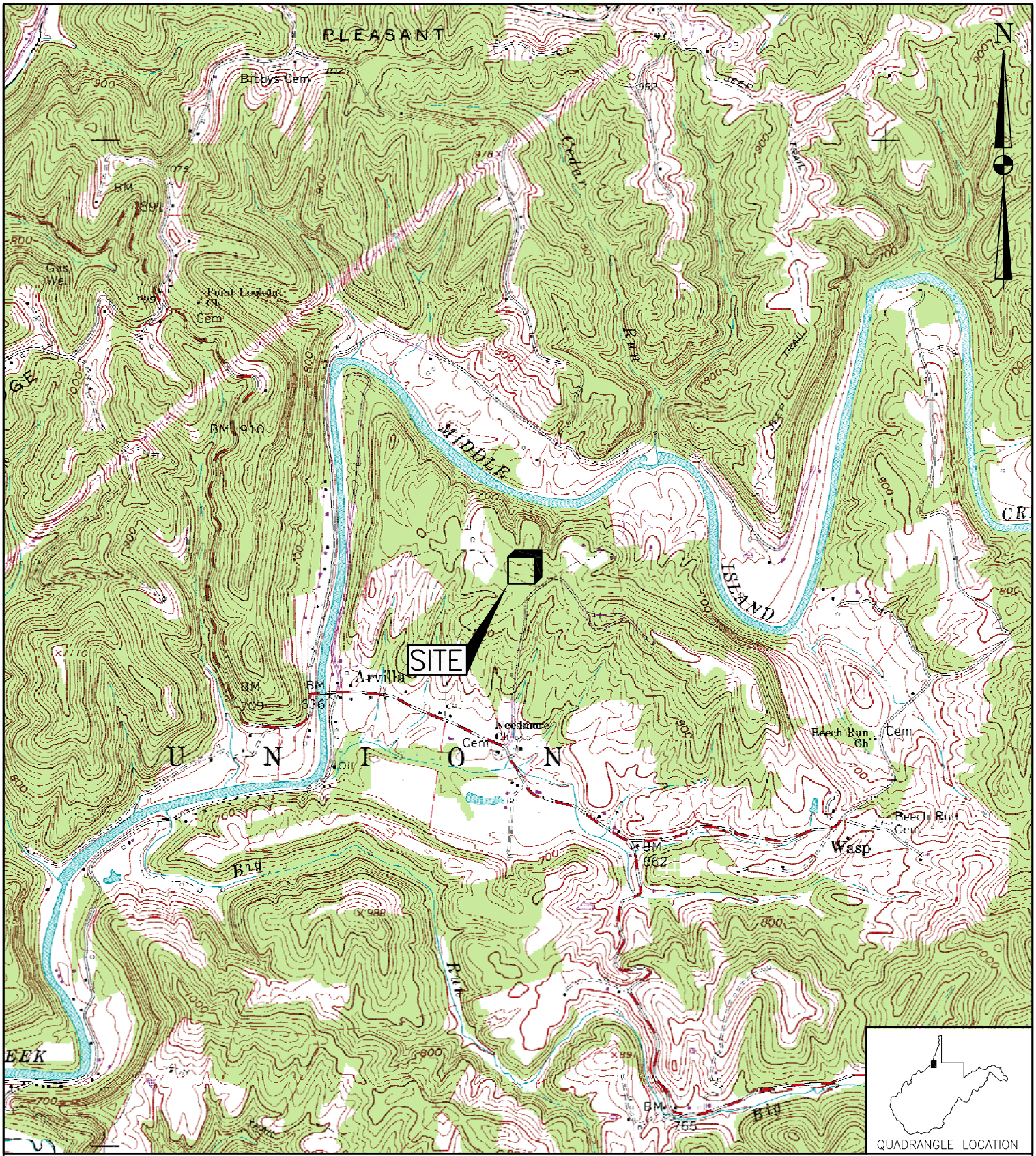
P3 WELL PRODUCTION FACILITY
PLEASANTS COUNTY, WEST VIRGINIA
SITE LAYOUT PLAN

DRAWING NAME: FIGURE 2

REV.: 0

ATTACHMENT G

Area Map



REFERENCE: USGS 7.5' QUADRANGLE MAP OF: BENS RUN, WEST VIRGINIA–OHIO; DATED 1960, PHOTOREVISED 1972.

DRAWN BY	DJF
DATE	11/01/16
CHECKED BY	JEL
SET JOB NO.	214054–21
SET DWG FILE	P3 SITE LOCm01.dwg
DRAWING SCALE	1"=2000'

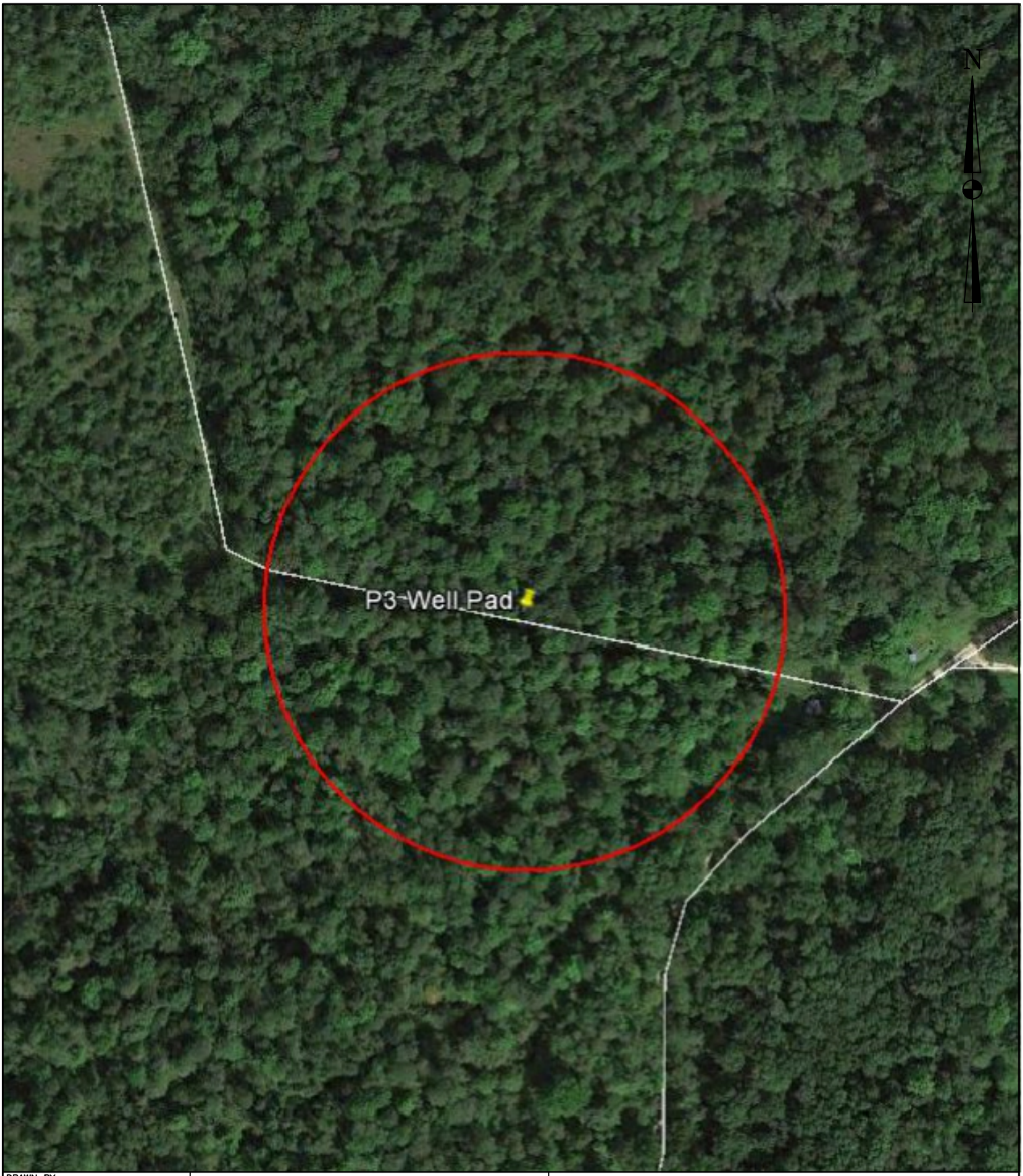
SE TECHNOLOGIES
98 Vanadium Road Bridgeville, PA 15017 (412) 221-1100

JAY–BEE OIL & GAS, INC.

P3 WELL PRODUCTION FACILITY
PLEASANTS COUNTY, WEST VIRGINIA
SITE LOCATION MAP

DRAWING NO.	REV.
FIGURE 1	0

Plot: env045 11/01/2016 09:52 G:\JAY–BEE OIL&GAS\214054\P3\FIGURE 1 P3 SITE LOC MAPm01.dwg



DRAWN BY	DJF
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CHECKED BY	JEL
SET JOB NO.	214054-21
SET DWG FILE	P3 300 FT RADa01.dwg
DRAWING SCALE	1"=150'

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

JAY-BEE OIL & GAS, INC.

P3 WELL PRODUCTION FACILITY
PLEASANTS COUNTY, WEST VIRGINIA
300 FOOT RADIUS

DRAWING NAME	REV.
FIGURE 4	0

Plot: env045 11/01/2016 10:22 G:\JAY-BEE OIL&GAS\214054\P3\FIGURE 4 P3 300 FT RADa01.dwg

ATTACHMENT H

G-70D Section Applicability Form

ATTACHMENT H – G70-D SECTION APPLICABILITY FORM

General Permit G70-D Registration
Section Applicability Form

General Permit G70-D 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, pneumatic pumps, reciprocating internal combustion engines (RICEs), tank truck/rail car 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-D 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-D APPLICABLE SECTIONS	
☒Section 5.0	Gas and Oil Well Affected Facility (NSPS, Subpart OOOO/OOOOa)
☒Section 6.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☐Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)
☒Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa 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/OOOOa)
☐Section 11.0	Pneumatic Pump Affected Facility (NSPS, Subpart OOOOa)
☒Section 12.0	Fugitive Emissions GHG and VOC Standards (NSPS, Subpart OOOOa)
☒Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines
☒Section 14.0	Tanker Truck/Rail Car Loading[2]
☒Section 15.0	Glycol Dehydration Units[3]

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

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

3 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]
HTR-1	1E	Gas Processing Unit	TBD		1.5 MMBTU/hr	NEW	None	None
HTR-2	2E	Gas Processing Unit	TBD		1.5 MMBTU/hr	NEW	None	None
HTR-3	3E	Gas Processing Unit	TBD		1.5 MMBTU/hr	NEW	None	None
HTR-4	4E	Gas Processing Unit	TBD		1.5 MMBTU/hr	NEW	None	None
HTR-5	5E	Gas Processing Unit	TBD		1.5 MMBTU/hr	NEW	None	None
HTR-6	6E	Line Heater	TBD		0.5 MMBTU/hr	NEW	None	None
TL-1	7E	Condensate Truck Loading	TBD		30,000 BBL/yr	NEW	None	None
TL-2	8E	Produced Water Truck Loading	TBD		63,600 BBL/yr	NEW	None	None
VRU-1	9E	VRU Driver	TBD	3/19/12	84 HP	NEW	1C	None
EC-1	10E	Enclosed Combustor	TBD		10.0 MMBTU/hr	NEW	N/A	None
T01	9E/10E	Condensate Tank	TBD		210 BBL	NEW	EC-1	VRU-1
T02	9E/10E	Condensate Tank	TBD		210 BBL	NEW	EC-1	VRU-1
T03	9E/10E	Condensate Tank	TBD		210 BBL	NEW	EC-1	VRU-1
T04	9E/10E	Produce Water Tank	TBD		210 BBL	NEW	EC-1	VRU-1
T05	9E/10E	Produced Water Tank	TBD		210 BBL	NEW	EC-1	VRU-1
T06	9E/10E	Produced Water Tank	TBD		210 BBL	NEW	EC-1	VRU-1
RBV-1	11E	Dehydration Unit Re-boiler Vent	TBD		0.500 MMBTU/hr	NEW	None	None
RSV-1	12E	Dehydration Unit Still Vent	TBD		40 MMSCFD	NEW	EC-2	None
EC-2	12E	Enclosed Combustor	TBD		10.0 MMBTU/hr	NEW	None	None
TEG-1	13E	Thermoelectric Generator	TBD		4.4 KW/hr	NEW	None	None
T01-T06	14E	Un-captured/Un-controlled VRU-1 Emissions	TBD			NEW	None	None

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
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 Sheet

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: P3 Well Pad

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 (methane, CO_2e)
Pumps	☐ Yes ☒ No	1	API	☒ Gas ☐ Liquid ☐ Both	0.004	0.000	0.344
Valves	☐ Yes ☒ No	224	EPA	☐ Gas ☐ Liquid ☒ Both	0.92	0.01	17.1
Safety Relief Valves	☐ Yes ☒ No	12	EPA	☐ Gas ☐ Liquid ☒ Both	0.02	0.001	1.81
Open Ended Lines	☐ Yes ☒ No	23	EPA	☒ Gas ☐ Liquid ☐ Both	0.07	0.002	5.29
Connections	☐ Yes ☒ No	899	EPA	☐ Gas ☐ Liquid ☒ Both	0.49	0.003	7.62
Compressors	☐ Yes ☒ No	1	API	☒ Gas ☐ Liquid ☐ Both	0.016	0.001	1.26
Flanges	☐ Yes ☒ No	180	API	☐ Gas ☐ Liquid ☒ Both	0.129	0.003	6.71
Other[1]	☐ Yes ☐ No		NA	☐ Gas ☐ Liquid ☐ Both			

[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.):
Blowdowns

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/rail car loading, etc.)
Thief Hatch, VRU and Enclosed Combustors

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	Subject to OOOO or OOOOa?
47-073-02560	Pending	Pending	Flow to separator and into gathering line as soon as practical	Yes
47-073-02563	Pending	Pending	Flow to separator and into gathering line as soon as practical	Yes
47-073-02558	Pending	Pending	Flow to separator and into gathering line as soon as practical	Yes

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)

ATTACHMENT L – STORAGE VESSEL DATA SHEET

Complete this data sheet if you are the owner or operator of a storage vessel that contains condensate and/or produced water. This form must be completed for ***each*** new or modified bulk liquid storage vessel(s) that contains condensate and/or produced water. (If you have more than one (1) identical tank (i.e. 4-400 bbl condensate tanks), then you can list all on one (1) data sheet). **Include gas sample analysis, flashing emissions, working and breathing losses, USEPA Tanks, simulation software (ProMax, E&P Tanks, HYSYS, etc.), and any other supporting documents where applicable.**

The following information is REQUIRED:

□ Composition of the representative sample used for the simulation
□ For each stream that contributes to flashing emissions:
- □ Temperature and pressure (inlet and outlet from separator(s))
- □ Simulation-predicted composition
- □ Molecular weight
- □ Flow rate

□ Resulting flash emission factor or flashing emissions from simulation
□ Working/breathing loss emissions from tanks and/or loading emissions if simulation is used to quantify those emissions

Additional information may be requested if necessary.

GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name **P3 Tank Farm**	2. Tank Name **T01-T03**
3. Emission Unit ID number **N/A Vapors to combustors, emission point 11E**	4. Emission Point ID number **9E/11E**
5. Date Installed, Modified or Relocated *(for existing tanks)* **Pending Permit Approval** Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? ☐ Yes ☒ No Was the tank manufactured after September 18, 2015? ☒ Yes ☐ No	6. Type of change: ☒ New construction ☐ New stored material ☐ Other ☐ Relocation
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. Was USEPA Tanks simulation software utilized? ☒ Yes ☐ No ***If Yes, please provide the appropriate documentation and items 8-42 below are not required.***	

TANK INFORMATION

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. **210 BBL ea**	
9A. Tank Internal Diameter (ft.) **12.5**	9B. Tank Internal Height (ft.) **15**
10A. Maximum Liquid Height (ft.) **14**	10B. Average Liquid Height (ft.) **10**
11A. Maximum Vapor Space Height (ft.) **14**	11B. Average Vapor Space Height (ft.) **7**
12. Nominal Capacity *(specify barrels or gallons)*. This is also known as "working volume". **196 BBL**	
13A. Maximum annual throughput (gal/yr) **1,260,000 ea.**	13B. Maximum daily throughput (gal/day) **3,452 ea.**
14. Number of tank turnovers per year: 1**43 ea.**	15. Maximum tank fill rate (gal/min) **50**

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 ☐ 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
☐ Other (describe)

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:
☐ Does Not Apply ☐ Rupture Disc (psig)
☐ Inert Gas Blanket of _____ ☐ Carbon Adsorption[1]
☒ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors)
☐ Conservation Vent (psig) ☐ Condenser[1]
0.4 oz. Vacuum Setting **14 oz.** Pressure Setting
☐ Emergency Relief Valve (psig)
Vacuum Setting Pressure Setting
☒ Thief Hatch Weighted ☒ Yes ☐ No
[1] Complete appropriate Air Pollution Control Device Sheet

20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application). **T01 – T03 total**

Material Name	**Flashing Loss**		**Breathing Loss**		**Working Loss**		**Total Emissions Loss**		**Estimation Method[1]**
	lb/hr	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	
VOC (uncontrolled)	397.4	1740.8	0.162	0.710	0.731	3.201	398.3	1744.7	MB & EPA
HAP (uncontrolled)	12.97	56.81	0.004	0.016	0.011	0.049	12.99	56.88	MB

[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.

