JAY-BEE OIL & GAS, INC.

APPLICATION FOR GENERAL PERMIT

Happy Well Pad Production Facility
Tyler County, West Virginia

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

APPLICATION FOR G70-D GENERAL PERMIT MODIFICATION

Jay-Bee Oil & Gas, Inc.

Happy Well Pad Production Facility
Tyler County, West Virginia

Table of Contents

SECTION I

Application Form

West Virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 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: Happy Production Facility

Operating Site Physical Address: Access road off Walnut Fork, CR13/1
If none available, list road, city or town and zip of facility.

City: Alma	Zip Code: 26320	County: Tyler

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.469846
Longitude: -80.750799

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities) 095-00064

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. Jay-Bee is applying for a G70D permit, adding 7 new wells to existing permit G70-A184 and the recently acquired ICON Happy Dehydration facility (R13-3306) to this new application.
Directions to the facility: From Middlebourne, proceed south/east on State Route 18 (Main Street) out of town. Proceed approximately 5.8 miles to the junction with Indian Creek Road on the left. From WV 18 and Indian Creek CR13 intersection, take Indian Creek Rd east for 4.6 miles. Turn left onto CR 13/1 (Walnut Fork) follow north for 2.0 miles to well pad entrance on left. Access road is approximately 0.9 miles.

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

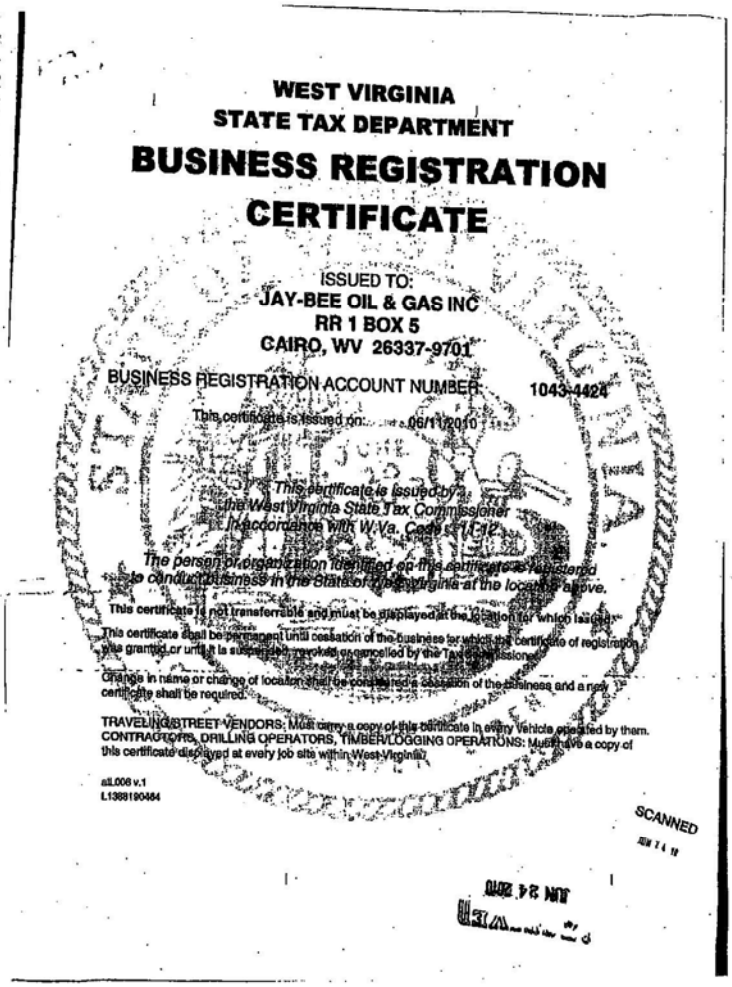
ATTACHMENT B - SITING CRITERIA WAIVER
If applicable, please complete this form and it must be notarized.

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: 06/1/2010

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

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

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

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

Change in name or change of location shall be 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.

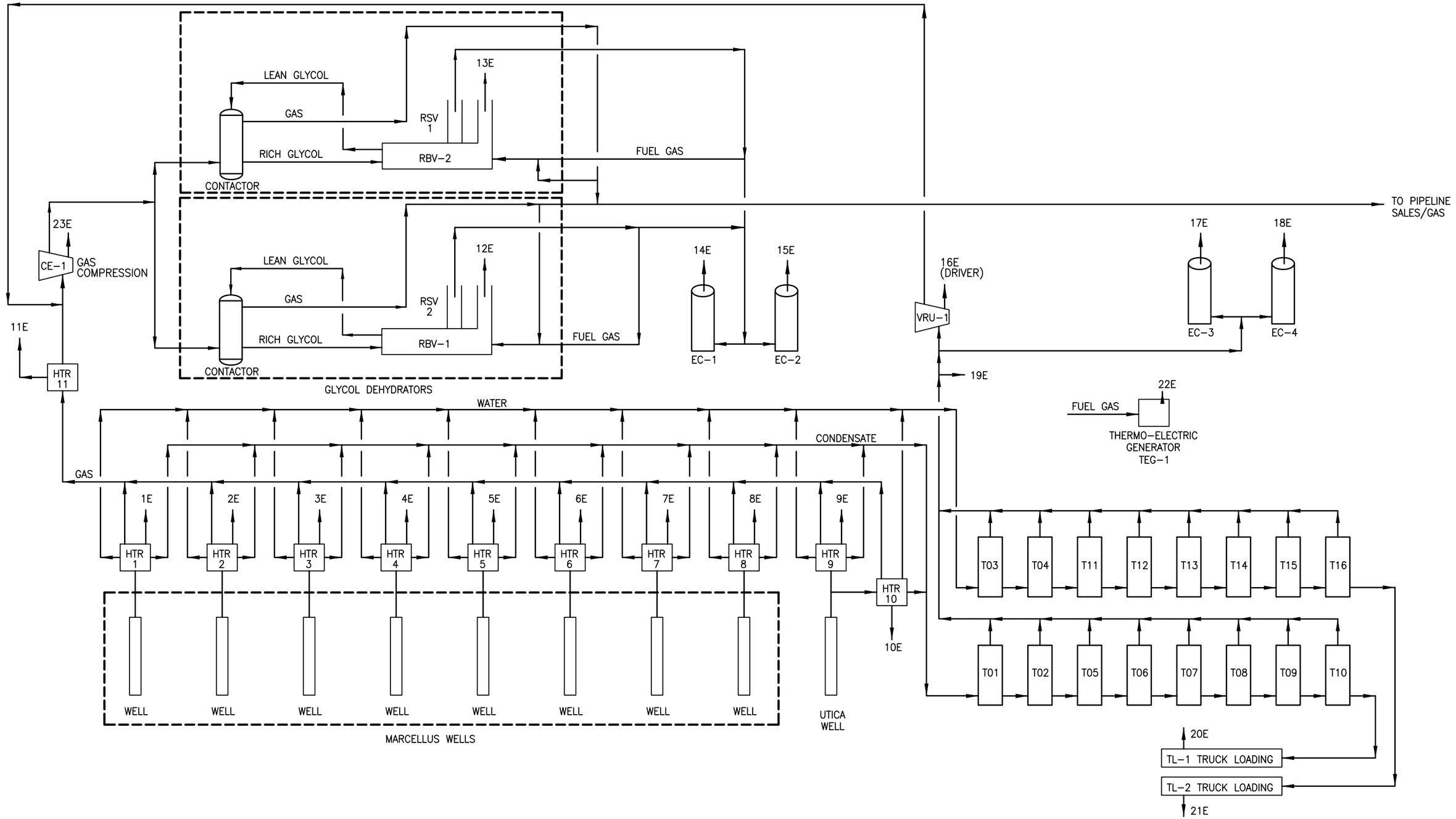
sBL006 v.1
L1388190464

SCANNED

JUN 24 2010

ATTACHMENT D

Process Flow Diagram



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DATE	11/14/16
CHECKED BY	RAD
SET JOB NO.	214054-13
SET DWG FILE	HAPPY FDb01.dwg
DRAWING SCALE	N.T.S.

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

JAY-BEE OIL & GAS, INC.

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

DRAWING NAME	REV.
FIGURE 1	0

Plot: env045 11/18/2015 12:22 G:\JAY-BEE OIL&GAS\214054\HAPPY\HAPPYb01.dwg

ATTACHMENT E

Process Description

Happy Facility Process Description

Jay Bee Oil & Gas is seeking to modify the Happy Production Facility (WV Facility ID No. 095-00064and WV G70-A184) by increasing the number of wells on the Happy Well Pad and incorporating the Happy Dehydration Facility (WV R13-3306), recently acquired from ICON Midstream Pipeline, LLC (ICON), into a new WV G70-D permit.

At the Happy facility, natural gas and produced fluids (condensate and water) will be received from eight Marcellus wells (two existing and six new) and one new Utica well and then passed through gas processing units (one per Marcellus well, two per Utica well) to avoid ice formation during subsequent pressure drops. The materials will then pass through a three-way separator for gas, condensate, and produced water separation.

Water vapor will be removed from the gas stream with a new, 40-mmscfd dehydration unit and the existing 20-mmscfd dehydration unit acquired from the ICON Happy dehydration facility. Dry gas will then be routed to a gathering pipeline owned and operated by others. Emissions from the dehydration unit still vents will be routed to two enclosed combustors (one existing and one new).

Both condensate and produced water will be accumulated in sixteen 210 BBL tanks (eight for condensate and eight for produced water), pending truck transportation by others. The condensate will be transported to a regional processing facility and the produced water a regional disposal facility.

Flash, working and breathing losses from these tanks will be routed to a vapor recovery unit (VRU) with the captured vapors routed back to the raw gas discharge line. Two new enclosed combustors will be utilized as a backup control devices for times when the VRU is not available (estimated max of 440 hours per year) or if a large slug of condensate production generates flash gas in excess of the capacity of the VRU. The VRU utilizes an 84HP driver that utilizes natural gas produced at the site as fuel. A capture and control efficiency of 95% is claimed for the VRU and 98% for the combustors. Once vapor reduces past the point that the VRU is able to process it, the combustor will then be converted as the primary source of recovery.

The Happy facility utilizes a Thermo-electric generator to meet the minor electric demands for various monitoring and data tracking equipment on the well pad. Finally, a Caterpillar model 3516 gas compressor engine will be installed at the site to facilitate the transfer of produced gas.

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

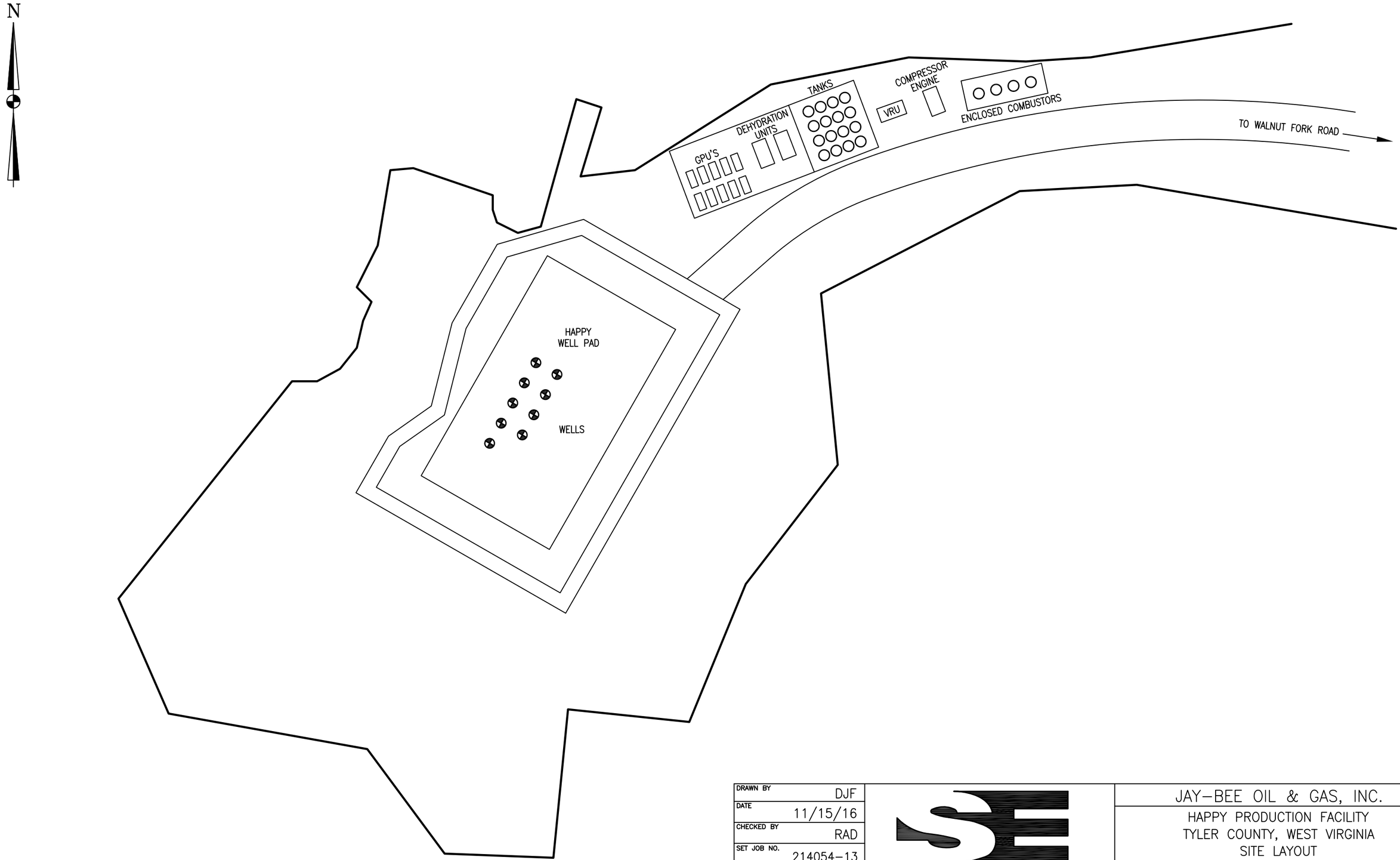
In summary, upon approval of this application, emission sources at this facility will include the following:

- Ten Gas Processing Units (GPUs), each with a 1.5-mmBtu/hr heater (Sources 1E & 2E, existing; and Sources 3E - 10E, new);
- One Line Heater (Source 11E, existing)
- One 20-mmscfd dehydration unit (Source 12E – reboiler vent, existing; and 14E/15E – still vent, existing);
- One 40-mmscfd dehydration unit (Source 13E – reboiler vent, new; and 14E/15E – still vent, new);
- Two enclosed combustors for control of still vent vapors (Sources 14E, existing; and 15E, new);
- One vapor recovery unit (VRU) with driver engine (Source 16E, existing), controlling emissions from T01-T16;
- Two enclosed combustors for VRU backup (Sources 17E and 18E, both new);
- Uncontrolled tank emissions. (Source 19E, existing);

- Eight Condensate Tanks (T01 & T02, existing; T05-T10, new);
- Eight Produced Water Tanks (T03 & T04, existing; T11-T16, new);
- Condensate Truck Loading (Max. 255 bbl/day) (Source 20E, existing);
- Produced Water Truck Loading (Max. 535 bbl/day) (Source 21E, existing);
- One Thermoelectric Generator (Source 22E, existing); and
- One Caterpillar 3516 Gas Compressor (Source 23E, new).