TANK CONSTRUCTION AND OPERATION INFORMATION

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

21A. Shell Color: **Blue**	21B. Roof Color: **Blue**	21C. Year Last Painted: **New**

22. 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): **2 oz – 14 oz**
Must be listed for tanks using VRUs with closed vent system.

24. Is the tank a **Vertical Fixed Roof Tank**? ☒ Yes ☐ No	24A. If yes, for dome roof provide radius (ft): NA	24B. If yes, for cone roof, provide slope (ft/ft): 0.05

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:
27. Closed Vent System with VRU? ☒ Yes ☐ No			
28. Closed Vent System with Enclosed Combustor? ☒ Yes ☐ No **Back-up to VRU**			
SITE INFORMATION			
29. Provide the city and state on which the data in this section are based: Pittsburgh, PA			
30. Daily Avg. Ambient Temperature (°F):		31. Annual Avg. Maximum Temperature (°F):	
32. Annual Avg. Minimum Temperature (°F):		33. Avg. Wind Speed (mph):	
34. Annual Avg. Solar Insulation Factor (BTU/ft^2-day):		35. Atmospheric Pressure (psia): 14.11	
LIQUID INFORMATION			
36. Avg. daily temperature range of bulk liquid (°F): **58.5**	36A. Minimum (°F): **49.3**	36B. Maximum (°F): **67.7**	
37. Avg. operating pressure range of tank (psig): **0-0.5 psig**	37A. Minimum (psig): **<0.1 psig**	37B. Maximum (psig): **0.8 psig**	
38A. Minimum liquid surface temperature (°F): **36**		38B. Corresponding vapor pressure (psia): **0.11**	
39A. Avg. liquid surface temperature (°F): **65**		39B. Corresponding vapor pressure (psia): **0.31**	
40A. Maximum liquid surface temperature (°F): **100**		40B. Corresponding vapor pressure (psia): **0.95**	
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:	**Condensate**		
41B. CAS number:	**68919-39-1**		
41C. Liquid density (lb/gal):	**5.49**		
41D. Liquid molecular weight (lb/lb-mole):	**81.3**		
41E. Vapor molecular weight (lb/lb-mole):	**39.56**		
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):	**5.28**		
41H. Months Storage per year. From: **January** To: **December**	**12**		
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.			

GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name **P3 Tank Farm**	2. Tank Name **T04-T06**
3. Emission Unit ID number **N/A Vapors to combustors, emission point 10E**	4. Emission Point ID number **9E/10E**
5. Date Installed, Modified or Relocated *(for existing tanks)* **Pending Permit Approval** Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? ☐ Yes ☒ No Was the tank manufactured after September 18, 2015? ☒ Yes ☐ No	6. Type of change: ☒ New construction ☐ New stored material ☐ Other ☐ Relocation
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. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 8-42 below are not required.***	

TANK INFORMATION

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) **2,671,200 (each)**	13B. Maximum daily throughput (gal/day) **7,318 (each)**
14. Number of tank turnovers per year **335 (max)**	15. Maximum tank fill rate (gal/min) **50**
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 ☒ 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 ☐ Other (describe)	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket of _____ ☐ Carbon Adsorption[1]

☒ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors) **as back-up to VRU**

☒ Conservation Vent (psig) ☐ Condenser[1]

0.4 oz Vacuum Setting 14 oz Pressure Setting

☐ Emergency Relief Valve (psig)

Vacuum Setting Pressure Setting

☒ Thief Hatch Weighted ☒ Yes ☐ No

[1] Complete appropriate Air Pollution Control Device Sheet

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

Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method[1]
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
VOC	3.87	16.94					3.87	16.94	MB
HAPs	0.325	1.43					0.325	1.43	MB

[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.

TANK CONSTRUCTION AND OPERATION INFORMATION

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

21A. Shell Color: **Blue**	21B. Roof Color: **Blue**	21C. Year Last Painted: **2016**

22. 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): **2 oz – 14 oz**
Must be listed for tanks using VRUs with closed vent system.

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:

27. Closed Vent System with VRU? ☒ Yes ☒ No

28. Closed Vent System with Enclosed Combustor? ☒ Yes ☒ No

SITE INFORMATION **Items 29 through 35 are N/A for Water Tank**

29. Provide the city and state on which the data in this section are based:

30. Daily Avg. Ambient Temperature (°F):	31. Annual Avg. Maximum Temperature (°F):
32. Annual Avg. Minimum Temperature (°F):	33. Avg. Wind Speed (mph):

34. Annual Avg. Solar Insulation Factor (BTU/ft^2-day):		35. Atmospheric Pressure (psia):	
LIQUID INFORMATION			
36. Avg. daily temperature range of bulk liquid (°F): **60**	36A. Minimum (°F): **36**	36B. Maximum (°F): **70**	
37. Avg. operating pressure range of tank (psig): **0-0.5 psig**	37A. Minimum (psig): **<0.1 psig**	37B. Maximum (psig): **0.8 psig**	
38A. Minimum liquid surface temperature (°F): 36		38B. Corresponding vapor pressure (psia): 0.11	
39A. Avg. liquid surface temperature (°F): 65		39B. Corresponding vapor pressure (psia): .031	
40A. Maximum liquid surface temperature (°F): 70		40B. Corresponding vapor pressure (psia): 0.95	
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:	**Produced Water**		
41B. CAS number:	**7732-15-8, 7747-40-7, 7647-14-5**		
41C. Liquid density (lb/gal):	**9-10 lb/gal**		
41D. Liquid molecular weight (lb/lb-mole):	**Varies**		
41E. Vapor molecular weight (lb/lb-mole):	**18**		
41F. Maximum true vapor pressure (psia):	**0.95**		
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year. From: To:	**Continuous**		
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.	**n/a**		

STORAGE TANK DATA TABLE

List all deminimis storage tanks (i.e. lube oil, glycol, diesel etc.)

Source ID #[1]	Status[2]	Content[3]	Volume[4]
T07	NEW	Tri-ethylene Glycol (TEG)	200

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the well site. Tanks should be designated T01, T02, T03, etc.
2. Enter storage tank Status using the following:
   - EXIST Existing Equipment
   - NEW Installation of New Equipment
   - REM Equipment Removed
3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, diesel, mercaptan etc.
4. Enter the maximum design storage tank volume in gallons.

ATTACHMENT M

Small Heaters and Reboilers Not Subject to 40CFR60 Subpart Dc Data Sheet

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]
HTR-1	1E	Gas Processing Unit	TBD	NEW	1.5	1263
HTR-2	2E	Gas Processing Unit	TBD	NEW	1.5	1263
HTR-3	3E	Gas Processing Unit	TBD	NEW	1.5	1263
HTR-4	4E	Gas Processing Unit	TBD	NEW	1.5	1263
HTR-5	5E	Gas Processing Unit	TBD	NEW	1.5	1263
HTR-6	6E	Line Heater	TBD	NEW	0.5	1263
RBV-1	11E	Reboiler	TBD	NEW	0.500	1263
TEG-1	13E	Thermoelectric Generator	TBD	NEW	4.4 KW/hr	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

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]	VRU-1		
Engine Manufacturer/Model	Cummins G5.9		
Manufacturers Rated bhp/rpm	84 @ 1800		
Source Status[2]	NS		
Date Installed/ Modified/Removed/Relocated[3]	Upon Receipt of Permit		
Engine Manufactured /Reconstruction Date[4]	After 3/1/2013		
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]	4SRB		
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 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 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	0.04	0.18				
AP	SO_2	<0.01	<0.01				
AP	PM_{10}	0.013	0.06				
AP	Formaldehyde	0.015	0.065				
AP	Total HAPs	0.022	0.10				
AP	GHG (CO_2e)	90	393				

1 Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion engine/generator engine located at the well site. Multiple 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# VRU-1)

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:

Manufacturer: **Miratech**	Model #: **VXC-1408-04-HSG**
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 1,078 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,

ATTACHMENT O

Tanker Truck Loading Data Sheet(s)

ATTACHMENT O – TANKER TRUCK/RAIL CAR 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/rail cars. Use extra pages if necessary.

Truck/Rail Car Loadout Collection Efficiencies

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

- For tanker trucks/rail cars passing the MACT level annual leak test – 99.2%
- For tanker trucks/rail cars passing the NSPS level annual leak test – 98.7%
- For tanker trucks/rail cars 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/rail car 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#: TL-1 & TL-2	Emission Point ID#: 7E & 8E	Year Installed/Modified: TBD
Emission Unit Description: Condensate Truck Loading		
Loading Area Data		
Number of Pumps: 2	Number of Liquids Loaded: 2	Max number of trucks/rail cars loading at one (1) time: 2
Are tanker trucks/rail cars 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. None		
Are any of the following truck/rail car loadout systems utilized? **No** ☐ Closed System to tanker truck/rail car passing a MACT level annual leak test? ☐ Closed System to tanker truck/rail car passing a NSPS level annual leak test? ☐ Closed System to tanker truck/rail car 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	24	24	24	24
Days/week	7	7	7	7

Bulk Liquid Data (use extra pages as necessary)

Liquid Name	**Condensate**	**Produced Water**	
Max. Daily Throughput (1000 gal/day)	**12.6**	**26.7**	
Max. Annual Throughput (1000 gal/yr)	**3,780**	**8,014**	
Loading Method[1]	**SUB**	**SP**	
Max. Fill Rate (gal/min)	**50**	**50**	
Average Fill Time (min/loading)	**120**	**120**	
Max. Bulk Liquid Temperature (°F)	**75**	**75**	
True Vapor Pressure[2]	**3.6 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)	**2.96**	**0.14**	
	Annual (ton/yr)	**4.00**	**0.19**	
Max.HAP Emission Rate	Loading (lb/hr)	**0.16**	**0.016**	
	Annual (ton/yr)	**0.22**	**0.02**	
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)

ATTACHMENT P

Glycol Dehydration Unit Data Sheet(s)

ATTACHMENT P – GLYCOL DEHYDRATION UNIT DATA SHEET

Complete this data sheet for each Glycol Dehydration Unit, Reboiler, Flash Tank and/or Regenerator at the facility. Include gas sample analysis and GRI- GLYCalc™ input and aggregate report. Use extra pages if necessary.

Manufacturer: Exterran	Model: 48875001
Max. Dry Gas Flow Rate: 40 mmscf/day	Reboiler Design Heat Input: 0.500 MMBTU/hr
Design Type: ☒ TEG ☐ DEG ☐ EG	Source Status[1]: NS
Date Installed/Modified/Removed[2]: TBD	Regenerator Still Vent APCD/ERD[3]: TO
Control Device/ERD ID#[3]: EC-2	Fuel HV (BTU/scf): 1263
H_2S Content (gr/100 scf): <0.001%	Operation (hours/year): 8760
Pump Rate (gpm): 7.5	
Water Content (wt %) in: Wet Gas: Saturated	Dry Gas: 7.0 lb/MMscf

Is the glycol dehydration unit exempt from 40CFR63 Section 764(d)? ☒Yes ☐ No: If Yes, answer the following:

The actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters per day, as determined by the procedures specified in §63.772(b)(1) of this subpart. ☐ Yes ☒ No

The actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram per year (1 ton per year), as determined by the procedures specified in §63.772(b)(2) of this subpart. ☒ Yes ☐ No

Is the glycol dehydration unit located within an Urbanized Area (UA) or Urban Cluster (UC)? ☐ Yes ☒No

Is a lean glycol pump optimization plan being utilized? ☐ Yes ☒ No

Recycling the glycol dehydration unit back to the flame zone of the reboiler.
☐ Yes ☒ No

Recycling the glycol dehydration unit back to the flame zone of the reboiler and mixed with fuel.
☐ Yes ☒ No

What happens when temperature controller shuts off fuel to the reboiler? **Still vent to enclosed combustor (EC-2).**
☐ Still vent emissions to the atmosphere.
☐ Still vent emissions stopped with valve.
☐ Still vent emissions to glow plug.

Please indicate if the following equipment is present.
☐ Flash Tank
☐ Burner management system that continuously burns condenser or flash tank vapors

Control Device Technical Data

Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)
Hydrocarbons	**99+% (Note: 98% used for calculations)**

Emissions Data

Emission Unit ID / Emission Point ID[4]	Description	Calculation Methodology[5]	PTE[6]	Controlled Maximum Hourly Emissions (lb/hr)	Controlled Maximum Annual Emissions (tpy)
RBV-1 / 11E	Reboiler Vent	AP-42	NO_x	0.05	0.22
		AP-42	CO	0.04	0.18
		AP-42	VOC	<0.01	0.01
		AP-42	SO_2	<0.01	<0.01
		AP-42	PM_{10}	<0.01	0.02
		AP-42	GHG (CO_2e)	60.4	264.5

RSV-1 / 12E	Glycol Regenerator Still Vent	GRI-GlyCalc™	VOC	0.62	2.73
		GRI-GlyCalc™	Benzene	0.008	0.036
		GRI-GlyCalc™	Toluene	0.03	0.13
		GRI-GlyCalc™	Ethylbenzene	<0.01	<0.01
		GRI-GlyCalc™	Xylenes	<0.01	<0.01
		GRI-GlyCalc™	n-Hexane	0.02	0.07
None	Glycol Flash Tank	GRI-GlyCalc™	VOC		
		GRI-GlyCalc™	Benzene		
		GRI-GlyCalc™	Toluene		
		GRI-GlyCalc™	Ethylbenzene		
		GRI-GlyCalc™	Xylenes		
		GRI-GlyCalc™	n-Hexane		

1 Enter the Source Status using the following codes:
NS Construction of New Source ES Existing Source
MS Modification of Existing Source

2 Enter the date (or anticipated date) of the glycol dehydration unit's installation (construction of source), modification or removal.

3 Enter the Air Pollution Control Device (APCD)/Emission Reduction Device (ERD) type designation using the following codes and the device ID number:
NA None CD Condenser FL Flare
CC Condenser/Combustion Combination TO Thermal Oxidizer O Other (please list)

4 Enter the appropriate Emission Unit ID Numbers and Emission Point ID Numbers for the glycol dehydration unit reboiler vent and glycol regenerator still vent. The glycol dehydration unit reboiler vent and glycol regenerator still vent should be designated RBV-1 and RSV-1, respectively. If the well site incorporates multiple glycol dehydration units, a Glycol Dehydration Emission Unit Data Sheet shall be completed for each, using Source Identification RBV-2 and RSV-2, RBV-3 and RSV-3, etc.

5 Enter the Potential Emissions Data Reference designation using the following codes:
MD Manufacturer's Data AP AP-42
GR GRI-GLYCalc™ OT Other (please list)

6 Enter the Reboiler Vent and Glycol Regenerator Still Vent Potential to Emit (PTE) for the listed regulated pollutants in lbs per hour and tons per year. The Glycol Regenerator Still Vent potential emissions may be determined using the most recent version of the thermodynamic software model GRI-GLYCalc™ (Radian International LLC & Gas Research Institute). **Attach all referenced Potential Emissions Data (or calculations) and the GRI-GLYCalc™ Aggregate Calculations Report (shall include emissions reports, equipment reports, and stream reports) to this Glycol Dehydration Emission Unit Data Sheet(s). Backup pumps do not have to be considered as operating for purposes of PTE.** This PTE data shall be incorporated in the Emissions Summary Sheet.

ATTACHMENT Q

Pneumatic Controllers Data Sheet

ATTACHMENT Q – PNEUMATIC CONTROLLERS DATA SHEET

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

ATTACHMENT R

Pneumatic Pump Data Sheet

ATTACHMENT R – PNEUMATIC PUMP DATA SHEET

Are there any natural gas-driven diaphragm pumps located at a well site that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list.

Source ID #	Date	Pump Make/Model	Pump Size

ATTACHMENT S

Air Pollution Control Device/Emission Reduction Device Sheet

ATTACHMENT S – 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 ID: T01-T06	Make/Model: Condensate and Produced Water Tanks
Primary Control Device ID: VRU-1	Make/Model: Arrow/WRC2
Control Efficiency (%): 98	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: TBD – Upon Permit ☒ 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 Model: CH-10.0	Hours of operation per year? 8760

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

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
RBV-1	Dehydration Unit Still Vent		

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	feet	feet	☐ Yes ☐ No Provide determination.

Waste Gas Information

Maximum Waste Gas Flow Rate	Heat Value of Waste Gas Stream	Exit Velocity of the Emissions Stream
64.3 (scfm)	660.7 BTU/ft^3	(ft/s)

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

Pilot Gas Information

Number of Pilot Lights	Fuel Flow Rate to Pilot Flame per Pilot	Heat Input per Pilot	Will automatic re-ignition be used?
1	798 scfh	985,100 BTU/hr	☒ 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
See Attachment N

General Information

Emission Unit ID#:	Installation Date: ☐ New ☐ Modified ☐ Relocated

Device Information

Manufacturer:
Model:

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

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description

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.

ATTACHMENT T

Emission Calculations

Jay-Bee Oil & Gas, Inc.

EMISSIONS SUMMARY

P3 Well Pad Production Facility
Pleasants County, WV

Emission Unit ID	Description	NOx lb/hr	CO lb/hr	CO_2e lb/hr	CH_4 lb/hr	VOC[4] lb/hr	SO_2 lb/hr	PM lb/hr	Benzene lb/hr	Ethylbenzene lb/hr	Xylenes lb/hr	n-Hexane lb/hr	Toluene lb/hr	Formaldehyde lb/hr	Total HAPs lb/hr
HTR-1	GPU #1	0.150	0.126	181.1	0.003	0.008	0.001	0.011	3.15E-06			0.003	5.10E-06	1.13E-04	0.003
HTR-2	GPU #2	0.150	0.126	181.1	0.003	0.008	0.001	0.011	3.15E-06			0.003	5.10E-06	1.13E-04	0.003
HTR-3	GPU #3	0.150	0.126	181.1	0.003	0.008	0.001	0.011	3.15E-06			0.003	5.10E-06	1.13E-04	0.003
HTR-4	GPU #4	0.150	0.126	181.1	0.003	0.008	0.001	0.011	3.15E-06			0.003	5.10E-06	1.13E-04	0.003
HTR-5	GPU #5	0.150	0.126	181.1	0.003	0.008	0.001	0.011	3.15E-06			0.003	5.10E-06	1.13E-04	0.003
HTR-6	Line Heater	0.050	0.042	60.4	0.0012	2.75E-03	0.0003	0.004	1.05E-06			0.001	1.70E-06	3.75E-05	0.001
TL-1	Truck Loading - Condensate[2]					2.96						0.16			0.160
TL-2	Truck Loading - Produced Water[2]					0.143						0.016			0.016
VRU-1	VRU Compressor	0.185	0.370	89.7	0.126	0.04	0.0004	0.013	0.001	1.65E-05	1.30E-04		3.71E-04	0.015	0.022
TEG-1	Thermoelectric Generator	0.001	0.001	1.6	0.0007	7.15E-05	7.80E-06	9.88E-05	2.73E-08			2.34E-05	4.42E-08		2.45E-05
T01-T06	Condensate Tanks + Water Tanks[3]			28.5		8.06			0.004	5.74E-04	7.70E-03	0.241	0.0094		0.263
EC-1	Condensate Tanks + Water Tanks[1]	0.922	4.57	1564.6	1.14	8.07	5.91E-04	0.047	1.31E-05			0.011		4.67E-04	0.012
RBV-1	500 MBTU/hr Reboiler	0.050	0.042	60.4	0.0012	0.003	3.00E-04	0.0038	1.05E-06			0.001	1.70E-06	3.75E-05	0.001
EC-2	Dehydration Unit Combustor	0.272	1.03	417.4	0.008	0.63	5.91E-04	0.037	0.008			0.018	0.031	3.63E-04	0.057
---	Truck Traffic Fugitive Dust							4.30							
---	Fugitive Emissions			9.2	0.37	0.39									0.004
Total (Exluding Fugitive Emissions)		2.23	6.68	3128.24	1.30	11.89	0.007	0.16	0.013	5.91E-04	7.83E-03	0.462	0.041	0.016	0.546
Total		2.23	6.68	3137.42	1.66	12.27	0.007	4.46	0.013	5.91E-04	7.83E-03	0.462	0.041	0.016	0.550

Emission Unit ID	Description	NOx tpy	CO tpy	CO_2e tpy	CH_4 tpy	VOC tpy	SO_2 tpy	PM tpy	Benzene tpy	Ethylbenzene tpy	Xylenes tpy	n-Hexane tpy	Toluene tpy	Formaldehyde tpy	Total HAPs tpy
HTR-1	GPU #1	0.657	0.552	793.4	0.015	0.036	0.004	0.050				0.012	2.23E-05	4.93E-04	0.012
HTR-2	GPU #2	0.657	0.552	793.4	0.015	0.036	0.004	0.050				0.012	2.23E-05	4.93E-04	0.012
HTR-3	GPU #3	0.657	0.552	793.4	0.015	0.036	0.004	0.050				0.012	2.23E-05	4.93E-04	0.012
HTR-4	GPU #4	0.657	0.552	793.4	0.015	0.036	0.004	0.050				0.012	2.23E-05	4.93E-04	0.012
HTR-5	GPU #5	0.657	0.552	793.4	0.015	0.036	0.004	0.050				0.012	2.23E-05	4.93E-04	0.012
HTR-6	Line Heater	0.219	0.184	264.5	0.005	0.012	0.001	0.017				0.004	7.45E-06	1.64E-04	0.004
TL-1	Truck Loading - Condensate[2]					4.00						0.216			0.22
TL-2	Truck Loading - Produced Water[2]					0.193						0.021			0.021
VRU-1	VRU Compressor	0.811	1.62	393.0	0.553	0.18	0.0017	0.057	0.0046	7.22E-05	5.68E-04		0.002	0.065	0.096
TEG-1	Thermoelectric Generator	0.006	0.00	6.9	0.003	3.13E-04	3.42E-05	4.33E-04	1.20E-07			1.03E-04	1.94E-07		1.07E-04
T01-T06	Condensate Tanks + Water Tanks[3]			124.9		35.31			0.018	2.52E-03	0.034	1.06	0.041		1.15
EC-1	Condensate Tanks + Water Tanks[1]	4.04	20.00	6,852.8	0.260	1.79	0.003	0.207				0.041		0.002	0.051
RBV-1	500 MBTU/hr Reboiler	0.219	0.184	264.5	0.005	0.012	0.001	0.017				0.004	7.45E-06	1.64E-04	0.004
EC-2	Dehydration Unit Combustor	1.19	4.50	1828.1	0.03	2.74	0.003	0.161	0.035			0.078	0.136	0.002	0.25
---	Truck Traffic Fugitive Dust							3.77							
---	Fugitive Emissions			40.18	1.61	1.70									0.018
Total (Exluding Fugitive Emissions)		9.77	29.25	13701.70	0.94	44.42	0.029	0.708	0.058	2.59E-03	0.0343	1.48	0.179	0.071	1.86
Total		9.77	29.25	13741.88	2.54	46.11	0.029	4.48	0.058	2.59E-03	0.0343	1.48	0.179	0.071	1.87

[1] Condensate and water tank emissions are currently controlled by a VRU + Enclosed Combustor at 98%. This line represents the un-controlled 2%.

[2] Truck loading is un-controlled.

[3] This line represents the 2% Un-captured/Controlled associated with the VRU.

[4] VRU-1 and EC-1 would not run concurrent so hourly VOC emissions for these sources are only accounted for once.

Jay-Bee Oil &Gas ,LLC
ENGINE EMISSIONS

P3 Well Pad Production Facility
Pleasants County, WV

Controlled Emission Rates

Source VRU-1

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
Configuration (In-line or V)	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	tpy	g/hr	lb/day	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		
VOC (NMNEHC)	0.220	0.04	0.18	18	0.98		
CO2	449	83	364	37,716	1,996		
CO2e		90	393				
Total Annual Hours of Operation	**8,760**						
SO2		0.0004	0.0017				
PM2.5		0.00632	0.0277				
PM (Condensable)		0.00659	0.0289				
CH_4		0.12623	0.5529				Factor From 40 CFR 98, Table C-2
N_2O		0.01148	0.0503				Factor From 40 CFR 98, Table C-2
acrolein		0.00175	0.0077				
acetaldehyde		0.00185	0.0081				
formaldehyde	0.080	0.0148	0.0649				Per Mfg.
benzene		0.00105	0.0046				
toluene		0.00037	0.0016				
ethylbenzene		1.6E-05	0.0001				
xylenes		0.00013	0.0006				
methanol		0.00203	0.0089				
Total HAPs		0.02202	0.0964				

453.59 grams = 1 pound
2,000 pounds = 1 ton

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, Inc.

P3 Well Pad Production Facility
Pleasants County, WV

Potential Emission Rates

Sources: HTR-1 Through HTR-5
*Emissions shown below are for each Gas Processing Unit

Burner Duty Rating	1500.0	Mbtu/hr
Burner Efficiency	98.0	%
Gas Heat Content (HHV)	1263.0	Btu/scf
Total Gas Consumption	29,084.8	scfd
H2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.1501	lb/hr	0.657	tpy
CO	0.1261	lb/hr	0.552	tpy
CO2	180.1	lb/hr	788.7	tpy
CH4	0.0035	lb/hr	0.0151	tpy
CO2e	181	lb/hr	793	tpy
VOC	0.0083	lb/hr	0.036	tpy
SO2	0.0009	lb/hr	0.004	tpy
H2S	0.0000	lb/hr	0.000	tpy
PM10	0.0114	lb/hr	0.050	tpy
CHOH	0.0001	lb/hr	0.000	tpy
Benzene	3.15E-06	lb/hr	0.000	tpy
N-Hexane	0.0027	lb/hr	0.012	tpy
Toluene	0.0000	lb/hr	0.000	tpy
Total HAPs	0.0028	lb/hr	0.012	tpy

AP-42 Factors Used

NOx	**100**	**lb/MMCF**	
CO	**84**	**lb/MMCF**	
CO_2	**120,000**	**lb/MMCF**	Global Warming Potential = 1
VOC	**5.5**	**lb/MMCF**	
PM	**7.6**	**lb/MMCF**	
SO_2	**0.6**	**lb/MMCF**	
CH_4	**2.3**	**lb/MMCF**	Global Warming Potential = 25
N_2O	**2.2**	**lb/MMCF**	Global Warming Potential =298
HCOH	**0.075**	**lb/MMCF**	
Benzene	**0.0021**	**lb/MMCF**	
n-Hexane	**1.8**	**lb/MMCF**	
Toluene	**0.0034**	**lb/MMCF**	

Jay-Bee Oil & Gas, Inc.

P3 Well Pad Production Facility
Pleasants County, WV

Potential Emission Rates

Source HTR-4
Line Heater

Burner Duty Rating	500.0	Mbtu/hr
Burner Efficiency	98.0	%
Gas Heat Content (HHV)	1263.0	Btu/scf
Total Gas Consumption	9,694.9	scfd
H2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.0500	lb/hr	0.219	tpy
CO	0.0420	lb/hr	0.184	tpy
CO2	60.0	lb/hr	262.9	tpy
CH4	0.0012	lb/hr	0.005	tpy
CO2e	60	lb/hr	264	tpy
VOC	0.0028	lb/hr	0.012	tpy
SO2	0.0003	lb/hr	0.001	tpy
H2S	0.0000	lb/hr	0.000	tpy
PM10	0.0038	lb/hr	0.017	tpy
CHOH	0.0000	lb/hr	0.000	tpy
Benzene	0.0000	lb/hr	0.000	tpy
N-Hexane	0.0009	lb/hr	0.004	tpy
Toluene	0.0000	lb/hr	0.000	tpy
Total HAPs	0.0009	lb/hr	0.004	tpy

AP-42 Factors Used

NOx	**100**	**lb/MMCF**	
CO	**84**	**lb/MMCF**	
CO_2	**120,000**	**lb/MMCF**	Global Warming Potential = 1
VOC	**5.5**	**lb/MMCF**	
PM	**7.6**	**lb/MMCF**	
SO_2	**0.6**	**lb/MMCF**	
CH_4	**2.3**	**lb/MMCF**	Global Warming Potential = 25
N_2O	**2.2**	**lb/MMCF**	Global Warming Potential =298
HCOH	**0.075**	**lb/MMCF**	
Benzene	**0.0021**	**lb/MMCF**	
n-Hexane	**1.8**	**lb/MMCF**	
Toluene	**0.0034**	**lb/MMCF**	

Jay-Bee Oil & Gas, Inc.

P3 Well Pad Production Facility
Pleasants County, WV

Potential Emission Rates

Source EC-1
Enclosed Combustor Pilot

Burner Duty Rating	985.1	MBtu/hr
Burner Efficiency	98.0	%
Gas Heat Content (HHV)	1263.0	Btu/scf
Total Gas Consumption	19100.9	scfd
H2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.0985	lb/hr	0.432	tpy
CO	0.0828	lb/hr	0.363	tpy
CO2	118.3	lb/hr	518.0	tpy
CH4	0.0023	lb/hr	0.010	tpy
CO2e	119	lb/hr	521	tpy
VOC	0.0054	lb/hr	0.024	tpy
SO2	0.0006	lb/hr	0.003	tpy
H2S	0.0000	lb/hr	0.000	tpy
PM10	0.0075	lb/hr	0.033	tpy
CHOH	0.0001	lb/hr	0.000	tpy
Benzene	0.0000	lb/hr	0.000	tpy
N-Hexane	0.0018	lb/hr	0.008	tpy
Toluene	0.0000	lb/hr	0.000	tpy
Total HAPs	0.0019	lb/hr	0.008	tpy

AP-42 Factors Used (Tables 1.4.1-1.4.3)

NOx	**100**	**lb/MMCF**	
CO	**84**	**lb/MMCF**	
CO_2	**120,000**	**lb/MMCF**	Global Warming Potential = 1
VOC	**5.5**	**lb/MMCF**	
PM	**7.6**	**lb/MMCF**	
SO_2	**0.6**	**lb/MMCF**	
CH_4	**2.3**	**lb/MMCF**	Global Warming Potential = 25
N_2O	**2.2**	**lb/MMCF**	Global Warming Potential =298
HCOH	**0.075**	**lb/MMCF**	
Benzene	**0.0021**	**lb/MMCF**	
n-Hexane	**1.8**	**lb/MMCF**	
Toluene	**0.0034**	**lb/MMCF**	

Jay-Bee Oil & Gas, Inc.

P3 Well Pad Production Facility
Pleasants 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	0.126 MMSCFD	45.887 MMSCF/yr	
Max BTUs to Flare	12.116 MMBTU/hr	106,140 MMBTU/yr	
Estimated Hours VRU Offline	5 %		

NOx	0.82	lb/hr	3.61	tpy
CO	4.48	lb/hr	19.64	tpy
CO2	1,416.29	lb/hr	6,203.36	tpy
CO2e	1,445.61	lb/hr	6,331.76	tpy
VOC	8.06	lb/hr	1.77	tpy
CH4	1.14	lb/hr	0.25	tpy
N2O	0.0027	lb/hr	0.0117	tpy
PM	0.0398	lb/hr	0.1744	tpy
CHOH	0.0004	lb/hr	0.0017	tpy
Benzene	0.0000	lb/hr	0.0000	tpy
n-Hexane	0.0094	lb/hr	0.0413	tpy
Toluene	0.0000	lb/hr	0.0001	tpy
Total HAP	0.0099	lb/hr	0.0431	tpy

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

Factors Used

AP-42 Table 13.5-1	**NOx**	**0.068 lb/MMBTU**	
AP-42 Table 13.5-1	**CO**	**0.37 lb/MMBTU**	
40 CFR 98 Table C-1	**CO2**	**116.89 lb/MMBTU**	Global Warming Potential = 1
40 CFR 98 Table C-2	**CH4**	**0.0022 lb/MMBTU**	Global Warming Potential = 25
40 CFR 98 Table C-2	**N2O**	**0.00022 lb/MMBTU**	Global Warming Potential =298
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.