ATTACHMENT F

Plot Plan



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

JAY-BEE OIL & GAS, INC.

HAPPY PRODUCTION FACILITY
TYLER COUNTY, WEST VIRGINIA
SITE LAYOUT

DRAWING NAME: FIGURE 2

REV.: 0

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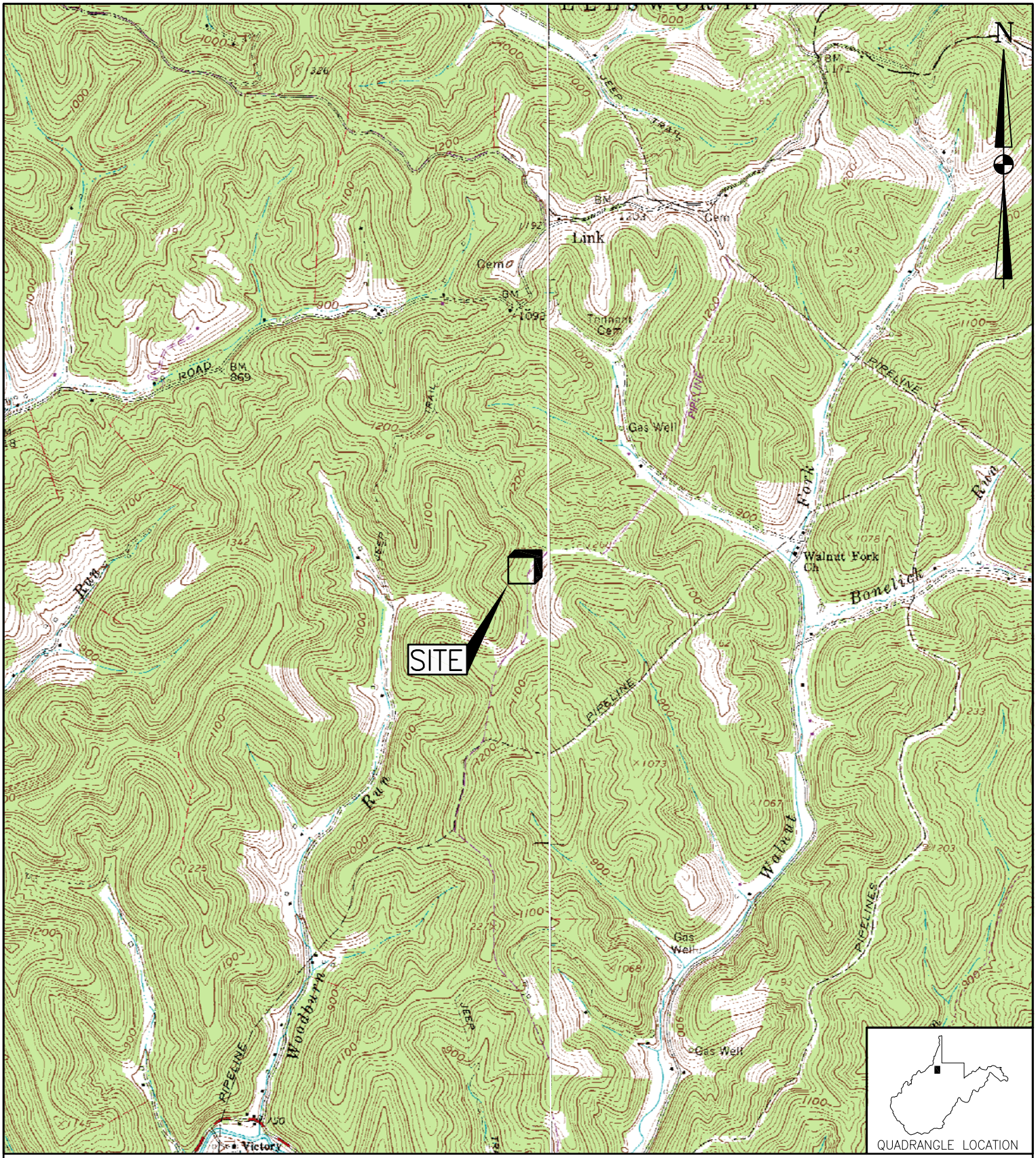
ATTACHMENT G

Area Map



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

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

JAY-BEE OIL & GAS, INC.

HAPPY PRODUCTION FACILITY
TYLER COUNTY, WEST VIRGINIA
SITE LOCATION LAYOUT

DRAWING NAME: FIGURE 3

REV.: 0

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DRAWING SCALE	1"=200'

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

JAY-BEE OIL & GAS, INC.

HAPPY DEHYDRATION FACILITY
TYLER COUNTY, WEST VIRGINIA
300' RADIUS

DRAWING NAME: FIGURE 4

REV. 0

ATTACHMENT H

G70-D 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

Emission Units / Emission Reduction Devices (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	2016		1.5 MMBTU/hr	EXISTING 06/01/16	None	None
HTR-2	2E	Gas Processing Unit	2016		1.5 MMBTU/hr	EXISTING 06/01/16	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	Gas Processing Unit	TBD		1.5 MMBTU/hr	NEW	None	None
HTR-7	7E	Gas Processing Unit	TBD		1.5 MMBTU/hr	NEW	None	None
HTR-8	8E	Gas Processing Unit	TBD		1.5 MMBTU/hr	NEW	None	None
HTR-9	9E	Gas Processing Unit	TBD		1.5 MMBTU/hr	NEW	None	None
HTR-10	10E	Gas Processing Unit	TBD		1.5 MMBTU/hr	NEW	None	None
HTR-11	11E	Line Heater	TBD		0.5 MMBTU/hr	NEW	None	None
RBV-1	12E	Dehydration Unit Re-boiler Vent	2016		0.300 MMBTU/hr	EXISTING 09/01/16	None	None
RSV-1	14E/15E	Dehydration Unit Still Vent	2016		20 MMSCFD	EXISTING 09/01/16	EC-1/EC-2	None
RBV-2	13E	Dehydration Unit Re-boiler Vent	TBD		0.500 MMBTU/hr	NEW	None	None
RSV-2	14E/15E	Dehydration Unit Still Vent	TBD		40 MMSCFD	NEW	EC-1/EC-2	None
EC-1	14E	Enclosed Combustor	2016		10.0 MMBTU/hr	EXISTING 06/01/16	None	None
EC-2	15E	Enclosed Combustor	TBD		10.0 MMBTU/hr	NEW	None	None
VRU-1	16E	VRU Driver	2016	>03/01/13	84 HP	EXISTING 06/01/16	1C	None
EC-3	17E	Enclosed Combustor	TBD		10.0 MMBTU/hr	NEW	None	None
EC-4	18E	Enclosed Combustor	TBD		10.0 MMBTU/hr	NEW	None	None
T01	16E/17E/18E	Condensate Tank	2016		210 BBL	EXISTING 03/01/16	EC-3/EC-4	VRU-1
T02	16E/17E/18E	Condensate Tank	2016		210 BBL	EXISTING 03/01/16	EC-3/EC-4	VRU-1

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

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]
T05	16E/17E/18E	Condensate Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T06	16E/17E/18E	Condensate Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T07	16E/17E/18E	Condensate Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T08	16E/17E/18E	Condensate Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T09	16E/17E/18E	Condensate Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T10	16E/17E/18E	Condensate Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T03	16E/17E/18E	Produced Water Tank	2016		210 BBL	EXISTING 03/01/16	EC-3/EC-4	VRU-1
T04	16E/17E/18E	Produced Water Tank	2016		210 BBL	EXISTING 03/01/16	EC-3/EC-4	VRU-1
T11	16E/17E/18E	Produced Water Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T12	16E/17E/18E	Produced Water Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T13	16E/17E/18E	Produced Water Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T14	16E/17E/18E	Produced Water Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T15	16E/17E/18E	Produced Water Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T16	16E/17E/18E	Produced Water Tank	TBD		210 BBL	NEW	EC-3/EC-4	VRU-1
T01-T16	19E	Un-captured/Un-controlled VRU-1 Emissions	TBD			NEW	None	None
TL-1	20E	Condensate Truck Loading	TBD		93,075 BBL/yr	Modification Pending App.	None	None
TL-2	21E	Produced Water Truck Loading	TBD		195,275 BBL/yr	Modification Pending App.	None	None
TEG-1	22E	Thermoelectric Generator	2016		4.4 KW/hr	EXISTING 06/01/16	None	None
CE-1	23E	Compressor Engine	TBD	3/21/2012	1,380 HP	NEW	2C	None

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

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	558	EPA	☐ Gas ☐ Liquid ☒ Both	1.98	0.019	45.4
Safety Relief Valves	☐ Yes ☒ No	25	EPA	☐ Gas ☐ Liquid ☒ Both	0.047	0.002	3.77
Open Ended Lines	☐ Yes ☒ No	57	EPA	☒ Gas ☐ Liquid ☐ Both	0.162	0.006	13.1
Connections (Not sampling)	☐ Yes ☒ No	1,980	EPA	☐ Gas ☐ Liquid ☒ Both	0.926	0.008	17.9
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?
47-095-02147	DUC[1]	DUC	Flow to separator and into gathering line as soon as practical	Yes
47-095-02148	DUC	DUC	Flow to separator and into gathering line as soon as practical	Yes
47-095-02225	Pending	Pending	Flow to separator and into gathering line as soon as practical	Yes
47-095-02226	Pending	Pending	Flow to separator and into gathering line as soon as practical	Yes
47-095-02227	Pending	Pending	Flow to separator and into gathering line as soon as practical	Yes
47-095-02228	Pending	Pending	Flow to separator and into gathering line as soon as practical	Yes
47-095-02229	Pending	Pending	Flow to separator and into gathering line as soon as practical	Yes
47-095-02230	Pending	Pending	Flow to separator and into gathering line as soon as practical	Yes
47-095-02384	Pending	Pending	Flow to separator and into gathering line as soon as practical	Yes

1 – Drilled/uncompleted

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 Vessel Data Sheet

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 **Happy Tank Farm**	2. Tank Name **T01-T02, T05-T10**
3. Emission Unit ID number **N/A Vapors to combustors, emission point 17E & 18E**	4. Emission Point ID number 1**7E/18E**
5. Date Installed , Modified or Relocated *(for existing tanks)* **T01-T02: 03/01/16; T05-T10: 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) **482,000 ea.**	13B. Maximum daily throughput (gal/day) 1**,320 ea.**
14. Number of tank turnovers per year: **58 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 – T02, T05 – T10 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)	**405.4**	**1,776**	**0.25**	**1.11**	**0.941**	**4.12**	**407**	**1,781**	**MB & EPA**
HAP (uncontrolled)	**13.2**	**58.0**	**0.008**	**0.036**	**0.031**	**0.134**	**13.3**	**58.1**	**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			
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**	37B. Maximum (psig): **0.8**	
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 **P2 Tank Farm**	2. Tank Name **T03-T04, T11-T16**
3. Emission Unit ID number **N/A Vapors to combustors, emission point 17E & 18E**	4. Emission Point ID number **17E/18E**
5. Date Installed, Modified or Relocated *(for existing tanks)* **T03-T04: 03/01/16; T11-T16: 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) **1,020,600 (each)**	13B. Maximum daily throughput (gal/day) **2,796 (each)**
14. Number of tank turnovers per year **128 (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	**3.94**	**17.3**					**3.94**	**17.3**	**MB**
HAPs	**0.330**	**1.45**					**0.330**	**1.45**	**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]
T17	New	Tri-ethylene Glycol (TEG)	250 Gallons

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	2016	EXISTING (06/01/16)	1.5	1263
HTR-2	2E	Gas Processing Unit	2016	EXISTING (06/01/16)	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	Gas Processing Unit	TBD	NEW	1.5	1263
HTR-7	7E	Gas Processing Unit	TBD	NEW	1.5	1263
HTR-8	8E	Gas Processing Unit	TBD	NEW	1.5	1263
HTR-9	9E	Gas Processing Unit	TBD	NEW	1.5	1263
HTR-10	10E	Gas Processing Unit	TBD	NEW	1.5	1263
HTR-11	11E	Line Heater	TBD	NEW	0.5	1263
RBV-1	12E	Reboiler	2016	EXISTING (09/01/16)	0.300	1263
RBV-2	13E	Reboiler	TBD	NEW	0.500	1263
TEG-1	22E	Thermoelectric Generator	2016	EXISTING (06/01/16)	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	CE-1	
Engine Manufacturer/Model	Cummins G5.9	Caterpillar G3516 BLE	
Manufacturers Rated bhp/rpm	84 @ 1800	1380 @ 1400	
Source Status[2]	ES	NS	
Date Installed/ Modified/Removed/Relocated[3]	Upon Receipt of Permit	Upon Receipt of Permit	
Engine Manufactured /Reconstruction Date[4]	After 3/1/2013	3/21/2012	
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable)[5]	☒40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☒40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☒IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources
Engine Type[6]	4SRB	4SLB	
APCD Type[7]	NSCR	OxCat	
Fuel Type[8]	RG	RG	
H_2S (gr/100 scf)	<1	<1	
Operating bhp/rpm	84 @ 1800	1380 @ 1400	
BSFC (BTU/bhp-hr)	7914	8256	
Hourly Fuel Throughput	526.4 ft^3/hr gal/hr	9,020.65 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	79.02 $MMft^3$/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**	**1.52**	**6.66**		
AP	**CO**	**0.37**	**1.62**	**0.52**	**2.27**		
AP	**VOC**	**0.04**	**0.18**	**1.40**	**6.13**		
AP	**SO_2**	**0.0004**	**0.002**	**<0.01**	**0.03**		
AP	**PM_{10}**	**0.013**	**0.057**	**0.11**	**0.50**		
AP	**Formaldehyde**	**0.015**	**0.065**	**0.32**	**1.41**		
AP	**Total HAPs**	**0.022**	**0.096**	**0.53**	**2.31**		
AP	**GHG (CO_2e)**	**89.7**	**393**	**1,750**	**7,666**		

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		

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/Rail Car Loading Data Sheet

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	Emission Point ID#: 20E	Year Installed/Modified: TDB
Emission Unit Description: Condensate Truck Loading		
Loading Area Data		
Number of Pumps: 1	Number of Liquids Loaded: 1	Max number of trucks/rail cars loading at one (1) time: 1
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? ☐ 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**		
Max. Daily Throughput (1000 gal/day)	**10.6**		
Max. Annual Throughput (1000 gal/yr)	**3,856**		
Loading Method[1]	**SUB**		
Max. Fill Rate (gal/min)	**50**		
Average Fill Time (min/loading)	**120**		
Max. Bulk Liquid Temperature (°F)	**75**		
True Vapor Pressure[2]	**3.6 psia**		
Cargo Vessel Condition[3]	**U**		
Control Equipment or Method[4]	**None**		
Max. Collection Efficiency (%)	**n/a**		
Max. Control Efficiency (%)	**n/a**		

Max.VOC Emission Rate	Loading (lb/hr)	**2.48**		
	Annual (ton/yr)	**4.07**		
Max.HAP Emission Rate	Loading (lb/hr)	**0.134**		
	Annual (ton/yr)	**0.220**		
Estimation Method[5]		**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 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-2**	Emission Point ID#: **21E**	Year Installed/Modified: **TBD**
Emission Unit Description: **Produced water Truck Loading**		
Loading Area Data		
Number of Pumps: **1**	Number of Liquids Loaded: **1**	Max number of trucks/rail cars loading at one (1) time: **1**
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? ☐ 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	**Produced Water**		
Max. Daily Throughput (1000 gal/day)	**22.4**		
Max. Annual Throughput (1000 gal/yr)	**8,165**		
Loading Method[1]	**SP**		
Max. Fill Rate (gal/min)	**50**		
Average Fill Time (min/loading)	**120**		
Max. Bulk Liquid Temperature (°F)	**75**		
True Vapor Pressure[2]	**n/a**		
Cargo Vessel Condition[3]	**U**		
Control Equipment or Method[4]	**None**		
Max. Collection Efficiency (%)	**n/a**		
Max. Control Efficiency (%)	**n/a**		

Max.VOC Emission Rate	Loading (lb/hr)	**0.143**		
	Annual (ton/yr)	**0.197**		
Max.HAP Emission Rate	Loading (lb/hr)	**0.016**		
	Annual (ton/yr)	**0.022**		
Estimation Method[5]		**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

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: HANO-486824035
Max. Dry Gas Flow Rate: 20 mmscf/day	Reboiler Design Heat Input: 0.300 MMBTU/hr
Design Type: ☒ TEG ☐ DEG ☐ EG	Source Status[1]: ES
Date Installed/Modified/Removed[2]: Upon Permit	Regenerator Still Vent APCD/ERD[3]: FL / EC-1 & EC-2
Control Device/ERD ID#[3]: FL / EC-1 & EC-2 (14E/15E)	Fuel HV (BTU/scf): 634.4 (HHV)
H_2S Content (gr/100 scf): <0.001%	Operation (hours/year): 8,760
Pump Rate (gpm): 3.5	
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 combustors (EC-1/2).**
☐ 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 / 12E	Reboiler Vent	AP-42	NO_x	**0.030**	**0.131**
		AP-42	CO	**0.025**	**0.110**
		AP-42	VOC	**0.002**	**0.007**
		AP-42	SO_2	**0.0002**	**0.001**
		AP-42	PM_{10}	**0.002**	**0.010**
		AP-42	GHG (CO_2e)	**36.2**	**158.7**
		GRI-GlyCalc™	VOC	**0.374**	**1.64**

RSV-1 / 14E & 15E	Glycol Regenerator Still Vent	GRI-GlyCalc™	Benzene	**0.005**	**0.020**
		GRI-GlyCalc™	Toluene	**0.016**	**0.069**
		GRI-GlyCalc™	Ethylbenzene	**0.000**	**0.000**
		GRI-GlyCalc™	Xylenes	**0.000**	**0.000**
		GRI-GlyCalc™	n-Hexane	**0.009**	**0.040**
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 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]: FL / EC-1 & EC-2
Control Device/ERD ID#[3]: FL / EC-1 & EC-2 (14E/15E)	Fuel HV (BTU/scf): 634.4 (HHV)
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 combustors (EC-1/2).**
☐ 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-2 / 13E	Reboiler Vent	AP-42	NO_x	**0.050**	**0.219**
		AP-42	CO	**0.042**	**0.184**
		AP-42	VOC	**0.003**	**0.012**
		AP-42	SO_2	**0.0003**	**0.001**
		AP-42	PM_{10}	**0.004**	**0.017**
		AP-42	GHG (CO_2e)	**60.4**	**265**

RSV-2 / 14E & 15E	Glycol Regenerator Still Vent	GRI-GlyCalc™	VOC	**0.802**	**3.51**
		GRI-GlyCalc™	Benzene	**0.010**	**0.042**
		GRI-GlyCalc™	Toluene	**0.034**	**0.147**
		GRI-GlyCalc™	Ethylbenzene	**0.000**	**0.000**
		GRI-GlyCalc™	Xylenes	**0.000**	**0.000**
		GRI-GlyCalc™	n-Hexane	**0.020**	**0.086**
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-T16	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-3 & EC-4 (17E/18E)	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-3 & EC-4 (17E/18E)	Installation Date: TBD – Upon Permit ☒ New ☐ Modified ☐ Relocated	
Maximum Rated Total Flow Capacity scfh 65000 scfd ea.	Maximum Design Heat Input (from mfg. spec sheet) 10.0 MMBTU/hr, ea.	Design Heat Content 1020 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? 8,760

List the emission units whose emissions are controlled by this vapor control device (Emission Point ID# 17E & 18E)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
T01-T02, T05-T10	Condensate Tanks		
T03-T04, T11-T16	Produced Water Tanks		

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
88.9 (scfm)	2,313 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 (ea. EC)	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 enter manual mode requiring inspection and manual 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 COMBUSTION
(Including Enclosed Combustors)

General Information

Control Device ID#: EC-1 & EC-2 (14E/15E)	Installation Date: EC-1: 06/06/16; EC-2: TBD, Upon Permit ☒ New ☒ Modified ☐ Relocated	
Maximum Rated Total Flow Capacity scfh 65000 scfd ea.	Maximum Design Heat Input (from mfg. spec sheet) 10.0 MMBTU/hr, ea.	Design Heat Content 1020 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? 8,760

List the emission units whose emissions are controlled by this vapor control device (Emission Point ID# 14E & 15E)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
RSV-1	Dehydration Unit Still Vent		
RSV-2	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
47.8 (scfm)	627 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 (ea. EC)	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 enter manual mode requiring inspection and manual 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.

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

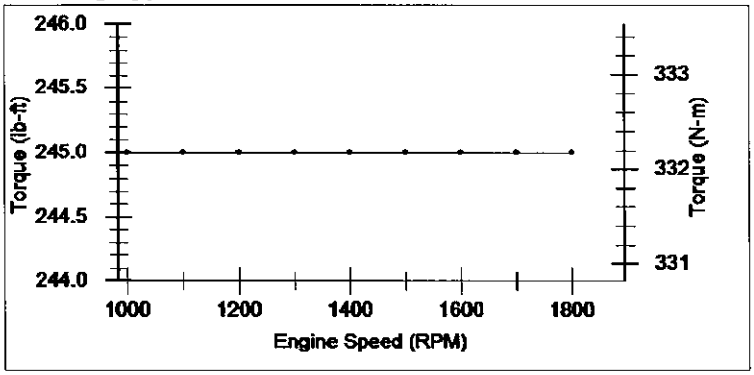
84 BHP (63 kW) @ 1800 RPM
245 lb-ft (332 N-m) @ 1800 RPM

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**

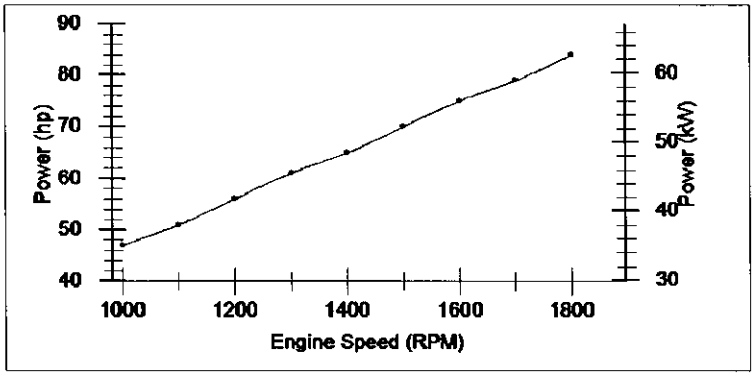
All data is based on the engine operating with fuel system, water pump, and 7 in H2O (1.74 kPa) inlet air restriction with 3.5 in (89 mm) inner diameter, and with 1 in Hg (3 kPa) exhaust restriction with 3 in (76 mm) inner diameter; not included are alternator, fan, optional equipment and driven components. 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



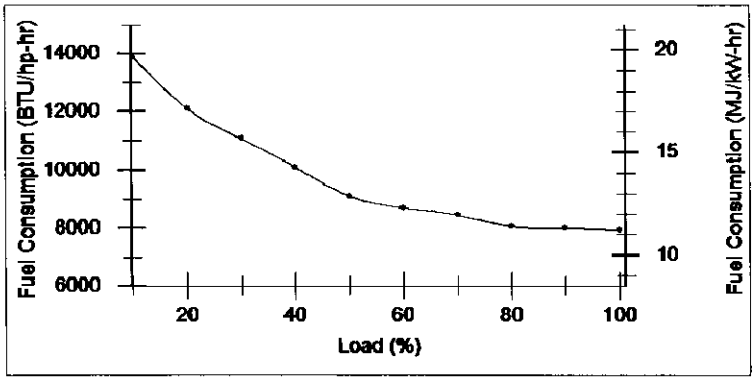
Torque Output

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:		
Derate Due to Low BTU Fuel:	0%	⚠ **The sample percentage for "Name Sample" is 99.991%. Results are based on the input sample normalized to 100%.**
Derate Due to Methane Number:	0%	
Total Power Available (%) After All Applicable Derates:	98% of rated	
Total Site Derate due to Altitude, Temperature, and Gas Composition:	2 HP (1 kW)	
Total Available Horsepower from Selected Engine Running on Specified Fuel Composition at Specified Site (includes 8 HP reduction for for cooling fan load):	74 HP (55 kW)	
Derate (Propane)		
Advertised Propane Rating:	NA HP (NA kW)	
Engine Derate Due to Site Altitude and Temperature:	NA%	
Total Power Available (%) After All Applicable Derates:	NA% of rated	
Total Site Derate due to Altitude and Temperature:	NA HP (NA kW)	
Total Available Horsepower from Selected Engine Running on Propane at Specified Site (includes 8 HP reduction for for cooling fan load):	NA HP (NA kW)	

Intake Manifold Requirements for Turbocharged Engines

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

Factory Set Points	**Factory Supplied**	**Recommended**
Engine Speed Target:	1800 rpm	⚠ **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

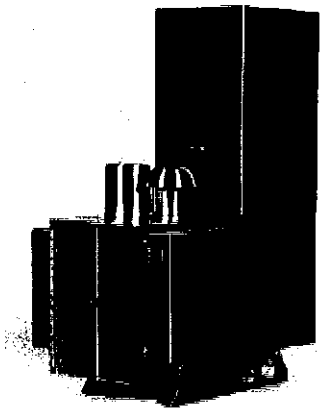
Tool Revision Date: 3/27/2014

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

Conversion Factors			
		Standard Units	Metric Units

Notes

Model 5120 Thermoelectric Generators



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

Power Specifiations

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

Electrical

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

Reverse current protection included.