P3 Well Pad Production Facility
Pleasants County, WV

Source RBV-1

Burner Duty Rating	500.0 MBtu/hr
Burner Efficiency	98.0 %
Gas Heat Content (HHV)	1263.0 Btu/scf
Total Gas Consumption	9,695 scfd
H2S Concentration	0.000 Mole %
Hours of Operation	8760

NOx	0.0500	lb/hr	0.219	tpy
CO	0.0420	lb/hr	0.184	tpy
CO2	60.0	lb/hr	262.9	tpy
CH4	0.0012	lb/hr	0.005	tpy
CO2e	60.4	lb/hr	264.5	tpy
VOC	0.0028	lb/hr	0.012	tpy
SO2	0.0003	lb/hr	0.001	tpy
H2S	0.0000	lb/hr	0.000	tpy
PM10	0.0038	lb/hr	0.017	tpy
CHOH	0.0000	lb/hr	0.000	tpy
Benzene	0.0000	lb/hr	0.000	tpy
N-Hexane	0.0009	lb/hr	0.004	tpy
Toluene	0.0000	lb/hr	0.000	tpy
Total HAPs	0.0009	lb/hr	0.004	tpy

AP-42 Factors Used

NOx	**100**	**lb/MMCF**	
CO	**84**	**lb/MMCF**	
CO_2	**120,000**	**lb/MMCF**	Global Warming Potential = 1
VOC	**5.5**	**lb/MMCF**	
PM	**7.6**	**lb/MMCF**	
SO_2	**0.6**	**lb/MMCF**	
CH_4	**2.3**	**lb/MMCF**	Global Warming Potential = 25
N_2O	**2.2**	**lb/MMCF**	Global Warming Potential = 298
HCOH	**0.075**	**lb/MMCF**	
Benzene	**0.0021**	**lb/MMCF**	
n-Hexane	**1.8**	**lb/MMCF**	
Toluene	**0.0034**	**lb/MMCF**	

Jay-Bee Oil & Gas, Inc.

P3 Well Pad Production Facility
Pleasants County, WV

Potential Emission Rates

Source EC-2
Enclosed Combustor Pilot

Burner Duty Rating	985.1	MBtu/hr
Burner Efficiency	98.0	%
Gas Heat Content (HHV)	1263.0	Btu/scf
Total Gas Consumption	19100.9	scfd
H_2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.0985	lb/hr	0.432	tpy
CO	0.0828	lb/hr	0.363	tpy
CO2	118.3	lb/hr	518.0	tpy
CH4	0.0023	lb/hr	0.010	tpy
CO2e	119	lb/hr	521	tpy
VOC	0.0054	lb/hr	0.024	tpy
SO2	0.0006	lb/hr	0.003	tpy
H2S	0.0000	lb/hr	0.000	tpy
PM10	0.0075	lb/hr	0.033	tpy
CHOH	0.0001	lb/hr	0.000	tpy
Benzene	0.0000	lb/hr	0.000	tpy
N-Hexane	0.0018	lb/hr	0.008	tpy
Toluene	0.0000	lb/hr	0.000	tpy
Total HAPs	0.0019	lb/hr	0.008	tpy

AP-42 Factors Used (Tables 1.4.1-1.4.3)

NOx	**100**	**lb/MMCF**	
CO	**84**	**lb/MMCF**	
CO_2	**120,000**	**lb/MMCF**	Global Warming Potential = 1
VOC	**5.5**	**lb/MMCF**	
PM	**7.6**	**lb/MMCF**	
SO_2	**0.6**	**lb/MMCF**	
CH_4	**2.3**	**lb/MMCF**	Global Warming Potential = 25
N_2O	**2.2**	**lb/MMCF**	Global Warming Potential =298
HCOH	**0.075**	**lb/MMCF**	
Benzene	**0.0021**	**lb/MMCF**	
n-Hexane	**1.8**	**lb/MMCF**	
Toluene	**0.0034**	**lb/MMCF**	

Jay-Bee Oil & Gas, Inc.

P3 Well Pad Production Facility
Pleasants County, WV

Potential Emission Rates

Source EC-2
Enclosed Vapor Combustor

Destruction Efficiency	98.0 %		
Gas Heat Content (HHV)	660.7 Btu/scf		
Max Flow to T-E	0.09264 MMSCFD	811.526	MMSCF/yr
Max BTUs to Flare	2.55 MMBtu/hr	22,341	MMBtu/yr

NOx	0.17	lb/hr	0.76	tpy
CO	0.94	lb/hr	4.13	tpy
CO2	298.11	lb/hr	1,305.74	tpy
CO2e	298.42	lb/hr	1,307.09	tpy
VOC	0.62	lb/hr	2.72	tpy
CH4	0.006	lb/hr	0.0246	tpy
N2O	0.001	lb/hr	0.0025	tpy
PM	0.029	lb/hr	0.128	tpy
Benzene	0.008	lb/hr	0.035	tpy
CHOH	0.000	lb/hr	0.001	tpy
n-Hexane	0.016	lb/hr	0.070	tpy
Toluene	0.031	lb/hr	0.136	tpy
Total HAPs	0.055	lb/hr	0.241	tpy

Note: VOCs and HAPs are set at 2% of the still vent emissions in the Glycalc Report.

Factors Used

AP-42 Table 13.5-1	**NOx**	**0.068 lb/MMBTU**	
AP-42 Table 13.5-1	**CO**	**0.37 lb/MMBTU**	
40 CFR 98 Table C-1	**CO2**	**116.89 lb/MMBTU**	Global Warming Potential = 1
40 CFR 98 Table C-2	**CH4**	**0.0022 lb/MMBTU**	Global Warming Potential = 25
40 CFR 98 Table C-2	**N2O**	**0.00022 lb/MMBTU**	Global Warming Potential =298
AP-42 Table 1.4-2	**PM**	**7.6 lb/MMSCF**	
AP-42 Table 1.4-3	**CHOH**	**0.075 lb/MMSCF**	

P3 Well Pad Production Facility
Pleasants 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	lb/hr	0.006	tpy
CO	0.0011	lb/hr	0.005	tpy
CO2	1.56	lb/hr	6.84	tpy
CO2e	1.57	lb/hr	6.88	tpy
CH_4	7.48E-04	lb/hr	3.28E-03	tpy
VOC	7.15E-05	lb/hr	3.13E-04	tpy
SO2	7.80E-06	lb/hr	3.42E-05	tpy
H2S	0.00E+00	lb/hr	0.00E+00	tpy
PM10	9.88E-05	lb/hr	4.33E-04	tpy
CHOH	9.75E-07	lb/hr	4.27E-06	tpy
Benzene	2.73E-08	lb/hr	1.20E-07	tpy
N-Hexane	2.34E-05	lb/hr	1.03E-04	tpy
Toluene	4.42E-08	lb/hr	1.94E-07	tpy
Total HAPs	2.45E-05	lb/hr	1.07E-04	tpy

AP-42 Factors Used

NOx	**100**	**lb/MMCF**	
CO	**84**	**lb/MMCF**	
CO_2	**120,000**	**lb/MMCF**	Global Warming Potential = 1
VOC	**5.5**	**lb/MMCF**	
PM	**7.6**	**lb/MMCF**	
SO_2	**0.6**	**lb/MMCF**	
CH_4	**2.3**	**lb/MMCF**	Global Warming Potential = 25
N_2O	**2.2**	**lb/MMCF**	Global Warming Potential =298
HCOH	**0.075**	**lb/MMCF**	
Benzene	**0.0021**	**lb/MMCF**	
n-Hexane	**1.8**	**lb/MMCF**	
Toluene	**0.0034**	**lb/MMCF**	

Jay-Bee Oil & Gas, Inc.

P3 Well Pad Production Facility
Pleasants County, WV

TL-1
Truck Loading - Condensate

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

$$L_L=12.46*(SPM/T)$$

Where,

Loading Loss	L_L=	2.979	lb/1000 gallons
Saturation Factor	S=	0.6	
True Vapor Pressure	P=	3.1	psia
Molecular Weight of Vapors	M=	66.84	lb/lb-mol
Temperature	T=	520	deg R

Maximum Daily Loading	300	BBL/day
	12,600	gpd
Hours of Loading	9	hr

Total VOC	26.7	lb/day	2.96	lb/hr
Total HAP	1.4	lb/day	0.16	lb/hr

Maximum Annual Loading	90,000	BBL/yr
	3,780,000	gpy

Total VOC	8001.6	lb/yr	4.00	tpy
Total HAP	432.5	lb/yr	0.22	tpy

Emissions

Total VOC	71.059	%
Total HAP	3.841	%

Jay-Bee Oil & Gas, Inc.

P3 Well Pad Production Facility
Pleasants County, WV

TL-2
Truck Loading - Produced Water

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

$$L_L=12.46*(SPM/T)$$

Where,

Loading Loss	L_L=	0.132	lb/1000 gallons
Saturation Factor	S=	0.6	
True Vapor Pressure	P=	0.3	psia
Molecular Weight of Vapors	M=	30.68	lb/lb-mol
Temperature	T=	520	deg R

Maximum Daily Loading	636	BBL/day
	26,712	gpd
Hours of Loading	9	hr

Total VOC	1.3	lb/day	0.14	lb/hr
Total HAP	0.1	lb/day	0.016	lb/hr

Maximum Annual Loading	190,800	BBL/yr
	8,013,600	gpy

Total VOC	385.7	lb/yr	0.19	tpy
Total HAP	42.5	lb/yr	0.02	tpy

Emissions

Total VOC	36.376	%
Total HAP	4.009	%

Jay-Bee Oil & Gas, Inc.

P3 Well Pad Production Facility
Pleasants County, WV

Truck Loading
Fugitive Dust

Item Number	Description	Number of Wheels	Mean Vehicle Weight (tons)	Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Truck Capacity (BBL/Truck)	Maximum Trips per Year	Control	Control Efficiency (%)
1	Produced Water Transportation Trucks	18	27	10	0.25	1	80	2385	None	---
2	Condensate Transportation Trucks	18	27	10	0.25	1	80	1125	None	---
			54000	lbs						

		PM	PM-10
k =	Particle size multiplier	0.8	0.36
s =	Silt content of road surface material (%)	10	3
S =	Mean vehicle speed (mph)	10	10
W =	Mean vehicle weight (tons)	27	27
w =	Mean number of wheels per vehicle	18	27
p =	Number of days per year with precipitation >0.01 in.	157	157

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

Item 1 - Produced Water		PM	PM-10	
E	lb/vmt	7.378804125	1.220015589	
E	[lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr	**1.845**	**0.305**	lb/hr
E	[lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] × [Ton ÷ 2000 lb] = t	**2.200**	**0.364**	tpy

Item 2 - Condensate		PM	PM-10	
E	lb/vmt	7.378804125	1.220015589	
E	[lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr	**1.845**	**0.305**	lb/hr
E	[lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] × [Ton ÷ 2000 lb] = t	**1.038**	**0.172**	tpy

Jay-Bee Oil & Gas - P3

Flash Emission Calculations - Condensate

Using Gas-Oil Ratio Method

Un-Controlled

Site specific data

Gas-Oil-ratio	=	500 scf/bbl	Using GOW from comparable well pads.
Throughput	=	90,000 bbl/yr	
Stock tank gas molecular weight	=	39.56 g/mole	
Number of wells	=	3	
Number of tanks	=	3	

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	2480.9099	E_{TOT}
VOC	**1740.8296**	Sum of C3+
Nitrogen	6.20E-01	
Carbon Dioxide	3.90E+00	
Methane	2.46E+02	
Ethane	4.89E+02	
Propane	6.43E+02	
Isobutane	1.74E+02	
n-Butane	4.00E+02	
2,2 Dimethylpropane	4.89E+00	
Isopentane	1.37E+02	
n-Pentane	1.44E+02	
2,2 Dimethylbutane	5.19E+00	
Cyclopentane	0.00E+00	
2,3 Dimethylbutane	7.52E+00	
2 Methylpentane	3.99E+01	
3 Methylpentane	2.38E+01	
n-Hexane	5.21E+01	HAP
Methylcyclopentane	3.80E+00	
Benzene	8.93E-01	HAP
Cyclohexane	5.38E+00	
2-Methylhexane	1.16E+01	
3-Methylhexane	1.14E+01	
2,2,4 Trimethylpentane	0.00E+00	
Other C7's	1.08E+01	
n-Heptane	1.67E+01	
Methylcyclohexane	1.04E+01	
Toluene	2.03E+00	HAP
Other C8's	1.70E+01	
n-Octane	5.66E+00	
Ethylbenzene	1.24E-01	HAP
M & P Xylenes	1.46E+00	HAP
O-Xylene	1.98E-01	HAP
Other C9's	7.05E+00	
n-Nonane	1.69E+00	
Other C10's	2.65E+00	
n-Decane	3.47E-01	
Undecanes (11)	3.72E-01	

Jay-Bee Oil & Gas - P3

Flash Emission Calculations - Produced Water

Using Gas-Water Ratio Method

Un-Controlled

Site specific data

Gas-Water-ratio	=	4.06 scf/bbl	Using GOW from comparable well pads.
Throughput	=	190,800 bbl/yr	
Stock tank gas molecular weight	=	30.68 g/mole	
Number of wells	=	3	
Number of tanks	=	3	

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	33.1209	E_{TOT}
VOC	**16.9397**	Sum of C3+
Nitrogen	5.51E-01	
Carbon Dioxide	4.98E-01	
Methane	9.80E+00	
Ethane	5.33E+00	
Propane	3.81E+00	
Isobutane	9.51E-01	
n-Butane	2.68E+00	
2,2 Dimethylpropane	4.21E-02	
Isopentane	1.35E+00	
n-Pentane	1.87E+00	
2,2 Dimethylbutane	6.99E-02	
Cyclopentane	0.00E+00	
2,3 Dimethylbutane	1.35E-01	
2 Methylpentane	7.51E-01	
3 Methylpentane	4.84E-01	
n-Hexane	1.31E+00	HAP
Methylcyclopentane	1.22E-01	
Benzene	2.38E-02	HAP
Cyclohexane	1.68E-01	
2-Methylhexane	3.65E-01	
3-Methylhexane	3.79E-01	
2,2,4 Trimethylpentane	0.00E+00	
Other C7's	3.49E-01	
n-Heptane	6.36E-01	
Methylcyclohexane	3.37E-01	
Toluene	5.23E-02	HAP
Other C8's	5.79E-01	
n-Octane	1.82E-01	
Ethylbenzene	3.64E-03	HAP
M & P Xylenes	2.98E-02	HAP
O-Xylene	3.31E-03	HAP
Other C9's	1.76E-01	
n-Nonane	3.28E-02	
Other C10's	3.84E-02	
n-Decane	6.62E-03	
Undecanes (11)	6.29E-03	

Jay-Bee Oil & Gas, Inc.

P3 Well Pad Production Facility
Pleasants 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
HAPs from gas analysis:	
Hexane	0.62 weight percent
Gas Density:	0.0580 lb/scf

Emission Source:	Count	Oil & Gas Production*	VOC %	VOC (lb/hr)	VOC (tpy)	CO2 (lb/hr)	CO2 (tpy)	CH4 (lb/hr)	CH4 (tpy)	CO2e (tpy)	Hexane (tpy)
Pump Seals:											
Gas:	1	0.00529 lb/hr	18.4	0.001	0.004	0.000	0.000	0.003	0.0138	0.344	0.000
Valves:											
Gas/Vapor:	168	0.02700 scf/hr	18.4	0.048	0.212	0.001	0.004	0.156	0.6837	17.096	0.007
Light Liquid:	56	0.05000 scf/hr	100.0	0.162	0.711						
Low Bleed Pneumatic	-	1.39000 scf/hr	18.4	0.000	0.000	0.000	0.000	0.000	0.0000	0.000	0.000
Relief Valves:	12	0.04000 scf/hr	18.4	0.005	0.022	0.000	0.000	0.017	0.0724	1.809	0.001
Open-ended Lines, gas:	23	0.06100 scf/hr	18.4	0.015	0.066	0.000	0.001	0.048	0.2115	5.288	0.002
Connectors:											
Gas:	674	0.00300 scf/hr	18.4	0.022	0.095	0.000	0.002	0.070	0.3049	7.624	0.003
Light Liquid:	225	0.00700 scf/hr	100.0	0.091	0.400						
Compressor Seals, Gas:	1	0.01940 lb/hr	18.4	0.004	0.016	0.000	0.000	0.012	0.0504	1.261	0.001
Flanges:											
Gas:	120	0.00086 lb/hr	18.4	0.019	0.083	0.000	0.001	0.061	0.2683	6.708	0.003
Light Liquid:	60	0.00300 scf/hr	100.0	0.010	0.046						

Blowdowns:

	Pressure (psig)	Internal Volume (scf)	Projected Blowdown Events (per year)	Gas Released Per Year (scf)	Gas Released Per Year (lbs)	Composition of Gas (% by volume)	Released (lb/hr)	Released (tpy)	CO2e (tpy)
VOC	290	65	16	1040	124.8	0.70	0.0100	0.0438	
CH4	290	65	16	1040	44.0	0.10	0.0005	0.0022	0.0546
HAPs	290	65	16	1040	116.3	0.02	0.0003	0.0013	

Fugitive Calculations:

	lb/hr	tpy
VOC	**0.388**	**1.698**
CH4	**0.367**	**1.607**
CO2	**0.002**	**0.009**
CO2e	**9.175**	**40.185**
HAPs	**0.004**	**0.018**

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

Jay-Bee Oil & Gas, Inc.