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

Fuel

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

Environmental

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

Materials of Construction

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

Standard Features

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

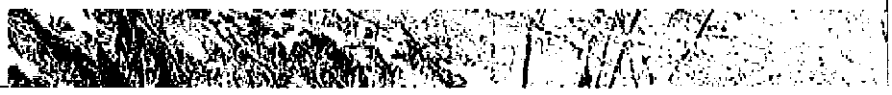
Optional Features

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

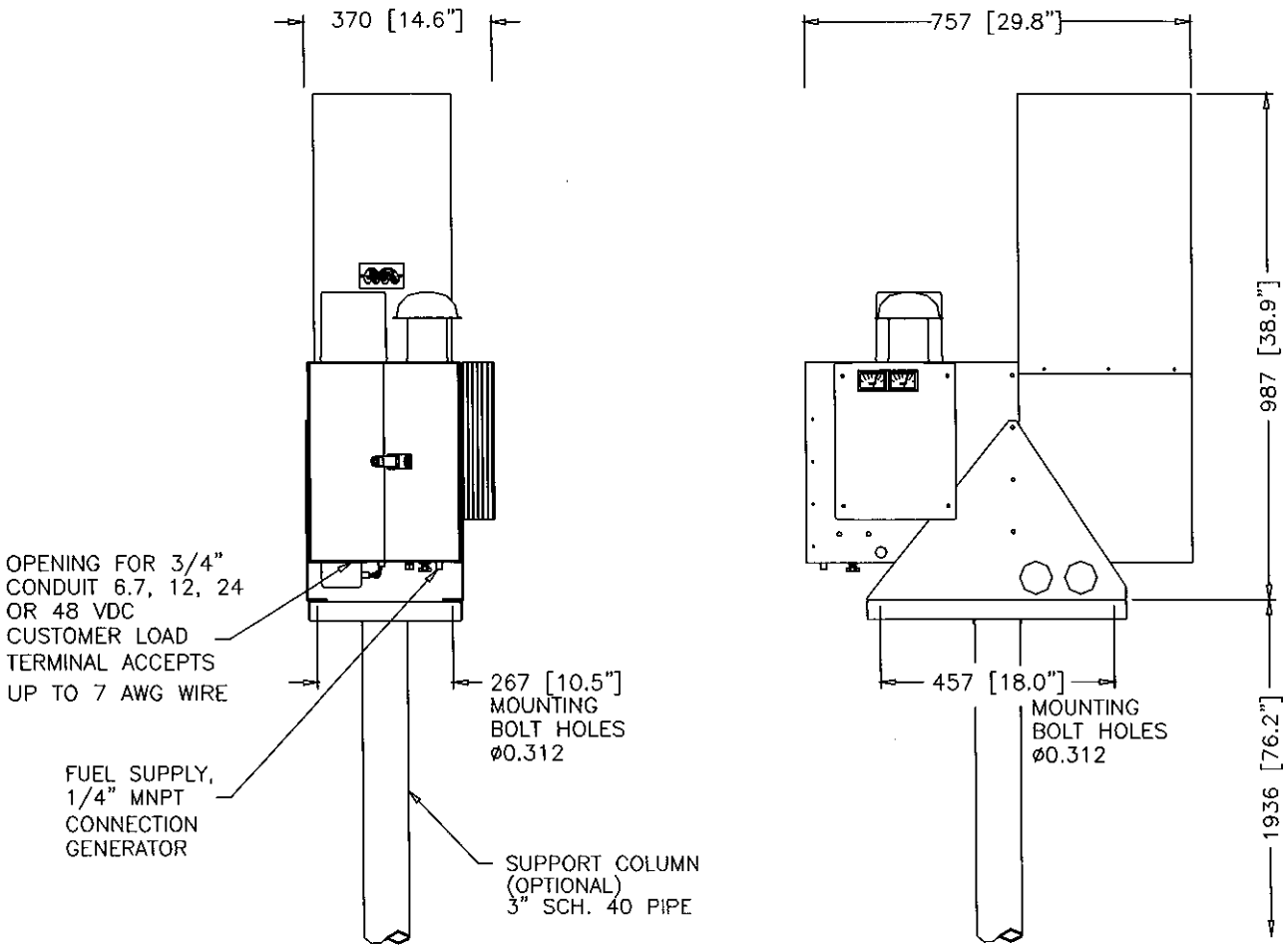
Note: Specifications shown are for standard configurations. Global Thermoelectric's Applications Engineering Department is available to design custom voltages, fuel supply systems and non-standard operating temperatures.

Global Thermoelectric

Power where you need it.



Typical Installation



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

Global Thermoelectric

Power where you need it.

Corporate Office
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Calgary, Alberta T2C 2L8
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Houston, TX 77238
Phone: (281) 445-1515
Fax: (281) 445-6060
Toll Free: 1 800 848-4113

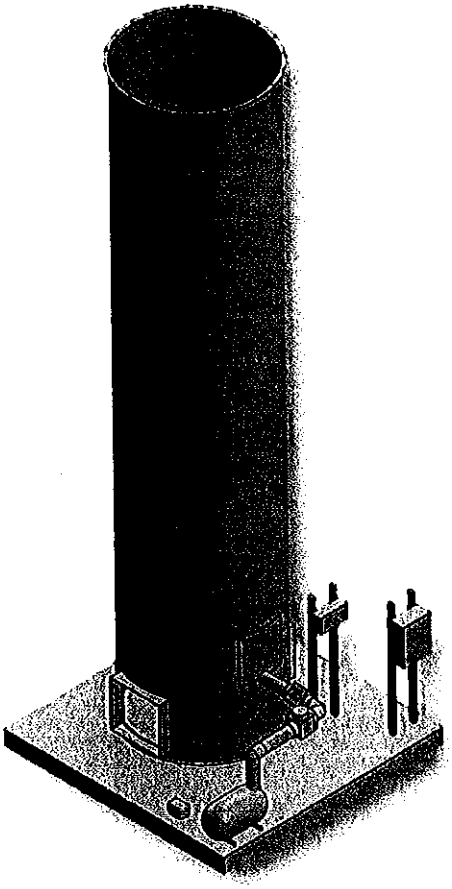
Model 5120 Thermoelectric Generator

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

Revision #3: 09/04/2015

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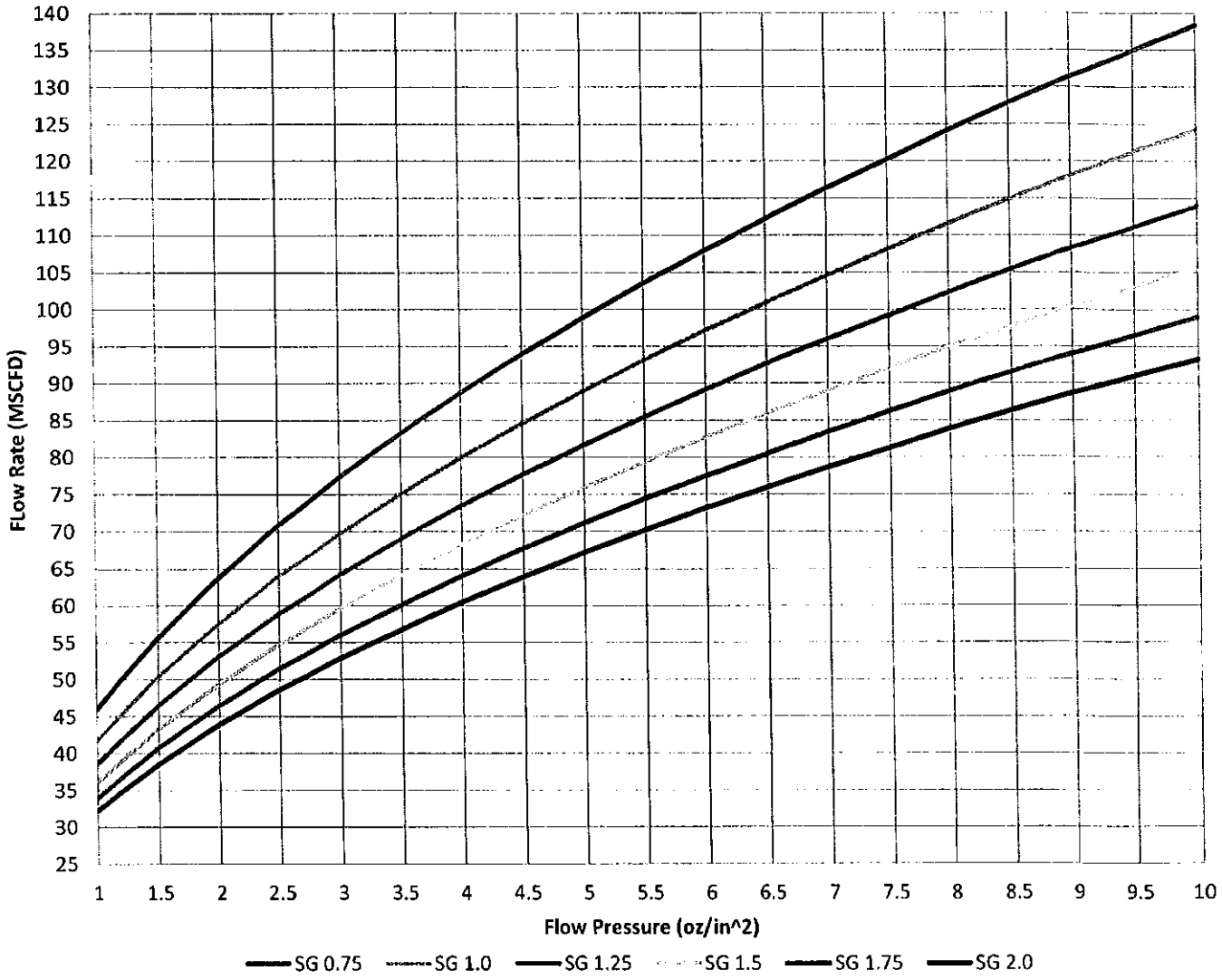
CH10.0: Flow Rate vs Flow Pressure with Corresponding Specific Gravity



USA COMPRESSION

USA Compression Unit 2302 Caterpillar G3516BLE Engine Emissions

Date of Manufacture	March 22, 2012	Engine Serial Number	JEF01613	Date Modified/Reconstructed	Not Any
Driver Rated HP	1380	Rated Speed in RPM	1400	Combustion Type	Spark Ignited 4 Stroke
Number of Cylinders	16	Compression Ratio	8:1	Combustion Setting	Ultra Lean Burn
Total Displacement (in^3)	4230	Fuel Delivery Method	Carburetor	Combustion Air Treatment	T.C./Aftercooled

Raw Engine Emissions (905 LHV BTU/SCF Fuel Gas with little to no H2S)

Fuel Consumption 7443 *LHV BTU/bhp-hr or* 8256 *HHV BTU/bhp-hr*
Altitude 1200 *ft*
Maximum Air Inlet Temp 105 *F*

	g/bhp-hr [1]	lb/MMBTU [2]	lb/hr	TPY
Nitrogen Oxides (NOx)	0.5		1.52	6.66
Carbon Monoxide (CO)	2.43		7.39	32.38
Volatile Organic Compounds (VOC or NMNEHC)	0.92		2.80	12.26
Formaldehyde (CH2O)	0.44		1.34	5.86
Particulate Matter (PM) Filterable+Condensable		9.99E-03	1.14E-01	4.98E-01
Sulfur Dioxide (SO2)		5.88E-04	6.70E-03	2.93E-02

	g/bhp-hr [1]	lb/hr	Metric Tonne/yr
Carbon Dioxide (CO2)	474	1442	5729
Methane (CH4)	4.05	12.32	48.95

[1] g/bhp-hr are based on Caterpillar Specifications (GERP) assuming 905 LHV BTU/SCF fuel gas, 1200 ft elevation, and 105 F Max Air Inlet Temperature. Note that g/bhp-hr values are based on 100% Load Operation. For Air Permitting, it is recommended to add a safety margin to CO, VOC, and Formaldehyde to account for variations in fuel gas composition and load.

[2] Emission Factor obtained from EPA's AP-42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combution Sources (Section 3.2 Natural Gas-Fired Reciprocating Engines, Table 3.2-2).

Catalytic Converter Emissions

Catalytic Converter Make amd Model: *EMIT ELX-4200Z-1616F-31CEO-36P*
Element Type: *EMIT RE-3615Z*
Number of Elements in Housing: *1.5*
Air/Fuel Ratio Control *Caterpillar ADEM3, NOx Feedback*

	% Reduction		lb/hr	TPY
Nitrogen Oxides (NOx)	0		**1.52**	**6.66**
Carbon Monoxide (CO)	93		**0.52**	**2.27**
Volatile Organic Compounds (VOC or NMNEHC)	50	(use 30% DRE for High BTU Fuels)	**1.40**	**6.13**
Formaldehyde (CH2O)	76		**0.32**	**1.41**
Particulate Matter (PM)	0		**1.14E-01**	**4.98E-01**
Sulfur Dioxide (SO2)	0		**6.70E-03**	**2.93E-02**

	% Reduction	lb/hr	Metric Tonne/yr
Carbon Dioxide (CO2)	0	**1442**	**5729**
Methane (CH4)	0	**12.32**	**48.95**

G3516B

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
G3516B

CATERPILLAR®

ENGINE SPEED (rpm):	1400	FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL
COMPRESSION RATIO:	8:1		
AFTERCOOLER - STAGE 2 INLET (°F):	130	**SITE CONDITIONS:**	
AFTERCOOLER - STAGE 1 INLET (°F):	201	FUEL:	Nat Gas
JACKET WATER OUTLET (°F):	210	FUEL PRESSURE RANGE(psig):	7.0-50.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	84.8
IGNITION SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	905
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	1200
COMBUSTION:	Ultra Lean Burn	MAXIMUM INLET AIR TEMPERATURE(°F):	105
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	NAMEPLATE RATING:	1380 bhp@1400rpm
SET POINT TIMING:	30.0		

			MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING	**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(1)	bhp	1380	1380	1035	690
INLET AIR TEMPERATURE		°F	106	105	105	105
ENGINE DATA						
FUEL CONSUMPTION (LHV)	(2)	Btu/bhp-hr	7443	7443	7972	8562
FUEL CONSUMPTION (HHV)	(2)	Btu/bhp-hr	8256	8256	8843	9498
AIR FLOW	(3)(4)	lb/hr	13863	13863	10874	7602
AIR FLOW WET (77°F, 14.7 psia)	(3)(4)	scfm	3126	3126	2452	1715
INLET MANIFOLD PRESSURE	(5)	in Hg(abs)	94.6	94.6	76.8	54.0
EXHAUST STACK TEMPERATURE	(6)	°F	992	992	986	1006
EXHAUST GAS FLOW (@ stack temp, 14.5 psia)	(7)(4)	ft3/min	9126	9126	7138	5065
EXHAUST GAS MASS FLOW	(7)(4)	lb/hr	14380	14380	11290	7900
EMISSIONS DATA						
NOx (as NO2)	(8)	g/bhp-hr	0.50	0.50	0.50	0.50
CO	(8)	g/bhp-hr	2.43	2.43	2.61	2.56
THC (mol. wt. of 15.84)	(8)	g/bhp-hr	4.77	4.77	5.11	5.19
NMHC (mol. wt. of 15.84)	(8)	g/bhp-hr	0.72	0.72	0.77	0.78
NMNEHC (VOCs) (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	0.48	0.48	0.51	0.52
HCHO (Formaldehyde)	(8)	g/bhp-hr	0.44	0.44	0.43	0.42
CO2	(8)	g/bhp-hr	474	474	506	550
EXHAUST OXYGEN	(10)	% DRY	9.0	9.0	8.7	8.3
HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(11)	Btu/min	23438	23438	21564	19970
HEAT REJ. TO ATMOSPHERE	(11)	Btu/min	6110	6110	5092	4074
HEAT REJ. TO LUBE OIL (OC)	(11)	Btu/min	4449	4449	3947	3323
HEAT REJ. TO A/C - STAGE 1 (1AC)	(11)(12)	Btu/min	12934	12934	10814	3965
HEAT REJ. TO A/C - STAGE 2 (2AC)	(11)(12)	Btu/min	5679	5679	5341	3462

HEAT EXCHANGER SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(12)(13)	Btu/min	44701
TOTAL AFTERCOOLER CIRCUIT (2AC)	(12)(13)	Btu/min	5963
A cooling system safety factor of 0% has been added to the heat exchanger sizing criteria.			

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature.
100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature.
Max. rating is the maximum capability for the specified fuel at site altitude and reduced inlet air temperature.
Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY: Joel LeBlanc, USA Compression
Data generated by Gas Engine Rating Pro Version 3.04.00
Ref. Data Set DM8800-04-002, Printed 31Jan2011

772 Airfield Lane
Sheridan, WY 82801
Office: 307.673.0883
EST@emittechnologies.com

Prepared For:
Joel LeBlanc
USA COMPRESSION

INFORMATION PROVIDED BY CATERPILLAR

Engine:	G3516B
Horsepower:	1380
RPM:	1400
Compression Ratio:	8.0:1
Exhaust Flow Rate:	9126 CFM
Exhaust Temperature:	992 °F
Reference:	DM8800-04
Fuel:	Natural Gas
Annual Operating Hours:	8760

Uncontrolled Emissions

NOx:	0.50 g/bhp-hr
CO:	2.43 g/bhp-hr
THC:	4.77 g/bhp-hr
NMHC:	0.72 g/bhp-hr
NMNEHC:	0.48 g/bhp-hr
HCHO:	0.44 g/bhp-hr
Oxygen:	9.00 %

POST CATALYST EMISSIONS

NOx:	Unaffected by Oxidation Catalyst
CO:	>93% Reduction
VOC:	>50% Reduction
HCHO:	>76% Reduction

CONTROL EQUIPMENT

Catalytic Converter

Model:	**ELX-4200Z-1616F-31CE0-36P**
Catalyst Type:	Oxidation, Precious group metals
Manufacturer:	EMIT Technologies, Inc.
Element Size:	1 - Rectangle 36 x 15 x 3.5 1 - Rectangle 18 x 15 x 3.5
Catalyst Elements:	2
Housing Type:	3 Element Capacity
Catalyst Installation:	Accessible Housing
Construction:	10 gauge Carbon Steel
Sample Ports:	6 (0.5" NPT)
Inlet Connections:	16" Flat Face Flange
Outlet Connections:	16" Flat Face Flange
Configuration:	End In / Side Out
Silencer:	Integrated
Silencer Grade:	Hospital Enhanced
Insertion Loss:	35-50 dBA

ATTACHMENT T

Emissions Calculations

Jay-Bee Oil & Gas, Inc.

Happy Production Facility
Tyler 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	GPU #6	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-7	GPU #7	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-8	GPU #8	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-9	GPU #9	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-10	GPU #10	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-11	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
RBV-1	300 MBTU/hr Reboiler	0.030	0.025	36.2	0.0007	0.002	1.80E-04	0.0023	6.30E-07			0.001	1.02E-06	2.25E-05	0.001
RBV-2	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
RSV-1	Controlled Still Vent Emissions (EC-1/2)				0.0026	0.374			0.005			0.009	0.016	1.40E-04	0.030
RSV-2	Controlled Still Vent Emissions (EC-1/2)				0.0054	0.802			0.010			0.020	0.034	2.90E-04	0.063
EC-1	Dehydration Unit Combustor 1	0.223	0.754	333	0.006	0.594	6.00E-04	0.029	0.007			0.016	0.025	2.90E-04	0.048
EC-2	Dehydration Unit Combustor 2	0.223	0.754	333	0.006	0.594	6.00E-04	0.029	0.007			0.016	0.025	2.90E-04	0.048
VRU-1	VRU Compressor Driver	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
EC-3	Tank Enclosed Combustor 1[1]	0.470	2.33	797.7	0.58	4.12	3.00E-04	0.024	2.11E-03			0.124	0.005	2.38E-04	0.135
EC-4	Tank Enclosed Combustor 2[1]	0.470	2.33	797.7	0.58	4.12	3.00E-04	0.024	2.11E-03			0.124	0.005	2.38E-04	0.135
TEG-1	Thermoelectric Generator	0.001	0.001	1.57	0.0007	7.15E-05	7.80E-06	9.88E-05	2.73E-08			2.34E-05	4.42E-08		2.45E-05
CE-1	Compressor Engine (Controlled)	1.521	0.518	1750	12.3	1.40	6.70E-03	1.14E-01	5.01E-03	4.52E-04	2.10E-03	1.26E-02	4.65E-03	0.321	5.28E-01
TL-1	Truck Loading - Condensate[2]					2.48						0.13			0.134
TL-2	Truck Loading - Produced Water[2]					0.143						0.016			0.016
T01-T16	Condensate Tanks + Water Tanks[3]			29.1		8.23			0.004	5.87E-04	7.86E-03	0.246	0.0096		0.269
---	Truck Traffic Fugitive Dust							30.96							
---	Fugitive Emissions			20.2	0.81	0.76									0.009
Total (Exluding Fugitive Emissions)		4.73	8.42	6099.47	13.67	19.19	0.019	0.36	0.029	1.06E-03	1.01E-02	0.569	0.074	0.338	1.217
Total		4.73	8.42	6119.69	14.47	22.57	0.019	31.31	0.029	1.06E-03	1.01E-02	0.719	0.074	0.338	1.376

Jay-Bee Oil & Gas, Inc.

Happy Production Facility
Tyler County, WV

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	0.000			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	0.000			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	0.000			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	0.000			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	0.000			0.012	2.23E-05	4.93E-04	0.012
HTR-6	GPU #6	0.657	0.552	793.4	0.015	0.036	0.004	0.050	0.000			0.012	2.23E-05	4.93E-04	0.012
HTR-7	GPU #7	0.657	0.552	793.4	0.015	0.036	0.004	0.050	0.000			0.012	2.23E-05	4.93E-04	0.012
HTR-8	GPU #8	0.657	0.552	793.4	0.015	0.036	0.004	0.050	0.000			0.012	2.23E-05	4.93E-04	0.012
HTR-9	GPU #9	0.657	0.552	793.4	0.015	0.036	0.004	0.050	0.000			0.012	2.23E-05	4.93E-04	0.012
HTR-10	GPU #10	0.657	0.552	793.4	0.015	0.036	0.004	0.050	0.000			0.012	2.23E-05	4.93E-04	0.012
HTR-11	Line Heater	0.219	0.184	264.5	0.005	0.012	0.001	0.017	0.000			0.004	7.45E-06	1.64E-04	0.004
RBV-1	300 MBTU/hr Reboiler	0.131	0.110	158.7	0.003	0.007	0.001	0.010	0.000			0.002	4.47E-06	9.86E-05	0.002
RBV-2	500 MBTU/hr Reboiler	0.219	0.184	264.5	0.005	0.012	0.001	0.017	0.000			0.004	7.45E-06	1.64E-04	0.004
RSV-1	Controlled Still Vent Emissions (EC-1/2)					1.638			0.020			0.040	6.92E-02	6.14E-04	0.130
RSV-2	Controlled Still Vent Emissions (EC-1/2)					3.513			0.042			0.086	1.47E-01	1.27E-03	0.276
EC-1	Dehydration Unit Enclosed Combustor 1	0.977	3.301	1457	0.028	2.600	2.63E-03	0.129	0.031			0.071	0.108	1.27E-03	0.211
EC-2	Dehydration Unit Enclosed Combustor 2	0.977	3.301	1457	0.028	2.600	2.63E-03	0.129	0.031			0.071	0.108	1.27E-03	0.211
VRU-1	VRU Compressor	0.81	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
EC-3	Tank Enclosed Combustor 1[1]	2.06	10.20	3,494.0	0.133	0.91	0.001	0.106	0.001			0.027	0.002	0.001	0.034
EC-4	Tank Enclosed Combustor 2[1]	2.06	10.20	3,494.0	0.133	0.91	0.001	0.106	0.001			0.027	0.002	0.001	0.034
TEG-1	Thermoelectric Generator	0.006	0.005	6.88	0.003	3.13E-04	3.42E-05	4.33E-04	1.20E-07			1.03E-04	1.94E-07		1.07E-04
CE-1	Compressor Engine (Controlled)	6.663	2.267	7,666	53.969	6.13	0.029	0.499	0.022	0.002	0.009	0.055	0.020	1.41	2.31
TL-1	Truck Loading - Condensate[2]					4.07						0.220			0.22
TL-2	Truck Loading - Produced Water[2]					0.197						0.022			0.022
T01-T16	Condensate Tanks + Water Tanks[3]			127.6		36.06			0.019	2.57E-03	0.034	1.08	0.042		1.18
---	Truck Traffic Fugitive Dust							27.69							
---	Fugitive Emissions			88.58	3.54	3.31									0.039
Total (Exluding Fugitive Emissions)		20.7	36.9	26716	55.0	49.8	0.082	1.57	0.110	0.005	0.044	1.46	0.285	1.48	4.21
Total		20.7	36.9	26804	58.6	57.4	0.082	29.3	0.110	0.005	0.044	1.70	0.285	1.48	4.49

[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.