P3 Well Pad Production Facility
Pleasants 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	-	-	-	-			-		-	
Helium, He	-	-	-	-			-		-	
Oxygen, O2	-	-	-	-			-		-	
Methane, CH4	77.080	12.366	0.427	59.347	701.0	778.5	7.346		0.7693	
Ethane, C2H6	14.832	4.460	0.154	21.405	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	0.151	0.130	0.004	0.625	6.6	7.2	0.068	0.625	0.0015	0.062
Heptane	0.071	0.071	0.002	0.341	3.6	3.9	0.037	0.341	0.0007	0.033
	100.000	20.837	0.719		1,140.8	1,257.7	11.875	18.400	0.9958	6.172

Gas Density (STP) = 0.058

Ideal Gross (HHV)	1,257.7
Ideal Gross (sat'd)	1,236.6
GPM	-
Real Gross (HHV)	1,263.0
Real Net (LHV)	1,145.6

Jay-Bee Oil & Gas, Inc.

P3 Well Pad Production Facility
Pleasants 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	0.036	0.009	0.000	0.022			-		0.0003	
Carbon Dioxide, CO2	0.141	0.041	0.001	0.103			-		0.0009	
Hydrogen Sulfide, H2S	-	0.000	0.000	0.000	0.0	0.0	0.000		0.0000	
Helium, He	-	-	-	-			-		-	
Oxygen, O2	-	-	-	-			-		-	
Methane, CH4	24.485	3.370	0.116	8.458	191.0	212.2	2.002		0.2096	
Ethane, C2H6	25.943	8.112	0.280	20.358	436.7	477.4	4.500		0.2676	7.176
Propane	23.253	11.311	0.391	28.386	593.8	645.4	6.110	28.386	0.2520	7.030
Iso-Butane	4.773	3.064	0.106	7.690	158.2	171.4	1.633	7.690	0.0512	1.715
Normal Butane	10.980	6.916	0.239	17.357	358.3	388.2	3.685	17.357	0.1150	3.731
Iso Pentane	3.027	2.367	0.082	5.941	121.4	131.3	1.250	5.941	0.0328	1.195
Normal Pentane	3.175	2.307	0.080	5.791	118.5	128.2	1.219	5.791	0.0320	1.152
Hexane	2.378	1.531	0.053	3.841	78.2	84.5	0.804	3.841	0.0175	0.726
Heptane	1.701	0.818	0.028	2.052	41.6	44.9	0.428	2.052	0.0081	0.374
	99.892	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.

P3 Well Pad Production Facility
Pleasants 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	0.0	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	2.605
Propane	4.384	1.933	0.067	7.827	101.5	110.3	1.044	7.827	0.0431	1.201
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	0.640
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	0.471
Heptane	2.188	2.192	0.076	8.877	111.6	120.4	1.147	8.877	0.0218	0.952
	100.000	24.699	0.853		1,296.4	1,424.0	13.469	36.376	0.9954	7.277

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.

P3 Well Pad Production Facility
Pleasants County, WV

Still Vent 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	0.158	0.044	0.002	0.211	0.0	0.0	-		0.0016	
Carbon Dioxide, CO2	0.164	0.072	0.002	0.343	0.0	0.0	0.012		0.0016	
Hydrogen Sulfide, H2S	-	-	-	-	0.0	0.0	-		-	
Water	54.800	9.864	0.341	46.930	0.0	0.0	-		0.5483	
Oxygen, O2	-	-	-	-	0.0	0.0	-		-	
Methane, CH4	30.600	4.909	0.170	23.356	278.3	309.1	5.104		0.3054	
Ethane, C2H6	7.680	2.309	0.080	10.987	124.3	135.9	1.829		0.0762	2.043
Propane	3.300	1.455	0.050	6.923	76.4	83.0	1.022	6.923	0.0324	0.904
Iso-Butane	0.506	0.294	0.010	1.399	15.2	16.5	0.157	1.399	0.0049	0.165
Normal Butane	1.190	0.692	0.024	3.291	35.8	38.8	0.454	3.291	0.0115	0.373
Iso Pentane	0.278	0.201	0.007	0.954	10.3	11.1	0.113	0.954	0.0028	0.101
Normal Pentane	0.328	0.237	0.008	1.126	12.2	13.1	0.133	1.126	0.0033	0.118
Hexane	0.406	0.350	0.012	1.665	17.9	19.3	0.197	1.665	0.0040	0.166
Heptane	0.590	0.591	0.020	2.813	30.1	32.5	1.310	2.813	0.0059	0.271
	100.000	21.018	0.726		600.4	659.3	10.330	18.172	0.9979	4.141

Gas Density (STP) = 0.058

Ideal Gross (HHV)	659.3
Ideal Gross (sat'd)	648.7
GPM	-
Real Gross (HHV)	660.7
Real Net (LHV)	601.7

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

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

Hydrogen Sulfide (H2S) conversion chart:

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

Ideal Gas at 14.696 psia and 60°F

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

Real Gas at 14.696 psia and 60°F

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

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.

MIRATECH

CONFIDENTIAL

MIRATECH Emissions Control Equipment Specification Summary

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

Engine Data

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

System Details

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

NSCR Housing & Catalyst Details

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

Emission Requirements

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

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

Engine Performance Data

Cummins Inc

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

Industrial

G5.9

FR 9961

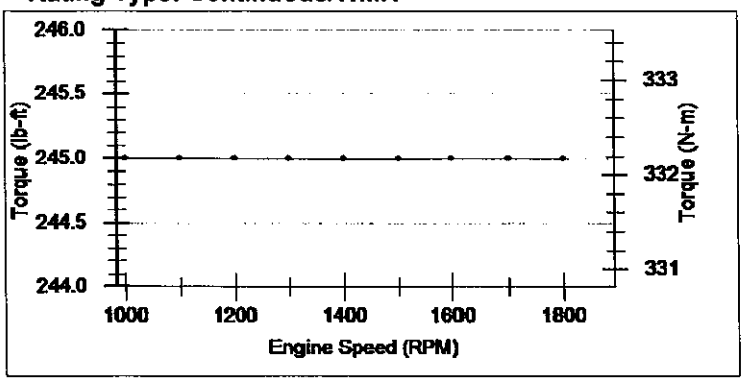
84 BHP (63 kW) @ 1800 RPM
245 lb-ft (332 N-m) @ 1800 RPM

Configuration	CPL Code	Revision
D491010CX02	**8655**	**12-May-2011**

Compression Ratio: **10.5:1**
Fuel System: **Field Gas, Dry Processed Nat Gas**
Emission Certification: **Non-certified**
Displacement: **359 in3 (5.9 L)**
Aspiration: **Naturally Aspirated**

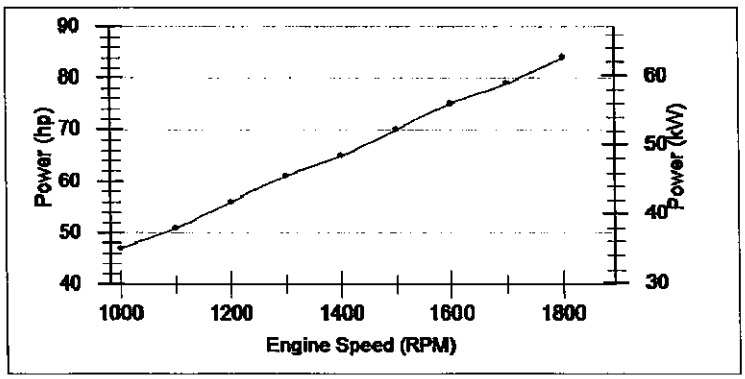
All data is based on the engine operating with fuel system, water pump, and 7 in H2O (1.74 kPa) inlet air restriction with 3.5 in (89 mm) inner diameter, and with 1 in Hg (3 kPa) exhaust restriction with 3 in (76 mm) inner diameter; not included are alternator, fan, optional equipment and driven components.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

Rating Type: Continuous/WMR



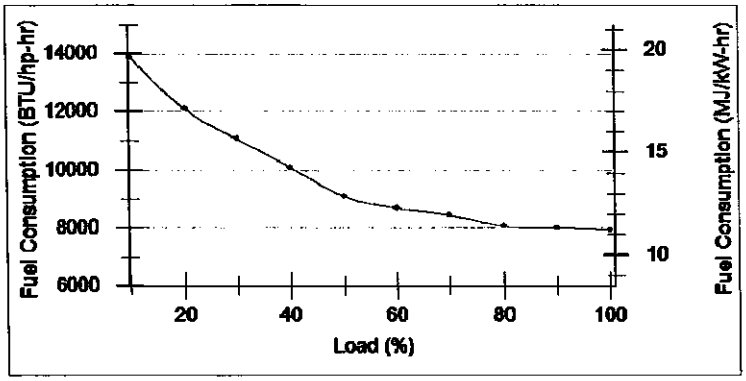
Torque Output

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



Power Output

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



Fuel Consumption @ 1,800 RPM

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

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

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

CHIEF ENGINEER:
Alfred S Weber

Bold entries revised after 1-Mar-2010

Intake Air System

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

Cooling System

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

Exhaust System

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

Lubrication System

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

Fuel System

Maximum fuel inlet pressure:	1 psi	5 kPa

Performance Data

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

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

Bold entries revised after 1-Mar-2010

Cranking System (Cold Starting Capability)

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

Noise Emissions

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

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

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

Ambient Temp deg F (deg C)

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

End of Report

Bold entries revised after 1-Mar-2010

Gas/Site Analysis & Engine Selection/Derate

Cummins Stationary Natural Gas Engines

Date: 4/10/2014

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

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

Intake Manifold Requirements for Turbocharged Engines

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

Factory Set Points	Factory Supplied	Recommended
Engine Speed Target:	1800 rpm	⚠ NOTICE: A Change to Ignition Timing Is Recommended Due to Methane Number of Fuel
Spark Plug Gap:	0.020 in	
Excess Oxygen Target-PV:	na %O2	
Propane Engine Timing Target:	na °BTDC	
Propane Gas over air Press at Carb Low:	na inH2O	
Propane Gas Press at Sec Reg Target:	na inH2O	
Excess Oxygen Target-NG:	0.45% O_2	
Natural Gas Engine Timing Target:	Factory: 26 °BTDC	Recommended Timing: 25 ° BTDC
Natural Gas over air Press at Carb Target:	5 inH2O	
Natural Gas Press at Sec Reg Target:	15 inH2O	

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

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

FR Differences for Selected Engine

Description of FR Differences for Selected Engine

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

Gas Analysis Tool
References & Standards

Date: 4/10/2014

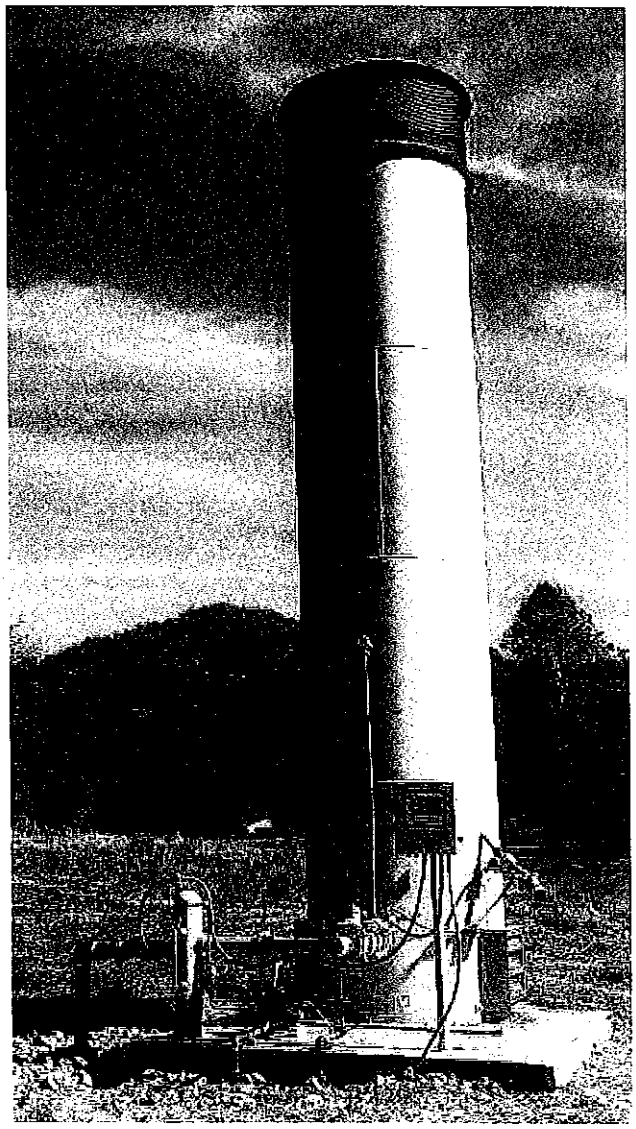
Tool Revision Date: 3/27/2014

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

Conversion Factors			
		Standard Units	Metric Units
Notes			

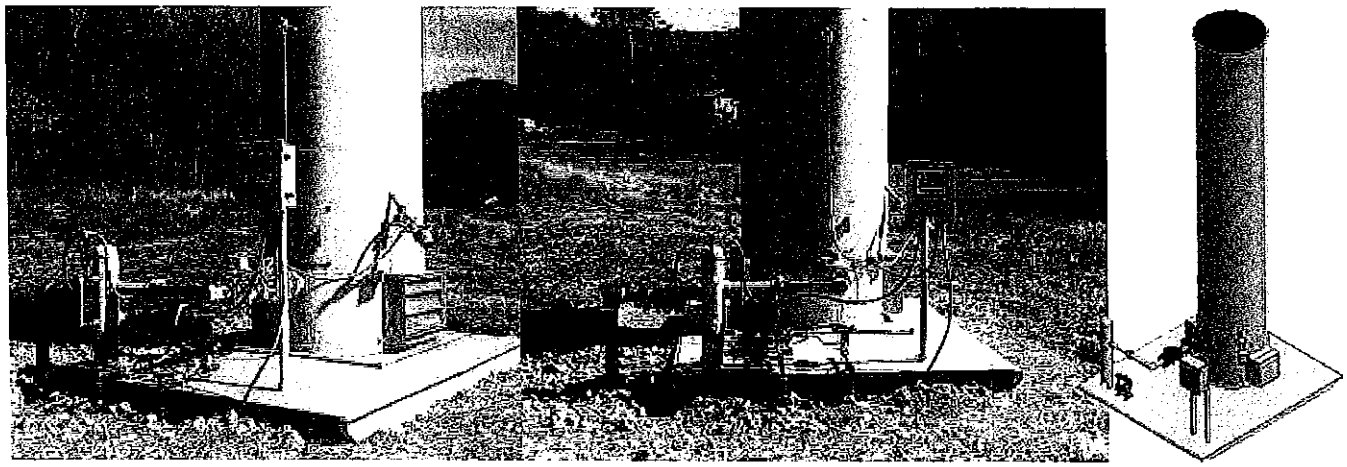
Vapor Combustor Unit (VCU)

HY-BON/EDI is pleased to provide the CH2.5 and CH10.0 enclosed combustors as an effective solution for eliminating VOC emissions. HY-BON/EDI's insulated combustors are automated and have been successfully tested per EPA 40, CFR 60 guidelines – making it the perfect blend of performance and safety. The combustor comes as a complete, skid mounted package containing the liquid knock-out vessel, liquid transfer pump, flame arrestor, bird screen and burner control system. Installation is simple and field performance adjustments can be made as production changes – making it the most flexible solution in the industry.



- EPA 40 CFR 60, Quad O Compliant
  List of EPA Approved Combustion Control Devices
- Completely Enclosed Combustion
- 99.99% Destruction Efficiency
- User Friendly Automated System
- Operational and Quad O reporting data can be saved to a USB Key
- RS-232 or RS-485 Communication supports satellite, cellular, or radio
- Modbus Slave Protocol allows it to communicate with SCADA systems and other devices/software

GENERAL PROPERTIES	CH2.5	CH10.0
BURNER SIZE (MMBTU/hr)	2.5	10.0
OUTER DIAMETER (inches)	34	54
HEIGHT (feet)	16	20
INLET PRESSURE (oz/in²)	≥ 0.5	
DESTRUCTION EFFICIENCY	≥ 99.99%	
SMOKELESS CAPACITY	100%	
TURN DOWN	SCALABLE	

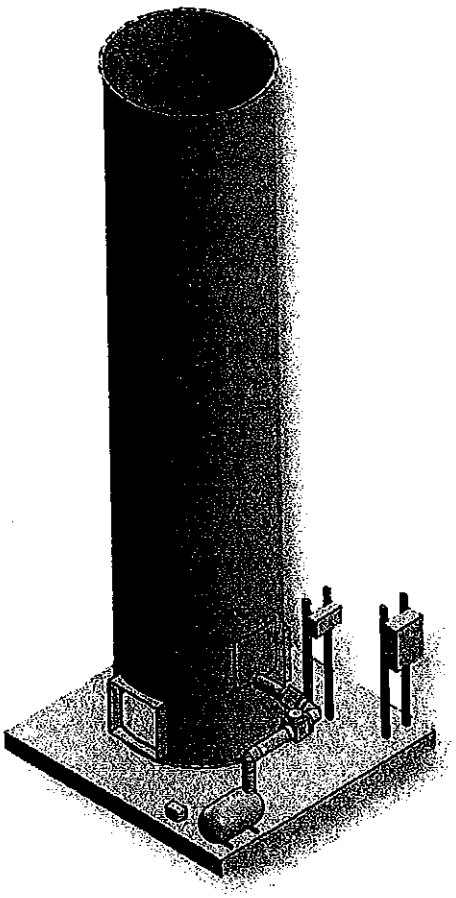


HY-BON EDI
Vent Gas Management

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.



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

- 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

HY-BON EDI
Vent Gas Management

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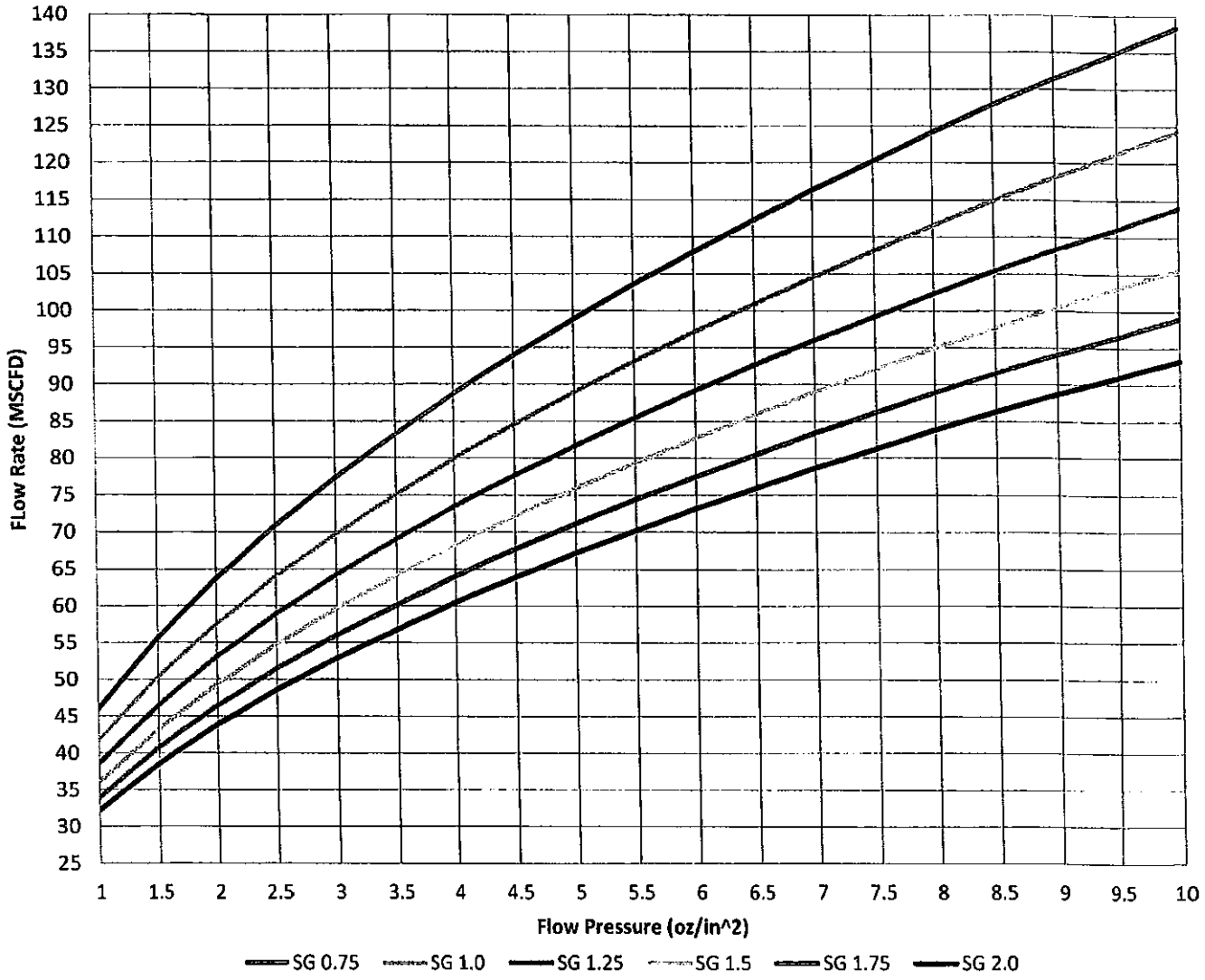
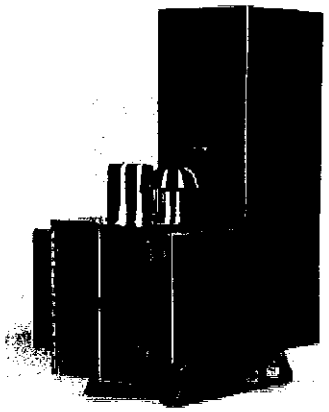
CH10.0: Flow Rate vs Flow Pressure with Corresponding Specific Gravity



Model 5120 Thermoelectric Generators



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

Power Specifiations

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

Electrical

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

Reverse current protection included.

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

Fuel

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

Environmental

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

Materials of Construction

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

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

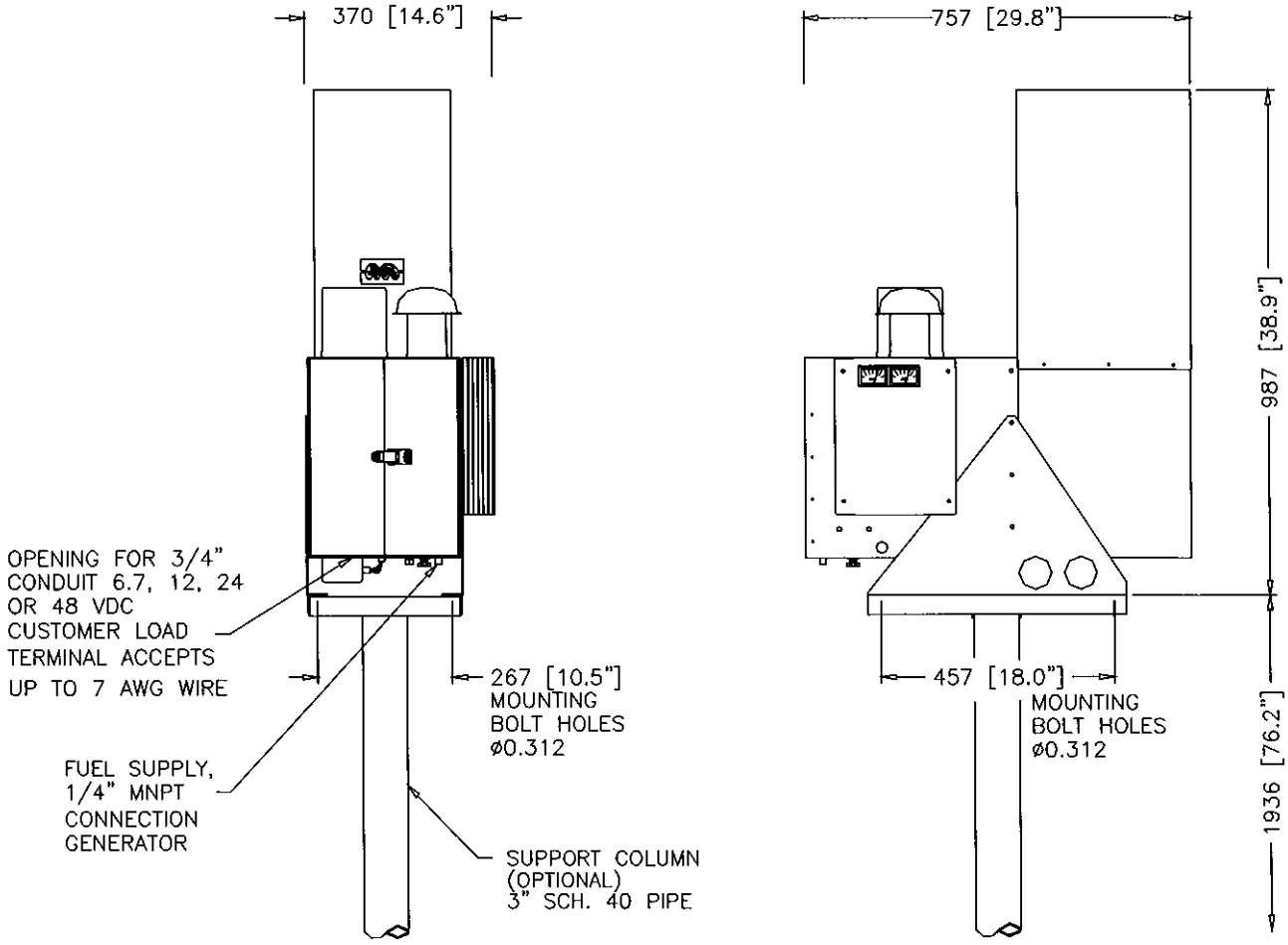
Optional Features
- Cathodic Protection Interface
- Pole Mount or bench stand
- Automatic Fuel Shut-off (SO)
- Corrosive Environmental Fuel System
- Flame Arrestor

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

Global Thermoelectric

Power where you need it.

Typical Installation



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

Global Thermoelectric

Power where you need it.

Corporate Office
#9, 3700 - 78 Avenue SE
Calgary, Alberta T2C 2L8
CANADA
Phone: (403) 236-5556
Fax: (403) 236-5575

US Sales
P.O. Box 38624
Houston, TX 77238
Phone: (281) 445-1515
Fax: (281) 445-6060
Toll Free: 1 800 848-4113

Certificate of Analysis

Number: 2030-14030288-003A

Carencro Laboratory
4780 NE Evangeline Thruway
Carencro, LA 70520

Alan Ball
Gas Analytical Services
PO Box 1028
Bridgeport, WV 26330

Apr. 02, 2014

Field: Jay Bee Oil & Gas
Station Name: RPT 8-1H
Sample Point: Submeter
Cylinder No: 0258
Analyzed: 04/01/2014 13:29:16 by GR14

Sampled By: DW-GAS
Sample Of: Gas Spot
Sample Date: 03/25/2014 12:00
Sample Conditions: 290 psig
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia		
Nitrogen	0.394	0.530		GPM TOTAL C2+	6.223
Carbon Dioxide	0.151	0.319			
Methane	77.080	59.336			
Ethane	14.832	21.401	3.980		
Propane	4.967	10.510	1.373		
Iso-Butane	0.616	1.718	0.202		
n-Butane	1.210	3.375	0.383		
Iso-Pentane	0.266	0.921	0.097		
n-Pentane	0.262	0.907	0.095		
i-Hexanes	0.093	0.378	0.037		
n-Hexane	0.058	0.239	0.023		
Benzene	0.001	0.004	NIL		
Cyclohexane	0.006	0.023	0.002		
i-Heptanes	0.031	0.150	0.014		
n-Heptane	0.011	0.056	0.005		
Toluene	0.002	0.008	0.001		
i-Octanes	0.015	0.080	0.007		
n-Octane	0.002	0.012	0.001		
Ethylbenzene	NIL	NIL	NIL		
Xylenes	NIL	NIL	NIL		
i-Nonanes	NIL	NIL	NIL		
n-Nonane	NIL	NIL	NIL		
Decane Plus	0.003	0.035	0.003		
	100.000	100.000	6.223		

: HAP

Physical Properties	Total	C10+
Calculated Molecular Weight	20.84	162.34
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.73 psia & 60°F		
Real Gas Dry BTU	1265.2	8778.9
Water Sat. Gas Base BTU	1243.1	8626.1
Relative Density Real Gas	0.7218	5.6078
Compressibility Factor	0.9984	

Peter L. Perro
Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Certificate of Analysis

Number: 2030-14030288-003A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

Alan Ball
Gas Analytical Services
PO Box 1028
Bridgeport, WV 26330

Apr. 02, 2014

Field: Jay Bee Oil & Gas
Station Name: RPT 8-1H
Sample Point: Submeter
Cylinder No: 0258
Analyzed: 04/01/2014 13:29:16 by GR14

Sampled By: DW-GAS
Sample Of: Gas Spot
Sample Date: 03/25/2014 12:00
Sample Conditions: 290 psig
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia		
Nitrogen	0.394	0.630		GPM TOTAL C2+	6.223
Carbon Dioxide	0.151	0.319		GPM TOTAL C3+	2.243
Methane	77.080	59.336		GPM TOTAL iC5+	0.285
Ethane	14.832	21.401	3.960		
Propane	4.997	10.510	1.373		
Iso-butane	0.615	1.716	0.202		
n-Butane	1.210	3.375	0.383		
Iso-pentane	0.266	0.921	0.097		
n-Pentane	0.262	0.907	0.095		
Hexanes Plus	0.222	0.963	0.093		
	100.000	100.000	6.223		

Physical Properties	Total	C6+
Relative Density Real Gas	0.7218	3.1591
Calculated Molecular Weight	20.84	91.50
Compressibility Factor	0.9964	
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.73 psia & 60°F		
Real Gas Dry BTU	1265.2	5014.1
Water Sat. Gas Base BTU	1243.1	4926.8

Comments: H2O Mol% : 1.740 ; Wt% : 1.506

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Certificate of Analysis

Number: 2030-14030288-003A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

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Gas Analytical Services
PO Box 1028
Bridgeport, WV 26330

Apr. 02, 2014

Field: Jay Bee Oil & Gas
Station Name: RPT 8-1H
Sample Point: Submeter
Cylinder No: 0258
Analyzed: 04/01/2014 13:29:16 by GR14

Sampled By: DW-GAS
Sample Of: Gas Spot
Sample Date: 03/25/2014 12:00
Sample Conditions: 280 psig
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia		
Nitrogen	0.394	0.530		GPM TOTAL C2+	6.223
Carbon Dioxide	0.151	0.319		GPM TOTAL C3+	2.243
Methane	77.060	59.336		GPM TOTAL IC6+	0.285
Ethane	14.832	21.401	3.980		
Propane	4.967	10.510	1.373		
Iso-Butane	0.616	1.718	0.202		
n-Butane	1.210	3.376	0.383		
Iso-Pentane	0.266	0.921	0.097		
n-Pentane	0.262	0.907	0.095		
Hexanes	0.151	0.615	0.060		
Heptanes Plus	0.071	0.368	0.033		
	100.000	100.000	6.223		