Jay-Bee Oil &Gas ,LLC
ENGINE EMISSIONS

Happy Production Facility
Tyler County, WV

Un-controlled Emissions

Source CE-1

Engine Data:

Engine Manufacturer	Caterpillar	
Engine Model	G3516 BLE	
Type (Rich-burn or Low Emission)	Lean	
Aspiration (Natural or Turbocharged)	Turbo	
Turbocharge Cooler Temperature	130	deg. F
Manufacturer Rating	1,380	hp
Speed at Above Rating	1,400	rpm
Configeration (In-line or Vee)	In-Line	
Number of Cylinders	16	
Fuel Heat Content (HHV)	1,263	BTU/scf
Fuel Consumption (HHV)	8,256	Btu/bhp-hr

Emission Rates:	g/bhp-hr	lb/hr	tons/year	g/hr	lb/day	AP-42 4Stroke Lean lb/mmbtu	Comment
Oxides of Nitrogen, NOx	0.50	1.52	6.66	690	36.51		
Carbon Monoxide CO	2.43	7.39	32.38	3,353	177.43		453.59 grams = 1 pound
VOC (NMNEHC)	0.92	2.80	12.26	1,270	67.18		2,000 pounds = 1 ton
CO2e		1750.13	7665.57				
Total Annual Hours of Operation	**8,760**						
SO2		0.006699	0.0293			0.000588	
PM2.5		0.000878	0.0038			0.0000771	
PM		0.113819	0.4985			0.00999	
CO2	474	1442.09	6316.35				Mfg. Data
Methane	4.05	12.32	53.97				Mfg. Data
acrolein		0.058561	0.2565			0.00514	
acetaldehyde		0.095248	0.4172			0.00836	
formaldehyde	0.440	1.338624	5.8632			0.11749	Mfg. Data
benzene		0.005013	0.0220			0.00044	
ethylbenzene		0.000452	0.0020			0.0000397	
methanol		0.028483	0.1248			0.00250	
toluene		0.004648	0.0204			0.00041	
xylenes		0.002096	0.0092			0.00018	
n-Hexane		0.012647	0.0554			0.00111	
total HAPs		1.545774	6.7705			0.134566219	

Exhaust Parameters: NOT UP TO DATE 11-8-16

Exhaust Gas Temperature	992	deg. F	
Exhaust Gas Flow Rate	9126	acfm	
Total Exhaust Gas Volume Flow, wet	9,126	acfm	
Total Exhaust Gas Volume Flow, wet	152.1	acf per sec	
Exhaust Stack Height	240	inches	
	12.00	feet	Roger: Where do we find this?
Exhaust Stack Inside Diameter	6	inches	Roger: Where do we find this?
	0.500	feet	
Exhaust Stack Velocity	774.6	ft/sec	
	46,478.3	ft/min	

$$\frac{4 \times \text{acfm}}{3.1416 \times (\text{stack diameter})^2}$$

Jay-Bee Oil &Gas ,LLC
ENGINE EMISSIONS

Happy Production Facility
Tyler County, WV

Controlled Emissions

Source CE-1

Engine Data:

Engine Manufacturer	Caterpillar	
Engine Model	G3516 BLE	
Type (Rich-burn or Low Emission)	Lean	
Aspiration (Natural or Turbocharged)	Turbo	
Turbocharge Cooler Temperature	130	deg. F
Manufacturer Rating	1,380	hp
Speed at Above Rating	1,400	rpm
Configeration (In-line or Vee)	In-Line	
Number of Cylinders	16	
Fuel Heat Content (HHV)	1,263	BTU/scf
Fuel Consumption (HHV)	8,256	Btu/bhp-hr

Emission Rates:	g/bhp-hr	lb/hr	tons/year	g/hr	lb/day	AP-42 4Stroke Lean lb/mmbtu	
Oxides of Nitrogen, NOx	0.50	1.52	6.66	690	36.51		
Carbon Monoxide CO	0.17	0.52	2.27	235	12.42		
VOC (NMNEHC)	0.46	1.40	6.13	635	33.59		
CO2e		1750.13	7665.57				
Total Annual Hours of Operation	**8,760**						
SO2		0.006699	0.0293			0.000588	Mfg. Data
PM2.5		0.000878	0.0038			0.0000771	
PM		0.113819	0.4985			0.00999	Mfg. Data
CO2	474	1442.09	6316.35				Mfg. Data
Methane	4.05	12.32	53.97				Mfg. Data
acrolein		0.058561	0.2565			0.00514	
acetaldehyde		0.095248	0.4172			0.00836	
formaldehyde	0.106	0.32127	1.4072			0.02820	Mfg. Data
benzene		0.005013	0.0220			0.00044	
ethylbenzene		0.000452	0.0020			0.0000397	
methanol		0.028483	0.1248			0.00250	
toluene		0.004648	0.0204			0.00041	
xylenes		0.002096	0.0092			0.00018	
n-Hexane		0.012647	0.0554			0.00111	
total HAPs		0.528419	2.3145			0.045270384	

Comment

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

Exhaust Parameters: NOT UP TO DATE 11-8-16

Exhaust Gas Temperature	992	deg. F
Exhaust Gas Flow Rate	9126	acfm
Total Exhaust Gas Volume Flow, wet	9,126	acfm
Total Exhaust Gas Volume Flow, wet	152.1	acf per sec
Exhaust Stack Height	240	inches
	12.00	feet
Exhaust Stack Inside Diameter	6	inches
	0.500	feet
Exhaust Stack Velocity	774.6	ft/sec
	46,478.3	ft/min

$$\frac{4 \times \text{acfm}}{3.1416 \times (\text{stack diameter})^{\wedge}2}$$

Jay-Bee Oil & Gas, Inc.

Happy Production Facility
Tyler County, WV

Potential Emission Rates

Sources: HTR-1 Through HTR-10

*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	4.93E-04	tpy
Benzene	3.15E-06	lb/hr	1.38E-05	tpy
N-Hexane	0.0027	lb/hr	0.012	tpy
Toluene	5.10E-06	lb/hr	2.23E-05	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.

Happy Production Facility
Tyler County, WV

Potential Emission Rates

Source HTR-11
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.

Happy Production Facility
Tyler County, WV

Source RBV-1

Burner Duty Rating	300.0	MBtu/hr
Burner Efficiency	98.0	%
Gas Heat Content (HHV)	1263.0	Btu/scf
Total Gas Consumption	5,817	scfd
H2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.0300	lb/hr	0.131	tpy
CO	0.0252	lb/hr	0.110	tpy
CO2	36.0	lb/hr	157.7	tpy
CH4	0.0007	lb/hr	0.003	tpy
CO2e	36.2	lb/hr	158.7	tpy
VOC	0.0017	lb/hr	0.007	tpy
SO2	0.0002	lb/hr	0.001	tpy
H2S	0.0000	lb/hr	0.000	tpy
PM10	0.0023	lb/hr	0.010	tpy
CHOH	0.0000	lb/hr	0.000	tpy
Benzene	0.0000	lb/hr	0.000	tpy
N-Hexane	0.0005	lb/hr	0.002	tpy
Toluene	0.0000	lb/hr	0.000	tpy
Total HAPs	0.0006	lb/hr	0.002	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**	

Happy Production Facility
Tyler County, WV

Source RBV-2

Reboiler

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.

Happy Production Facility
Tyler County, WV

Potential Emission Rates

Sources EC-1 & EC-2
Enclosed Combustor Pilot

Burner Duty Rating	1000.0	MBtu/hr
Burner Efficiency	98.0	%
Gas Heat Content (HHV)	627.0	Btu/scf
Burner Gas Consumption	39058.7	scfd
Number of Units	2	
Total Burner Gas Consumption	78117.4	scfd
H_2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.2001	lb/hr	0.876	tpy
CO	0.1681	lb/hr	0.736	tpy
CO2	240.1	lb/hr	1051.6	tpy
CH4	0.0046	lb/hr	0.020	tpy
CO2e	242	lb/hr	1,058	tpy
VOC	0.0110	lb/hr	0.048	tpy
SO2	0.0012	lb/hr	0.005	tpy
H2S	0.0000	lb/hr	0.000	tpy
PM10	0.0152	lb/hr	0.067	tpy
CHOH	0.0002	lb/hr	0.001	tpy
Benzene	0.0000	lb/hr	0.000	tpy
N-Hexane	0.0036	lb/hr	0.016	tpy
Toluene	0.0000	lb/hr	0.000	tpy
Total HAPs	0.0038	lb/hr	0.016	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.

Happy Production Facility
Tyler County, WV

Potential Emission Rates

RSV-1 to Sources EC-1 & EC-2
Enclosed Vapor Combustor

Destruction Efficiency	98.0	%		
Gas Heat Content (HHV)	627.0	Btu/scf		
Max Flow to T-E	0.04488	MMSCFD	393.149	MMSCF/yr
Max BTUs to Flare	1.17	MMBtu/hr	10,271	MMBtu/yr

NOx	0.080	lb/hr	0.349	tpy
CO	0.434	lb/hr	1.90	tpy
CO2	137	lb/hr	600	tpy
CO2e	137	lb/hr	601	tpy
VOC	0.374	lb/hr	1.64	tpy
CH4	0.003	lb/hr	0.011	tpy
N2O	0.0003	lb/hr	0.001	tpy
PM	0.0142	lb/hr	0.062	tpy
Benzene	0.0046	lb/hr	0.020	tpy
CHOH	0.0001	lb/hr	0.001	tpy
n-Hexane	0.009	lb/hr	0.040	tpy
Toluene	0.016	lb/hr	0.069	tpy
Total HAPs	0.030	lb/hr	0.130	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**	

Happy Production Facility
Tyler County, WV

Potential Emission Rates

RSV-2 to Sources EC-1 & EC-2
Enclosed Vapor Combustor

Destruction Efficiency	98.0	%		
Gas Heat Content (HHV)	634.0	Btu/scf		
Max Flow to T-E	0.09264	MMSCFD	811.526	MMSCF/yr
Max BTUs to Flare	2.45	MMBtu/hr	21,438	MMBtu/yr

NOx	0.166	lb/hr	0.729	tpy
CO	0.905	lb/hr	3.97	tpy
CO2	286	lb/hr	1,253	tpy
CO2e	286	lb/hr	1,254	tpy
VOC	0.802	lb/hr	3.51	tpy
CH4	0.005	lb/hr	0.024	tpy
N2O	0.001	lb/hr	0.002	tpy
PM	0.029	lb/hr	0.128	tpy
Benzene	0.010	lb/hr	0.042	tpy
CHOH	0.000	lb/hr	0.001	tpy
n-Hexane	0.020	lb/hr	0.086	tpy
Toluene	0.034	lb/hr	0.147	tpy
Total HAPs	0.063	lb/hr	0.276	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**	

Jay-Bee Oil &Gas ,LLC

Happy Production Facility
Tyler 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	AP-42 4strokerich lb/MMBtu	
Oxides of Nitrogen, NOx	1.000	0.19	0.81	84	4.44		Comment
Carbon Monoxide CO	2.000	0.37	1.62	168	8.89		453.59 grams = 1 pound
VOC (NMNEHC)	0.220	0.04	0.18	18	0.98		2,000 pounds = 1 ton
CO2	449	83	364	37,716	1,996		
CO2e		89.7	393				
Total Annual Hours of Operation	**8,760**						
SO2		0.0004	0.0017			0.0006	
PM2.5		0.00632	0.0277			0.0095	
PM (Condensable)		0.00659	0.0289			0.00991	
CH_4		0.12623	0.5529			0.0022	Factor From 40 CFR 98, Table C-2
N_2O		0.01148	0.0503			0.0002	Factor From 40 CFR 98, Table C-2
acrolein		0.00175	0.0077			0.00263	
acetaldehyde		0.00185	0.0081			0.00279	
formaldehyde	0.080	0.0148	0.0649				Per Mfg.
benzene		0.00105	0.0046			0.00158	
toluene		0.00037	0.0016			0.000558	
ethylbenzene		1.6E-05	0.0001			0.0000248	
xylenes		0.00013	0.0006			0.000195	
methanol		0.00203	0.0089			0.00306	
Total HAPs		0.02202	0.0964				

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.

Happy Production Facility
Tyler County, WV

Potential Emission Rates

Source EC-3 & 4
Enclosed Combustor Pilot

Burner Duty Rating	1000.0	MBtu/hr
Burner Efficiency	98.0	%
Gas Heat Content (HHV)	1263.0	Btu/scf
Total Gas Consumption	19389.8	scfd
Number of Units	2	
Total Burner Gas Consumptio	38779.7	scfd
H2S Concentration	0.000	Mole %
Hours of Operation	8760	

NOx	0.1000	lb/hr	0.438	tpy
CO	0.0840	lb/hr	0.368	tpy
CO2	120.0	lb/hr	525.8	tpy
CH4	0.0023	lb/hr	0.010	tpy
CO2e	121	lb/hr	529	tpy
VOC	0.0055	lb/hr	0.024	tpy
SO2	0.0006	lb/hr	0.003	tpy
H2S	0.0000	lb/hr	0.000	tpy
PM10	0.0076	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.

Happy Production Facility
Tyler County, WV

Potential Emission Rates

Source EC-3 & EC-4
Enclosed Vapor Combustor - Control of Tank Emissions

Destruction Efficiency	98.0	%		
Gas Heat Content (HHV)	2313.1	Btu/scf		
Max Flow to T-E	0.128	MMSCFD	46.808	MMSCF/yr
Max BTUs to Flare	12.360	MMBTU/hr	108,271	MMBTU/yr
Estimated Hours VRU Offline	5	%		

NOx	0.84	lb/hr	3.68	tpy
CO	4.57	lb/hr	20.03	tpy
CO2	1,444.73	lb/hr	6,327.92	tpy
CO2e	1,474.67	lb/hr	6,459.05	tpy
VOC	8.23	lb/hr	1.80	tpy
CH4	1.17	lb/hr	0.26	tpy
N2O	0.0027	lb/hr	0.0119	tpy
PM	0.0406	lb/hr	0.1779	tpy
CHOH	0.0004	lb/hr	0.0018	tpy
Benzene	0.004	lb/hr	0.001	tpy
n-Hexane	0.246	lb/hr	0.054	tpy
Toluene	0.010	lb/hr	0.002	tpy
Total HAP	0.269	lb/hr	0.059	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.

Happy Production Facility
Tyler 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=	2.97	lb/1000 gallons
Saturation Factor	S=	0.6	
True Vapor Pressure	P=	3.1	psia
Molecular Weight of Vapors	M=	66.64	lb/lb-mol
Temperature	T=	520	deg R

Maximum Daily Loading	252	BBL/day
	10,584	gpd
Hours of Loading	9	hr

Total VOC	22.3	lb/day	2.48	lb/hr
Total HAP	1.2	lb/day	0.13	lb/hr

Maximum Annual Loading	91,809	BBL/yr
	3,855,978	gpy

Total VOC	8138.0	lb/yr	4.07	tpy
Total HAP	439.9	lb/yr	0.22	tpy

Emissions

Total VOC	71.059	%
Total HAP	3.841	%

Jay-Bee Oil & Gas, Inc.