Physical Properties	Total	C7+
Relative Density Real Gas	0.7218	3.6570
Calculated Molecular Weight	20.84	103.02
Compressibility Factor	0.9964	
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.73 psia & 60°F		
Real Gas Dry BTU	1265.2	5577.8
Water Sat. Gas Base BTU	1243.1	5480.7

Comments: H2O Mol% : 1.740 ; Wt% : 1.508

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

September 2, 2015

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

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

Date Sampled: 08/12/15

Date Analyzed: 08/22/15

Job Number: [redacted]

Sample: [redacted] Well B1 2H

FLASH LIBERATION OF SEPARATOR WATER		
	Separator	Stock Tank
Pressure, psig	540	0
Temperature, °F	78	70
Gas Water Ratio (1)	------	4.06
Gas Specific Gravity (2)	------	1.069

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

Piston No.: WF# 235

Base Conditions: 14.65 PSI & 60 °F

Certified: FESCO, Ltd. Alice, Texas

David Dannhaus 361-661-7015

August 27, 2015

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

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

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

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

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT - GPA 2286

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	1.821	
Carbon Dioxide	1.049	
Methane	56.602	
Ethane	16.424	4.367
Propane	8.000	2.191
Isobutane	1.516	0.493
n-Butane	4.274	1.340
2-2 Dimethylpropane	0.054	0.020
Isopentane	1.730	0.629
n-Pentane	2.405	0.867
Hexanes	2.953	1.209
Heptanes Plus	3.172	1.397
Totals	100.000	12.514

Computed Real Characteristics Of Heptanes Plus:

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

Computed Real Characteristics Of Total Sample:

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

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

Base Conditions: 14.650 PSI & 60 Deg F

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

Certified: FESCO, Ltd. Alice, Texas
David Dannhaus

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT - GPA 2286

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	1.821		1.663
Carbon Dioxide	1.049		1.505
Methane	56.602		29.592
Ethane	16.424	4.367	16.095
Propane	8.000	2.191	11.497
Isobutane	1.516	0.493	2.872
n-Butane	4.274	1.340	8.096
2,2 Dimethylpropane	0.054	0.020	0.127
Isopentane	1.730	0.629	4.069
n-Pentane	2.405	0.867	5.655
2,2 Dimethylbutane	0.075	0.031	0.211
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.145	0.059	0.407
2 Methylpentane	0.807	0.333	2.268
3 Methylpentane	0.520	0.211	1.461
n-Hexane	1.405	0.575	3.947
Methylcyclopentane	0.134	0.046	0.368
Benzene	0.028	0.008	0.072
Cyclohexane	0.185	0.063	0.507
2-Methylhexane	0.337	0.156	1.102
3-Methylhexane	0.351	0.159	1.145
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.326	0.141	1.054
n-Heptane	0.588	0.270	1.921
Methylcyclohexane	0.318	0.127	1.018
Toluene	0.053	0.018	0.158
Other C8's	0.486	0.225	1.747
n-Octane	0.147	0.075	0.548
Ethylbenzene	0.003	0.001	0.011
M & P Xylenes	0.026	0.010	0.090
O-Xylene	0.003	0.001	0.010
Other C9's	0.129	0.065	0.530
n-Nonane	0.024	0.013	0.099
Other C10's	0.025	0.015	0.116
n-Decane	0.004	0.003	0.020
Undecanes (11)	0.004	0.002	0.019
Totals	100.000	12.514	100.000

Computed Real Characteristics Of Total Sample:

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

April 29, 2014

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

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

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

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

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.011	0.003	0.004
Carbon Dioxide	0.025	0.011	0.014
Methane	7.015	3.036	1.384
Ethane	7.995	5.461	2.958
Propane	9.072	6.384	4.919
Isobutane	2.654	2.216	1.896
n-Butane	7.473	6.018	5.341
2,2 Dimethylpropane	0.192	0.166	0.170
Isopentane	4.335	4.049	3.845
n-Pentane	5.799	5.369	5.144
2,2 Dimethylbutane	0.319	0.341	0.338
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.532	0.557	0.564
2 Methylpentane	3.616	3.833	3.831
3 Methylpentane	2.379	2.481	2.521
n-Hexane	6.324	6.642	6.701
Heptanes Plus	42.259	53.409	60.372
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

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

Characteristics of Total Sample:

Specific Gravity	0.6583	(Water=1)
°API Gravity	83.46	@ 60°F
Molecular Weight	61.3	
Vapor Volume	25.69	CF/Gal
Weight	5.48	Lbs/Gal

Base Conditions: 14.650 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

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

David Dannhaus 361-661-7015

FESCO, Ltd. Job Number: 42794.002

TANKS DATA INPUT REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Carbon Dioxide	0.025	0.011	0.014
Nitrogen	0.011	0.003	0.004
Methane	7.015	3.036	1.384
Ethane	7.995	5.461	2.958
Propane	9.072	6.384	4.919
Isobutane	2.654	2.218	1.696
n-Butane	7.686	6.206	5.511
Isopentane	4.335	4.049	3.845
n-Pentane	5.799	5.389	5.144
Other C-6's	6.846	7.212	7.264
Heptanes	13.266	15.122	16.031
Octanes	12.697	15.144	16.932
Nonanes	4.935	6.808	7.697
Decanes Plus	8.665	13.799	16.337
Benzene	0.113	0.081	0.108
Toluene	0.613	0.525	0.695
E-Benzene	0.534	0.526	0.697
Xylenes	1.436	1.407	1.875
n-Hexane	6.324	6.642	6.701
2,2,4 Trimethylpentane	0.000	0.000	0.000
Totals:	100.000	100.000	100.000

Characteristics of Total Sample:

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

Characteristics of Decanes (C10) Plus:

Specific Gravity	0.7794	(Water=1)
Molecular Weight	153.3	

Characteristics of Atmospheric Sample:

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

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

* Sample used for analysis

FESCO, Ltd.

Job Number: 42794.002

TOTAL EXTENDED REPORT - GPA 2186-M

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.011	0.003	0.004
Carbon Dioxide	0.025	0.011	0.014
Methane	7.015	3.036	1.384
Ethane	7.995	5.461	2.956
Propane	9.072	6.384	4.919
Isobutane	2.854	2.218	1.898
n-Butane	7.473	6.018	5.341
2,2 Dimethylpropane	0.192	0.166	0.170
Isopentane	4.335	4.049	3.845
n-Pentane	5.799	5.369	5.144
2,2 Dimethylbutane	0.319	0.341	0.338
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.532	0.557	0.564
2 Methylpentane	3.616	3.833	3.831
3 Methylpentane	2.379	2.481	2.521
n-Hexane	6.324	6.642	6.701
Methylcyclopentane	0.537	0.486	0.556
Benzene	0.113	0.081	0.106
Cyclohexane	0.956	0.831	0.989
2-Methylhexane	3.063	3.637	3.774
3-Methylhexane	2.577	3.022	3.175
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	1.532	1.725	1.888
n-Heptane	4.601	5.422	5.669
Methylcyclohexane	2.764	2.838	3.337
Toluene	0.613	0.525	0.695
Other C-8's	7.205	8.736	9.764
n-Octane	2.728	3.569	3.831
E-Benzene	0.534	0.526	0.697
M & P Xylenes	0.616	0.611	0.804
O-Xylene	0.820	0.796	1.071
Other C-9's	3.468	4.696	5.383
n-Nonane	1.467	2.109	2.314
Other C-10's	2.979	4.434	5.175
n-decane	0.771	1.208	1.349
Undecanes(11)	2.240	3.420	4.048
Dodecanes(12)	1.277	2.107	2.529
Tridecanes(13)	0.746	1.320	1.606
Tetradecanes(14)	0.349	0.660	0.814
Pentadecanes(15)	0.160	0.324	0.404
Hexadecanes(16)	0.078	0.169	0.213
Heptadecanes(17)	0.037	0.085	0.108
Octadecanes(18)	0.018	0.043	0.055
Nonadecanes(19)	0.007	0.017	0.022
Eicosanes(20)	0.002	0.005	0.006
Heneicosanes(21)	0.001	0.003	0.003
Docosanes(22)	0.001	0.001	0.002
Tricosanes(23)	0.000	0.001	0.001
Tetracosanes(24)	0.000	0.001	0.001
Pentacosanes(25)	0.000	0.000	0.000
Hexacosanes(26)	0.000	0.000	0.000
Heptacosanes(27)	0.000	0.000	0.000
Octacosanes(28)	0.000	0.000	0.000
Nonacosanes(29)	0.000	0.000	0.000
Triacontanes(30)	0.000	0.000	0.000
Hentriacontanes Plus(31+)	0.000	0.000	0.000
Total	100.000	100.000	100.000

= HAP

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	2.378	0.988
Heptanes Plus	1.701	0.761
Totals	100.000	22.579

Computed Real Characteristics Of Heptanes Plus:

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

Computed Real Characteristics Of Total Sample:

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

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

Base Conditions: 14.850 PSI & 60 Deg F

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	0.738	0.309	1.608
3 Methylpentane	0.441	0.181	0.961
n-Hexane	0.964	0.400	2.100
Methylcyclopentane	0.072	0.025	0.153
Benzene	0.018	0.005	0.036
Cyclohexane	0.102	0.035	0.217
2-Methylhexane	0.184	0.086	0.466
3-Methylhexane	0.181	0.083	0.458
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.174	0.076	0.436
n-Heptane	0.266	0.124	0.674
Methylcyclohexane	0.169	0.068	0.419
Toluene	0.035	0.012	0.082
Other C8's	0.246	0.115	0.685
n-Octane	0.079	0.041	0.228
Ethylbenzene	0.002	0.001	0.005
M & P Xylenes	0.022	0.009	0.059
O-Xylene	0.003	0.001	0.008
Other C9's	0.089	0.046	0.284
n-Nonane	0.021	0.012	0.068
Other C10's	0.030	0.018	0.107
n-Decane	0.004	0.002	0.014
Undecanes (11)	0.004	0.002	0.015
Totals	100.000	22.579	100.000

Computed Real Characteristics Of Total Sample:

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

May 2, 2014

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

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

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

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

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT - GPA 2286

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

Computed Real Characteristics Of Heptanes Plus:

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

Computed Real Characteristics Of Total Sample:

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

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

Base Conditions: 14.850 PSI & 60 Deg F

Certified: FESCO, Ltd. - Alice, Texas

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

David Dannhaus 361-661-7015

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT - GPA 2286

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.185		0.078
Carbon Dioxide	0.018		0.012
Methane	0.000		0.001
Ethane	0.202	0.054	0.091
Propane	10.137	2.815	6.708
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:	P3 T01-T03
City:	Huntington
State:	West Virginia
Company:	Jay-Bee Oil & Gas
Type of Tank:	Vertical Fixed Roof Tank
Description:	P3 Condensate Tanks 210 BBL Tanks - Single Tank Emissions

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:	153.19
Net Throughput(gal/yr):	1,260,000.00
Is Tank Heated (y/n):	N

Paint Characteristics

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

Roof Characteristics

Type:	Cone
Height (ft)	0.25
Slope (ft/ft) (Cone Roof)	0.05

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Pittsburgh, Pennsylvania (Avg Atmospheric Pressure = 14.11 psia)

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

P3 T01-T03 - 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	58.50	49.32	67.67	53.39	2.8439	2.3395	3.4338	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3

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

P3 T01-T03 - Vertical Fixed Roof Tank
Huntington, West Virginia

Annual Emission Calcaulations	
Standing Losses (lb):	473.5495
Vapor Space Volume (cu ft):	399.2441
Vapor Density (lb/cu ft):	0.0353
Vapor Space Expansion Factor:	0.1626
Vented Vapor Saturation Factor:	0.5662
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):	0.0500
Shell Radius (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0353
Vapor Molecular Weight (lb/lb-mole):	69.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.8439
Daily Avg. Liquid Surface Temp. (deg. R):	518.1654
Daily Average Ambient Temp. (deg. F):	50.3083
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	513.0583
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,202.9556
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1626
Daily Vapor Temperature Range (deg. R):	36.6923
Daily Vapor Pressure Range (psia):	1.0943
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.8439
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	2.3395
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	3.4338
Daily Avg. Liquid Surface Temp. (deg R):	518.1654
Daily Min. Liquid Surface Temp. (deg R):	508.9923
Daily Max. Liquid Surface Temp. (deg R):	527.3385
Daily Ambient Temp. Range (deg. R):	19.1500
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.5662
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	2.8439
Vapor Space Outage (ft):	5.0833

Working Losses (lb):	2,134.0644
Vapor Molecular Weight (lb/lb-mole):	69.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.8439
Annual Net Throughput (gal/yr.):	1,260,000.0000
Annual Turnovers:	153.1861
Turnover Factor:	0.3625
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):	2,607.6138

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

Emissions Report for: Annual

P3 T01-T03 - Vertical Fixed Roof Tank
Huntington, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 6)	2,134.06	473.55	2,607.61

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Jay-Bee Oil & Gas P3 Well Pad
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee P3.ddf
Date: November 03, 2016

DESCRIPTION:

Description: 40 MMSCFD
Still vent to combustor
No flash tank

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 85.00 deg. F
Pressure: 290.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.1510
Nitrogen	0.3940
Methane	77.0800
Ethane	14.8320
Propane	4.9670
Isobutane	0.6160
n-Butane	1.2100
Isopentane	0.2660
n-Pentane	0.2620
n-Hexane	0.0580
Cyclohexane	0.0060
Other Hexanes	0.0930
Heptanes	0.0420
Benzene	0.0010
Toluene	0.0020
C8+ Heavies	0.0200

DRY GAS:

Flow Rate: 40.0 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Flow Rate: 7.5 gpm

PUMP:

Glycol Pump Type: Gas Injection
Gas Injection Pump Volume Ratio: 0.080 acfm gas/gpm glycol

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device: Combustion Device
Destruction Efficiency: 98.0 %
Excess Oxygen: 5.0 %
Ambient Air Temperature: 60.0 deg. F

GRI-GLYCalc VERSION 4.0 - EMISSIONS SUMMARY

Case Name: Jay-Bee Oil & Gas P3 Well Pad
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee P3.ddf
Date: November 03, 2016

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.5677	13.624	2.4864
Ethane	0.2765	6.635	1.2109
Propane	0.1898	4.556	0.8314
Isobutane	0.0407	0.977	0.1784
n-Butane	0.0988	2.372	0.4329
Isopentane	0.0300	0.721	0.1316
n-Pentane	0.0363	0.871	0.1589
n-Hexane	0.0163	0.391	0.0713
Cyclohexane	0.0063	0.151	0.0275
Other Hexanes	0.0201	0.483	0.0881
Heptanes	0.0275	0.660	0.1204
Benzene	0.0083	0.199	0.0364
Toluene	0.0305	0.732	0.1336
C8+ Heavies	0.1192	2.861	0.5221
Total Emissions	1.4680	35.233	6.4299
Total Hydrocarbon Emissions	1.4680	35.233	6.4299
Total VOC Emissions	0.6239	14.973	2.7326
Total HAP Emissions	0.0551	1.322	0.2413
Total BTEX Emissions	0.0388	0.931	0.1700

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	28.3840	681.216	124.3219
Ethane	13.8234	331.761	60.5465
Propane	9.4907	227.778	41.5694
Isobutane	2.0363	48.870	8.9188
n-Butane	4.9420	118.607	21.6459
Isopentane	1.5018	36.044	6.5780
n-Pentane	1.8142	43.541	7.9463
n-Hexane	0.8144	19.547	3.5673
Cyclohexane	0.3141	7.539	1.3759
Other Hexanes	1.0058	24.139	4.4054
Heptanes	1.3746	32.991	6.0209
Benzene	0.4153	9.967	1.8190
Toluene	1.5251	36.601	6.6798
C8+ Heavies	5.9595	143.028	26.1026
Total Emissions	73.4012	1761.630	321.4974
Total Hydrocarbon Emissions	73.4012	1761.630	321.4974
Total VOC Emissions	31.1939	748.653	136.6291
Total HAP Emissions	2.7548	66.115	12.0660

Total BTEX Emissions	1.9404	46.568	8.4987

GRI-GLYCalc VERSION 4.0 - EQUIPMENT SUMMARY REPORT

Case Name: Jay-Bee Oil & Gas P3 Well Pad
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee P3.ddf
Date: November 03, 2016