Happy Production Facility
Tyler 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	194,400	BBL/yr
	8,164,800	gpy

Total VOC	393.0	lb/yr	0.20	tpy
Total HAP	43.3	lb/yr	0.02	tpy

Emissions

Total VOC	36.376	%
Total HAP	4.009	%

Happy Production Facility
Tyler County, WV

Potential Emission Rates

Source TEG-1

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

NOx	0.0013	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.

Happy Production Facility
Tyler 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	1.8	1	80	2430	None	---
2	Condensate Transportation Trucks	18	27	10	1.8	1	80	1148	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	**13.282**	**2.196**	lb/hr
E	[lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] × [Ton ÷ 2000 lb] = tpy	**16.137**	**2.668**	tpy

Item 2 - Condensate		**PM**	**PM-10**	
E	lb/vmt	7.378804125	1.220015589	
E	[lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr	**13.282**	**2.196**	lb/hr
E	[lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] × [Ton ÷ 2000 lb] = tpy	**7.621**	**1.260**	tpy

Jay-Bee Oil & Gas, Inc.

Happy Production Facility
Tyler County, WV

Inlet Gas Composition Information:

	Fuel Gas mole %	Fuel M.W. lb/lb-mole	Fuel S.G.	Fuel Wt. %	LHV, dry Btu/scf	HHV, dry Btu/scf	AFR vol/vol	VOC NM / NE	Z Factor	GPM
Nitrogen, N2	0.394	0.110	0.004	0.530			-		0.0039	
Carbon Dioxide, CO2	0.151	0.066	0.002	0.319			-		0.0015	
Hydrogen Sulfide, H2S	-	-	-	-			-		-	
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.

Happy Production Facility
Tyler County, WV

Water Tank Flash Vapor Composition Information:

	Fuel Gas mole %	Fuel M.W. lb/lb-mole	Fuel S.G.	Fuel Wt. %	LHV, dry Btu/scf	HHV, dry Btu/scf	AFR vol/vol	VOC NM / NE	Z Factor	GPM
Nitrogen, N2	0.575	0.161	0.006	0.652			-		0.0057	
Carbon Dioxide, CO2	1.602	0.705	0.024	2.855			-		0.0160	
Hydrogen Sulfide, H2S	-	0.000	0.000	0.000	0.0	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 - Happy

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	=	91,809	bbl/yr	
Stock tank gas molecular weight	=	39.56	g/mole	
Number of wells	=	9		
Number of tanks	=	8		

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	2530.7762	E_{TOT}
VOC	**1775.8203**	Sum of C3+
Nitrogen	6.33E-01	
Carbon Dioxide	3.97E+00	
Methane	2.51E+02	
Ethane	4.99E+02	
Propane	6.56E+02	
Isobutane	1.77E+02	
n-Butane	4.08E+02	
2,2 Dimethylpropane	4.99E+00	
Isopentane	1.40E+02	
n-Pentane	1.47E+02	
2,2 Dimethylbutane	5.29E+00	
Cyclopentane	0.00E+00	
2,3 Dimethylbutane	7.67E+00	
2 Methylpentane	4.07E+01	
3 Methylpentane	2.43E+01	
n-Hexane	5.31E+01	HAP
Methylcyclopentane	3.87E+00	
Benzene	9.11E-01	HAP
Cyclohexane	5.49E+00	
2-Methylhexane	1.18E+01	
3-Methylhexane	1.16E+01	
2,2,4 Trimethylpentane	0.00E+00	
Other C7's	1.10E+01	
n-Heptane	1.71E+01	
Methylcyclohexane	1.06E+01	
Toluene	2.08E+00	HAP
Other C8's	1.73E+01	
n-Octane	5.77E+00	
Ethylbenzene	1.27E-01	HAP
M & P Xylenes	1.49E+00	HAP
O-Xylene	2.02E-01	HAP
Other C9's	7.19E+00	
n-Nonane	1.72E+00	
Other C10's	2.71E+00	
n-Decane	3.54E-01	
Undecanes (11)	3.80E-01	

Jay-Bee Oil & Gas - Happy

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	=	194,400	bbl/yr	
Stock tank gas molecular weight	=	30.68	g/mole	
Number of wells	=	9		
Number of tanks	=	8		

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	33.7458	E_{TOT}
VOC	**17.2593**	Sum of C3+
Nitrogen	5.61E-01	
Carbon Dioxide	5.08E-01	
Methane	9.99E+00	
Ethane	5.43E+00	
Propane	3.88E+00	
Isobutane	9.69E-01	
n-Butane	2.73E+00	
2,2 Dimethylpropane	4.29E-02	
Isopentane	1.37E+00	
n-Pentane	1.91E+00	
2,2 Dimethylbutane	7.12E-02	
Cyclopentane	0.00E+00	
2,3 Dimethylbutane	1.37E-01	
2 Methylpentane	7.65E-01	
3 Methylpentane	4.93E-01	
n-Hexane	1.33E+00	HAP
Methylcyclopentane	1.24E-01	
Benzene	2.43E-02	HAP
Cyclohexane	1.71E-01	
2-Methylhexane	3.72E-01	
3-Methylhexane	3.86E-01	
2,2,4 Trimethylpentane	0.00E+00	
Other C7's	3.56E-01	
n-Heptane	6.48E-01	
Methylcyclohexane	3.44E-01	
Toluene	5.33E-02	HAP
Other C8's	5.90E-01	
n-Octane	1.85E-01	
Ethylbenzene	3.71E-03	HAP
M & P Xylenes	3.04E-02	HAP
O-Xylene	3.37E-03	HAP
Other C9's	1.79E-01	
n-Nonane	3.34E-02	
Other C10's	3.91E-02	
n-Decane	6.75E-03	
Undecanes (11)	6.41E-03	

Jay-Bee Oil & Gas, Inc.

Happy Production Facility
Tyler County, WV

Fugitive VOC Emissions

Volatile Organic Compounds, NMNEHC from gas analysis:	18.40	weight percent
Methane from gas analysis:	59.35	weight percent
Carbon Dioxide from gas analysis:	0.32	weight percent
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:	**446**	0.02700 scf/hr	18.4	0.129	0.563	0.002	0.010	0.415	1.8167	45.428	0.019
Light Liquid:	**112**	0.05000 scf/hr	100.0	0.324	1.417						
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:	**25**	0.04000 scf/hr	18.4	0.011	0.047	0.000	0.001	0.034	0.1507	3.769	0.002
Open-ended Lines, gas:	**57**	0.06100 scf/hr	18.4	0.037	0.162	0.001	0.003	0.120	0.5241	13.105	0.006
Connectors:											
Gas:	**1,584**	0.00300 scf/hr	18.4	0.051	0.222	0.001	0.004	0.164	0.7163	17.911	0.008
Light Liquid:	**396**	0.00700 scf/hr	100.0	0.161	0.704						
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	**0.755**	**3.308**
CH4	**0.809**	**3.542**
CO2	**0.004**	**0.019**
CO2e	**20.224**	**88.580**
HAPs	**0.009**	**0.039**

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.

Happy Production Facility
Tyler County, WV

Condensate Tank Flash Vapor Composition Information:

	Fuel Gas mole %	Fuel M.W. lb/lb-mole	Fuel S.G.	Fuel Wt. %	LHV, dry Btu/scf	HHV, dry Btu/scf	AFR vol/vol	VOC NM / NE	Z Factor	GPM
Nitrogen, N2	0.036	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.

Happy Production Facility
Tyler 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	0.156	0.044	0.002	0.214	0.0	0.0	-		0.0016	
Carbon Dioxide, CO2	0.162	0.071	0.002	0.349	0.0	0.0	0.012		0.0016	
Hydrogen Sulfide, H2S	-	-	-	-	0.0	0.0	-		-	
Water	55.355	9.964	0.344	48.728	0.0	0.0	-		0.5539	
Oxygen, O2	-	-	-	-	0.0	0.0	-		-	
Methane, CH4	30.241	4.852	0.168	23.726	275.0	305.4	5.044		0.3018	
Ethane, C2H6	7.585	2.281	0.079	11.155	122.8	134.2	1.807		0.0752	2.018
Propane	3.261	1.438	0.050	7.032	75.5	82.0	1.010	7.032	0.0320	0.894
Iso-Butane	0.500	0.291	0.010	1.422	15.0	16.3	0.155	1.422	0.0049	0.163
Normal Butane	1.177	0.684	0.024	3.346	35.4	38.4	0.449	3.346	0.0114	0.369
Iso Pentane	0.274	0.198	0.007	0.968	10.2	11.0	0.113	0.968	0.0027	0.100
Normal Pentane	0.324	0.234	0.008	1.144	12.0	13.0	0.133	1.144	0.0032	0.117
Hexane	0.284	0.245	0.008	1.196	12.5	13.5	0.197	1.196	0.0028	0.116
Heptane	0.147	0.147	0.005	0.721	7.5	8.1	1.310	0.721	0.0015	0.067
	99.467	20.448	0.706		565.9	621.9	10.228	15.828	0.9926	3.844

Gas Density (STP) = 0.057

Ideal Gross (HHV)	621.9
Ideal Gross (sat'd)	611.9
GPM	-
Real Gross (HHV)	626.6
Real Net (LHV)	570.1

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Jay Bee Happy - RBV-1
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee Happy1.ddf
Date: November 16, 2016

DESCRIPTION:

Description: 20 MMSCFD
Still Vent as fuel and excess to EC-1/2 for destruction
No Flash Tank

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 85.00 deg. F
Pressure: 500.00 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: 20.0 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Flow Rate: 3.5 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 Happy - RBV-1
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee Happy1.ddf
Date: November 16, 2016

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.4665	11.196	2.0432
Ethane	0.2192	5.260	0.9599
Propane	0.1384	3.322	0.6063
Isobutane	0.0279	0.671	0.1224
n-Butane	0.0659	1.581	0.2885
Isopentane	0.0190	0.456	0.0832
n-Pentane	0.0224	0.539	0.0983
n-Hexane	0.0092	0.221	0.0403
Cyclohexane	0.0035	0.084	0.0154
Other Hexanes	0.0117	0.281	0.0512
Heptanes	0.0141	0.339	0.0620
Benzene	0.0046	0.109	0.0200
Toluene	0.0158	0.380	0.0693
C8+ Heavies	0.0416	0.997	0.1820
Total Emissions	1.0598	25.435	4.6419

Total Hydrocarbon Emissions	1.0598	25.435	4.6419
Total VOC Emissions	0.3742	8.980	1.6388
Total HAP Emissions	0.0296	0.710	0.1295
Total BTEX Emissions	0.0204	0.489	0.0892

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	23.3242	559.782	102.1602
Ethane	10.9577	262.986	47.9949
Propane	6.9210	166.104	30.3139
Isobutane	1.3969	33.525	6.1183
n-Butane	3.2938	79.050	14.4266
Isopentane	0.9498	22.794	4.1599
n-Pentane	1.1224	26.937	4.9160
n-Hexane	0.4596	11.031	2.0132
Cyclohexane	0.1757	4.216	0.7694
Other Hexanes	0.5848	14.035	2.5613
Heptanes	0.7072	16.974	3.0977

Benzene	0.2280	5.471	0.9985
Toluene	0.7908	18.978	3.4635
C8+ Heavies	2.0781	49.875	9.1021
Total Emissions	52.9899	1271.757	232.0956

Total Hydrocarbon Emissions	52.9899	1271.757	232.0956
Total VOC Emissions	18.7079	448.989	81.9405
Total HAP Emissions	1.4784	35.481	6.4752
Total BTEX Emissions	1.0187	24.449	4.4620

GRI-GLYCalc VERSION 4.0 - EQUIPMENT SUMMARY REPORT

Case Name: Jay Bee Happy - RBV-1
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee Happy1.ddf
Date: November 16, 2016

COMBUSTION DEVICE

Ambient Temperature: 60.00 deg. F
Excess Oxygen: 5.00 %
Combustion Efficiency: 98.00 %
Supplemental Fuel Requirement: 2.58e-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

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
Calculated Dry Gas Dew Point: 3.66 lbs. H2O/MMSCF

Temperature: 85.0 deg. F
Pressure: 500.0 psig
Dry Gas Flow Rate: 20.0000 MMSCF/day
Glycol Losses with Dry Gas: 0.0737 lb/hr
Wet Gas Water Content: Saturated
Calculated Wet Gas Water Content: 63.67 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio: 4.20 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.74%	94.26%
Carbon Dioxide	99.84%	0.16%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.96%	0.04%
Propane	99.93%	0.07%
Isobutane	99.90%	0.10%
n-Butane	99.86%	0.14%
Isopentane	99.85%	0.15%
n-Pentane	99.81%	0.19%
n-Hexane	99.66%	0.34%
Cyclohexane	98.49%	1.51%
Other Hexanes	99.74%	0.26%
Heptanes	99.31%	0.69%
Benzene	86.79%	13.21%
Toluene	80.54%	19.46%
C8+ Heavies	97.30%	2.70%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	37.09%	62.91%
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	0.33%	99.67%
n-Pentane	0.36%	99.64%
n-Hexane	0.41%	99.59%
Cyclohexane	3.05%	96.95%
Other Hexanes	0.77%	99.23%
Heptanes	0.45%	99.55%
Benzene	4.97%	95.03%
Toluene	7.88%	92.12%
C8+ Heavies	11.75%	88.25%

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Jay Bee Happy - RBV-1
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee Happy1.ddf
Date: November 16, 2016

DESCRIPTION:

Description: 20 MMSCFD
Still Vent as fuel and excess to EC-1/2 for destruction
No Flash Tank