COMBUSTION DEVICE

Ambient Temperature:	60.00	deg. F
Excess Oxygen:	5.00	%
Combustion Efficiency:	98.00	%
Supplemental Fuel Requirement:	3.88e-001	MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	2.00%	98.00%
Isobutane	2.00%	98.00%
n-Butane	2.00%	98.00%
Isopentane	2.00%	98.00%
n-Pentane	2.00%	98.00%
n-Hexane	2.00%	98.00%
Cyclohexane	2.00%	98.00%
Other Hexanes	2.00%	98.00%
Heptanes	2.00%	98.00%
Benzene	2.00%	98.00%
Toluene	2.00%	98.00%
C8+ Heavies	2.00%	98.00%

ABSORBER

Calculated Absorber Stages:	1.29	
Specified Dry Gas Dew Point:	7.00	lbs. H2O/MMSCF
Temperature:	85.0	deg. F
Pressure:	290.0	psig
Dry Gas Flow Rate:	40.0000	MMSCF/day
Glycol Losses with Dry Gas:	0.1072	lb/hr
Wet Gas Water Content:	Saturated	
Calculated Wet Gas Water Content:	101.00	lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	2.87	gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	6.92%	93.08%
Carbon Dioxide	99.89%	0.11%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.98%	0.02%
Propane	99.95%	0.05%
Isobutane	99.92%	0.08%
n-Butane	99.89%	0.11%
Isopentane	99.87%	0.13%
n-Pentane	99.83%	0.17%

n-Hexane	99.67%	0.33%
Cyclohexane	98.63%	1.37%
Other Hexanes	99.76%	0.24%
Heptanes	99.30%	0.70%
Benzene	87.94%	12.06%
Toluene	81.21%	18.79%
C8+ Heavies	96.06%	3.94%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	28.81%	71.19%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.37%	99.63%
n-Pentane	0.40%	99.60%
n-Hexane	0.44%	99.56%
Cyclohexane	3.10%	96.90%
Other Hexanes	0.84%	99.16%
Heptanes	0.47%	99.53%
Benzene	4.98%	95.02%
Toluene	7.89%	92.11%
C8+ Heavies	11.93%	88.07%

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Jay-Bee Oil & Gas P3 Well Pad
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee P3.ddf
Date: November 03, 2016

DESCRIPTION:

Description: 40 MMSCFD
Still vent to combustor
No flash tank

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.5677	13.624	2.4864
Ethane	0.2765	6.635	1.2109
Propane	0.1898	4.556	0.8314
Isobutane	0.0407	0.977	0.1784
n-Butane	0.0988	2.372	0.4329
Isopentane	0.0300	0.721	0.1316
n-Pentane	0.0363	0.871	0.1589
n-Hexane	0.0163	0.391	0.0713
Cyclohexane	0.0063	0.151	0.0275
Other Hexanes	0.0201	0.483	0.0881
Heptanes	0.0275	0.660	0.1204
Benzene	0.0083	0.199	0.0364
Toluene	0.0305	0.732	0.1336
C8+ Heavies	0.1192	2.861	0.5221
Total Emissions	1.4680	35.233	6.4299
Total Hydrocarbon Emissions	1.4680	35.233	6.4299
Total VOC Emissions	0.6239	14.973	2.7326
Total HAP Emissions	0.0551	1.322	0.2413
Total BTEX Emissions	0.0388	0.931	0.1700

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	28.3840	681.216	124.3219
Ethane	13.8234	331.761	60.5465
Propane	9.4907	227.778	41.5694
Isobutane	2.0363	48.870	8.9188
n-Butane	4.9420	118.607	21.6459
Isopentane	1.5018	36.044	6.5780
n-Pentane	1.8142	43.541	7.9463
n-Hexane	0.8144	19.547	3.5673

Cyclohexane	0.3141	7.539	1.3759
Other Hexanes	1.0058	24.139	4.4054
Heptanes	1.3746	32.991	6.0209
Benzene	0.4153	9.967	1.8190
Toluene	1.5251	36.601	6.6798
C8+ Heavies	5.9595	143.028	26.1026
Total Emissions	73.4012	1761.630	321.4974
Total Hydrocarbon Emissions	73.4012	1761.630	321.4974
Total VOC Emissions	31.1939	748.653	136.6291
Total HAP Emissions	2.7548	66.115	12.0660
Total BTEX Emissions	1.9404	46.568	8.4987

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature:	60.00 deg. F
Excess Oxygen:	5.00 %
Combustion Efficiency:	98.00 %
Supplemental Fuel Requirement:	3.88e-001 MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	2.00%	98.00%
Isobutane	2.00%	98.00%
n-Butane	2.00%	98.00%
Isopentane	2.00%	98.00%
n-Pentane	2.00%	98.00%
n-Hexane	2.00%	98.00%
Cyclohexane	2.00%	98.00%
Other Hexanes	2.00%	98.00%
Heptanes	2.00%	98.00%
Benzene	2.00%	98.00%
Toluene	2.00%	98.00%
C8+ Heavies	2.00%	98.00%

ABSORBER

Calculated Absorber Stages:	1.29	
Specified Dry Gas Dew Point:	7.00	lbs. H2O/MMSCF
Temperature:	85.0	deg. F
Pressure:	290.0	psig
Dry Gas Flow Rate:	40.0000	MMSCF/day
Glycol Losses with Dry Gas:	0.1072	lb/hr
Wet Gas Water Content:	Saturated	
Calculated Wet Gas Water Content:	101.00	lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	2.87	gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	6.92%	93.08%
Carbon Dioxide	99.89%	0.11%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.98%	0.02%
Propane	99.95%	0.05%
Isobutane	99.92%	0.08%
n-Butane	99.89%	0.11%
Isopentane	99.87%	0.13%
n-Pentane	99.83%	0.17%
n-Hexane	99.67%	0.33%
Cyclohexane	98.63%	1.37%
Other Hexanes	99.76%	0.24%
Heptanes	99.30%	0.70%
Benzene	87.94%	12.06%
Toluene	81.21%	18.79%
C8+ Heavies	96.06%	3.94%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	28.81%	71.19%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.37%	99.63%
n-Pentane	0.40%	99.60%
n-Hexane	0.44%	99.56%
Cyclohexane	3.10%	96.90%
Other Hexanes	0.84%	99.16%
Heptanes	0.47%	99.53%
Benzene	4.98%	95.02%
Toluene	7.89%	92.11%
C8+ Heavies	11.93%	88.07%

STREAM REPORTS:

WET GAS STREAM

Temperature: 85.00 deg. F
Pressure: 304.70 psia
Flow Rate: 1.67e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.13e-001	1.69e+002
Carbon Dioxide	1.51e-001	2.92e+002
Nitrogen	3.93e-001	4.85e+002
Methane	7.69e+001	5.43e+004
Ethane	1.48e+001	1.96e+004
Propane	4.96e+000	9.62e+003
Isobutane	6.15e-001	1.57e+003
n-Butane	1.21e+000	3.09e+003
Isopentane	2.65e-001	8.43e+002
n-Pentane	2.61e-001	8.30e+002
n-Hexane	5.79e-002	2.20e+002
Cyclohexane	5.99e-003	2.22e+001
Other Hexanes	9.28e-002	3.52e+002
Heptanes	4.19e-002	1.85e+002
Benzene	9.98e-004	3.43e+000
Toluene	2.00e-003	8.10e+000
C8+ Heavies	2.00e-002	1.50e+002
Total Components	100.00	9.18e+004

DRY GAS STREAM

Temperature: 85.00 deg. F
Pressure: 304.70 psia
Flow Rate: 1.67e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.47e-002	1.17e+001
Carbon Dioxide	1.51e-001	2.92e+002
Nitrogen	3.94e-001	4.85e+002
Methane	7.71e+001	5.43e+004
Ethane	1.48e+001	1.96e+004
Propane	4.96e+000	9.62e+003
Isobutane	6.15e-001	1.57e+003
n-Butane	1.21e+000	3.09e+003
Isopentane	2.66e-001	8.42e+002
n-Pentane	2.62e-001	8.29e+002
n-Hexane	5.78e-002	2.19e+002
Cyclohexane	5.92e-003	2.19e+001
Other Hexanes	9.28e-002	3.51e+002
Heptanes	4.17e-002	1.84e+002
Benzene	8.79e-004	3.02e+000
Toluene	1.62e-003	6.57e+000
C8+ Heavies	1.92e-002	1.44e+002

Total Components	100.00	9.16e+004

LEAN GLYCOL STREAM

Temperature: 85.00 deg. F
Flow Rate: 7.50e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	4.16e+003
Water	1.51e+000	6.36e+001
Carbon Dioxide	7.31e-013	3.08e-011
Nitrogen	7.55e-014	3.19e-012
Methane	2.81e-018	1.19e-016
Ethane	5.43e-008	2.29e-006
Propane	4.90e-009	2.07e-007
Isobutane	9.36e-010	3.95e-008
n-Butane	2.07e-009	8.75e-008
Isopentane	1.33e-004	5.61e-003
n-Pentane	1.71e-004	7.21e-003
n-Hexane	8.50e-005	3.59e-003
Cyclohexane	2.38e-004	1.00e-002
Other Hexanes	2.02e-004	8.53e-003
Heptanes	1.54e-004	6.48e-003
Benzene	5.16e-004	2.18e-002
Toluene	3.09e-003	1.31e-001
C8+ Heavies	1.91e-002	8.07e-001
Total Components	100.00	4.22e+003

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 85.00 deg. F
Pressure: 304.70 psia
Flow Rate: 7.97e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.34e+001	4.15e+003
Water	4.96e+000	2.21e+002
Carbon Dioxide	9.93e-003	4.42e-001
Nitrogen	5.70e-003	2.54e-001
Methane	6.38e-001	2.84e+001
Ethane	3.11e-001	1.38e+001
Propane	2.13e-001	9.49e+000
Isobutane	4.58e-002	2.04e+000
n-Butane	1.11e-001	4.94e+000
Isopentane	3.39e-002	1.51e+000
n-Pentane	4.09e-002	1.82e+000
n-Hexane	1.84e-002	8.18e-001
Cyclohexane	7.29e-003	3.24e-001
Other Hexanes	2.28e-002	1.01e+000

Heptanes	3.10e-002	1.38e+000
Benzene	9.82e-003	4.37e-001
Toluene	3.72e-002	1.66e+000
C8+ Heavies	1.52e-001	6.77e+000
Total Components	100.00	4.45e+003

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 4.34e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.62e+001	1.57e+002
Carbon Dioxide	8.77e-002	4.42e-001
Nitrogen	7.91e-002	2.54e-001
Methane	1.55e+001	2.84e+001
Ethane	4.02e+000	1.38e+001
Propane	1.88e+000	9.49e+000
Isobutane	3.06e-001	2.04e+000
n-Butane	7.43e-001	4.94e+000
Isopentane	1.82e-001	1.50e+000
n-Pentane	2.20e-001	1.81e+000
n-Hexane	8.25e-002	8.14e-001
Cyclohexane	3.26e-002	3.14e-001
Other Hexanes	1.02e-001	1.01e+000
Heptanes	1.20e-001	1.37e+000
Benzene	4.64e-002	4.15e-001
Toluene	1.45e-001	1.53e+000
C8+ Heavies	3.06e-001	5.96e+000
Total Components	100.00	2.31e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 2.05e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	6.54e+001	5.68e-001
Ethane	1.70e+001	2.76e-001
Propane	7.95e+000	1.90e-001
Isobutane	1.29e+000	4.07e-002
n-Butane	3.14e+000	9.88e-002
Isopentane	7.69e-001	3.00e-002
n-Pentane	9.29e-001	3.63e-002
n-Hexane	3.49e-001	1.63e-002
Cyclohexane	1.38e-001	6.28e-003
Other Hexanes	4.31e-001	2.01e-002

Heptanes	5.07e-001	2.75e-002
Benzene	1.96e-001	8.31e-003
Toluene	6.12e-001	3.05e-002
C8+ Heavies	1.29e+000	1.19e-001
Total Components	100.00	1.47e+000

ATTACHMENT U

Facility-wide Controlled Emission Summary Sheet(s)

ATTACHMENT U – 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}		$PM_{2.5}$		CH_4		GHG (CO_2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1E	0.15	0.66	0.13	0.55	0.01	0.04	0.001	0.004	0.01	0.05	0.01	0.05	0.003	0.015	181.1	793.4
2E	0.15	0.66	0.13	0.55	0.01	0.04	0.001	0.004	0.01	0.05	0.01	0.05	0.003	0.015	181.1	793.4
3E	0.15	0.66	0.13	0.55	0.01	0.04	0.001	0.004	0.01	0.05	0.01	0.05	0.003	0.015	181.1	793.4
4E	0.15	0.66	0.13	0.55	0.01	0.04	0.001	0.004	0.01	0.05	0.01	0.05	0.003	0.015	181.1	793.4
5E	0.15	0.66	0.13	0.55	0.01	0.04	0.001	0.004	0.01	0.05	0.01	0.05	0.003	0.015	181.1	793.4
6E	0.05	0.22	0.04	0.18	0.00	0.01	0.000	0.001	<0.01	0.02	<0.01	0.02	0.001	0.005	60.4	264.5
7E					2.96	4.00										
8E					0.14	0.19										
9E	0.19	0.81	0.37	1.62	0.04	0.18	0.000	0.002	0.013	0.06	0.013	0.06	0.13	0.55	89.7	393.0
10E	0.92	4.04	4.57	20.00	8.07	1.79	0.001	0.00	0.047	0.21	0.047	0.21	1.14	0.26	1564.6	6,852.8
11E	0.05	0.22	0.04	0.18	0.003	0.01	0.000	0.001	0.004	0.017	0.004	0.017	0.001	0.005	60.4	264.5
12E	0.27	1.19	1.03	4.50	0.63	2.74	0.001	0.003	0.037	0.161	0.037	0.161	0.008	0.03	417.4	1,828.1
13E	0.001	0.006	0.001	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.001	0.003	1.6	6.9
TOTAL	2.23	9.77	6.68	29.25	11.89	44.42	0.007	0.029	0.16	0.71	0.16	0.71	1.30	0.94	3,128	13,702

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 – 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
1E	1.13E-04	4.93E-04	3.15E-06		5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
2E	1.13E-04	4.93E-04	3.15E-06		5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
3E	1.13E-04	4.93E-04	3.15E-06		5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
4E	1.13E-04	4.93E-04	3.15E-06		5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
5E	1.13E-04	4.93E-04	3.15E-06		5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
6E	3.75E-05	1.64E-04	1.05E-06		1.70E-06	7.45E-06					0.001	0.004	0.001	0.004
7E											0.16	0.22	0.160	0.22
8E											0.02	0.021	0.016	0.021
9E	0.015	0.065	0.001	0.005	0.009	0.002	1.65E-05	7.22E-05	1.30E-04	5.68E-04			0.022	0.096
10E	4.67E-04	0.002	1.31E-05								0.011	0.041	0.012	0.051
11E	3.75E-05	1.64E-04	1.05E-06		1.70E-06	7.45E-06					0.001	0.004	0.001	0.004
12E	3.63E-04	0.002	0.008	0.04	0.031	0.136					0.002	0.078	0.0657	0.25
13E			2.73E-08	1.20E-07	4.42E-08	1.94E-07					2.34E-05	1.03E-04	2.45E-05	1.07E-07
TOTAL	0.016	0.071	0.013	0.058	0.041	0.179	5.91E-04	2.59E-03	7.83E-03	0.034	0.461	1.48	0.546	1.86

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 V

Class I Legal Advertisement

ATTACHMENT V – CLASS I LEGAL ADVERTISEMENT

Affidavit Notice Will Be Submitted Upon Receipt

RECOMMENDED PUBLIC NOTICE TEMPLATE

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 G70-D General Permit Registration for a natural gas production facility located on Arvilla Road, near Friendly, in Pleasants County, West Virginia. The latitude and longitude coordinates are: 39.440460, -81.060782.

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be:

9.77 tons of Nitrogen Oxides per year
29.25 tons of Carbon Monoxide per year
3.04 tons of Particulate Matter per year
46.11 tons of Volatile Organic Compounds per year
0.03 tons of Sulfur Dioxide per year
0.07 tons of Formaldehyde per year
0.06 tons of Benzene per year
0.18 tons of Toluene per year
1.48 tons of Hexane per year
1.87 tons of Total Hazardous Air Pollutants per year
13,797 tons of Greenhouse Gases per year

Startup of operation is planned to begin on or about the 1st day of February, 2017. 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 1250, during normal business hours.
Dated this the _____ day of _____, 2016.

By: Mr. Shane Dowell
Office Manager
Jay-Bee Oil & Gas, Inc.
3570 Shields Ave.
Cairo, WV 26337