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.4665	11.196	2.0432
Ethane	0.2192	5.260	0.9599
Propane	0.1384	3.322	0.6063
Isobutane	0.0279	0.671	0.1224
n-Butane	0.0659	1.581	0.2885
Isopentane	0.0190	0.456	0.0832
n-Pentane	0.0224	0.539	0.0983
n-Hexane	0.0092	0.221	0.0403
Cyclohexane	0.0035	0.084	0.0154
Other Hexanes	0.0117	0.281	0.0512
Heptanes	0.0141	0.339	0.0620
Benzene	0.0046	0.109	0.0200
Toluene	0.0158	0.380	0.0693
C8+ Heavies	0.0416	0.997	0.1820
Total Emissions	1.0598	25.435	4.6419
Total Hydrocarbon Emissions	1.0598	25.435	4.6419
Total VOC Emissions	0.3742	8.980	1.6388
Total HAP Emissions	0.0296	0.710	0.1295
Total BTEX Emissions	0.0204	0.489	0.0892

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr

Methane	23.3242	559.782	102.1602
Ethane	10.9577	262.986	47.9949
Propane	6.9210	166.104	30.3139
Isobutane	1.3969	33.525	6.1183
n-Butane	3.2938	79.050	14.4266
Isopentane	0.9498	22.794	4.1599
n-Pentane	1.1224	26.937	4.9160
n-Hexane	0.4596	11.031	2.0132
Cyclohexane	0.1757	4.216	0.7694
Other Hexanes	0.5848	14.035	2.5613
Heptanes	0.7072	16.974	3.0977
Benzene	0.2280	5.471	0.9985
Toluene	0.7908	18.978	3.4635
C8+ Heavies	2.0781	49.875	9.1021
Total Emissions	52.9899	1271.757	232.0956

Total Hydrocarbon Emissions	52.9899	1271.757	232.0956
Total VOC Emissions	18.7079	448.989	81.9405
Total HAP Emissions	1.4784	35.481	6.4752
Total BTEX Emissions	1.0187	24.449	4.4620

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 60.00 deg. F
Excess Oxygen: 5.00 %
Combustion Efficiency: 98.00 %
Supplemental Fuel Requirement: 2.58e-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

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
Calculated Dry Gas Dew Point: 3.66 lbs. H2O/MMSCF

Temperature: 85.0 deg. F
Pressure: 500.0 psig
Dry Gas Flow Rate: 20.0000 MMSCF/day
Glycol Losses with Dry Gas: 0.0737 lb/hr
Wet Gas Water Content: Saturated
Calculated Wet Gas Water Content: 63.67 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio: 4.20 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.74%	94.26%
Carbon Dioxide	99.84%	0.16%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.96%	0.04%
Propane	99.93%	0.07%
Isobutane	99.90%	0.10%
n-Butane	99.86%	0.14%
Isopentane	99.85%	0.15%
n-Pentane	99.81%	0.19%
n-Hexane	99.66%	0.34%
Cyclohexane	98.49%	1.51%
Other Hexanes	99.74%	0.26%
Heptanes	99.31%	0.69%
Benzene	86.79%	13.21%
Toluene	80.54%	19.46%
C8+ Heavies	97.30%	2.70%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	37.09%	62.91%
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	0.33%	99.67%
n-Pentane	0.36%	99.64%
n-Hexane	0.41%	99.59%
Cyclohexane	3.05%	96.95%
Other Hexanes	0.77%	99.23%
Heptanes	0.45%	99.55%
Benzene	4.97%	95.03%
Toluene	7.88%	92.12%
C8+ Heavies	11.75%	88.25%

STREAM REPORTS:

WET GAS STREAM

Temperature: 85.00 deg. F
Pressure: 514.70 psia
Flow Rate: 8.35e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.34e-001	5.31e+001
Carbon Dioxide	1.51e-001	1.46e+002
Nitrogen	3.93e-001	2.42e+002
Methane	7.70e+001	2.72e+004
Ethane	1.48e+001	9.80e+003
Propane	4.96e+000	4.81e+003
Isobutane	6.15e-001	7.86e+002
n-Butane	1.21e+000	1.54e+003
Isopentane	2.66e-001	4.22e+002
n-Pentane	2.62e-001	4.15e+002

n-Hexane	5.79e-002	1.10e+002
Cyclohexane	5.99e-003	1.11e+001
Other Hexanes	9.29e-002	1.76e+002
Heptanes	4.19e-002	9.25e+001
Benzene	9.99e-004	1.72e+000
Toluene	2.00e-003	4.05e+000
C8+ Heavies	2.00e-002	7.48e+001
Total Components	100.00	4.58e+004

DRY GAS STREAM

Temperature: 85.00 deg. F
Pressure: 514.70 psia
Flow Rate: 8.33e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.72e-003	3.05e+000
Carbon Dioxide	1.51e-001	1.46e+002
Nitrogen	3.94e-001	2.42e+002
Methane	7.71e+001	2.72e+004
Ethane	1.48e+001	9.79e+003
Propane	4.96e+000	4.81e+003
Isobutane	6.15e-001	7.86e+002
n-Butane	1.21e+000	1.54e+003
Isopentane	2.66e-001	4.21e+002
n-Pentane	2.62e-001	4.14e+002
n-Hexane	5.78e-002	1.09e+002
Cyclohexane	5.91e-003	1.09e+001
Other Hexanes	9.28e-002	1.76e+002
Heptanes	4.17e-002	9.18e+001
Benzene	8.68e-004	1.49e+000
Toluene	1.61e-003	3.26e+000
C8+ Heavies	1.95e-002	7.28e+001
Total Components	100.00	4.58e+004

LEAN GLYCOL STREAM

Temperature: 85.00 deg. F
Flow Rate: 3.50e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)

TEG	9.85e+001	1.94e+003
Water	1.50e+000	2.96e+001
Carbon Dioxide	1.18e-012	2.32e-011
Nitrogen	1.35e-013	2.65e-012
Methane	4.77e-018	9.40e-017
Ethane	8.51e-008	1.68e-006
Propane	6.78e-009	1.34e-007
Isobutane	1.22e-009	2.41e-008
n-Butane	2.68e-009	5.27e-008
Isopentane	1.61e-004	3.17e-003
n-Pentane	2.06e-004	4.06e-003
n-Hexane	9.61e-005	1.89e-003
Cyclohexane	2.81e-004	5.53e-003
Other Hexanes	2.32e-004	4.56e-003
Heptanes	1.63e-004	3.20e-003
Benzene	6.06e-004	1.19e-002
Toluene	3.43e-003	6.76e-002
C8+ Heavies	1.40e-002	2.77e-001
Total Components	100.00	1.97e+003

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 85.00 deg. F
Pressure: 514.70 psia
Flow Rate: 3.72e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.36e+001	1.94e+003
Water	3.84e+000	7.97e+001
Carbon Dioxide	1.65e-002	3.42e-001
Nitrogen	1.01e-002	2.10e-001
Methane	1.13e+000	2.33e+001
Ethane	5.29e-001	1.10e+001
Propane	3.34e-001	6.92e+000
Isobutane	6.74e-002	1.40e+000
n-Butane	1.59e-001	3.29e+000
Isopentane	4.60e-002	9.53e-001
n-Pentane	5.43e-002	1.13e+000
n-Hexane	2.23e-002	4.62e-001
Cyclohexane	8.74e-003	1.81e-001
Other Hexanes	2.84e-002	5.89e-001
Heptanes	3.43e-002	7.10e-001
Benzene	1.16e-002	2.40e-001

Toluene	4.14e-002	8.58e-001
C8+ Heavies	1.14e-001	2.35e+000
Total Components	100.00	2.07e+003

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.87e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	5.65e+001	5.01e+001
Carbon Dioxide	1.58e-001	3.42e-001
Nitrogen	1.52e-001	2.10e-001
Methane	2.95e+001	2.33e+001
Ethane	7.39e+000	1.10e+001
Propane	3.18e+000	6.92e+000
Isobutane	4.88e-001	1.40e+000
n-Butane	1.15e+000	3.29e+000
Isopentane	2.67e-001	9.50e-001
n-Pentane	3.16e-001	1.12e+000
n-Hexane	1.08e-001	4.60e-001
Cyclohexane	4.24e-002	1.76e-001
Other Hexanes	1.38e-001	5.85e-001
Heptanes	1.43e-001	7.07e-001
Benzene	5.92e-002	2.28e-001
Toluene	1.74e-001	7.91e-001
C8+ Heavies	2.48e-001	2.08e+000
Total Components	100.00	1.04e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.62e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	6.83e+001	4.66e-001
Ethane	1.71e+001	2.19e-001
Propane	7.37e+000	1.38e-001
Isobutane	1.13e+000	2.79e-002
n-Butane	2.66e+000	6.59e-002

Isopentane	6.18e-001	1.90e-002
n-Pentane	7.30e-001	2.24e-002
n-Hexane	2.50e-001	9.19e-003
Cyclohexane	9.80e-002	3.51e-003
Other Hexanes	3.19e-001	1.17e-002
Heptanes	3.31e-001	1.41e-002
Benzene	1.37e-001	4.56e-003
Toluene	4.03e-001	1.58e-002
C8+ Heavies	5.73e-001	4.16e-002
Total Components	100.00	1.06e+000

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Jay Bee Happy - RBV-2
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee Happy2.ddf
Date: November 16, 2016

DESCRIPTION:

Description: 40 MMSCFD
Still Vent as fuel and excess to EC-1/2 for destruction
No Flash Tank

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 85.00 deg. F
Pressure: 500.00 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 Happy - RBV-2
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee Happy2.ddf
Date: November 16, 2016

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.9985	23.963	4.3733
Ethane	0.4697	11.272	2.0572
Propane	0.2965	7.116	1.2987
Isobutane	0.0599	1.437	0.2623
n-Butane	0.1412	3.389	0.6186
Isopentane	0.0407	0.978	0.1784
n-Pentane	0.0482	1.156	0.2109
n-Hexane	0.0197	0.474	0.0865
Cyclohexane	0.0076	0.181	0.0331
Other Hexanes	0.0251	0.603	0.1100
Heptanes	0.0304	0.730	0.1332
Benzene	0.0097	0.233	0.0426
Toluene	0.0336	0.807	0.1472
C8+ Heavies	0.0895	2.148	0.3920
Total Emissions	2.2703	54.487	9.9439

Total Hydrocarbon Emissions	2.2703	54.487	9.9439
Total VOC Emissions	0.8022	19.252	3.5135
Total HAP Emissions	0.0631	1.514	0.2763
Total BTEX Emissions	0.0433	1.040	0.1898

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	49.9235	1198.164	218.6649
Ethane	23.4835	563.605	102.8579
Propane	14.8255	355.813	64.9359
Isobutane	2.9941	71.859	13.1143
n-Butane	7.0615	169.475	30.9292
Isopentane	2.0370	48.888	8.9220
n-Pentane	2.4078	57.787	10.5460
n-Hexane	0.9870	23.688	4.3230
Cyclohexane	0.3780	9.073	1.6558
Other Hexanes	1.2555	30.131	5.4989
Heptanes	1.5206	36.494	6.6601

Benzene	0.4862	11.668	2.1294
Toluene	1.6806	40.334	7.3610
C8+ Heavies	4.4743	107.384	19.5975
Total Emissions	113.5151	2724.362	497.1960

Total Hydrocarbon Emissions	113.5151	2724.362	497.1960
Total VOC Emissions	40.1080	962.593	175.6732
Total HAP Emissions	3.1537	75.690	13.8134
Total BTEX Emissions	2.1668	52.002	9.4904

GRI-GLYCalc VERSION 4.0 - EQUIPMENT SUMMARY REPORT

Case Name: Jay Bee Happy - RBV-2
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee Happy2.ddf
Date: November 16, 2016

COMBUSTION DEVICE

Ambient Temperature: 60.00 deg. F
Excess Oxygen: 5.00 %
Combustion Efficiency: 98.00 %
Supplemental Fuel Requirement: 5.51e-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

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
Calculated Dry Gas Dew Point: 3.53 lbs. H2O/MMSCF

Temperature: 85.0 deg. F
Pressure: 500.0 psig
Dry Gas Flow Rate: 40.0000 MMSCF/day
Glycol Losses with Dry Gas: 0.1475 lb/hr
Wet Gas Water Content: Saturated
Calculated Wet Gas Water Content: 63.67 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio: 4.49 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.54%	94.46%
Carbon Dioxide	99.83%	0.17%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.96%	0.04%
Propane	99.93%	0.07%
Isobutane	99.89%	0.11%
n-Butane	99.85%	0.15%
Isopentane	99.84%	0.16%
n-Pentane	99.79%	0.21%
n-Hexane	99.63%	0.37%
Cyclohexane	98.38%	1.62%
Other Hexanes	99.72%	0.28%
Heptanes	99.26%	0.74%
Benzene	85.91%	14.09%
Toluene	79.32%	20.68%
C8+ Heavies	97.09%	2.91%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	38.66%	61.34%
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	0.33%	99.67%
n-Pentane	0.36%	99.64%
n-Hexane	0.41%	99.59%
Cyclohexane	3.05%	96.95%
Other Hexanes	0.77%	99.23%
Heptanes	0.45%	99.55%
Benzene	4.97%	95.03%
Toluene	7.88%	92.12%
C8+ Heavies	11.75%	88.25%

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Jay Bee Happy - RBV-2
File Name: C:\Program Files (x86)\GRI-GLYCalc4\Jay Bee Happy2.ddf
Date: November 16, 2016

DESCRIPTION:

Description: 40 MMSCFD
Still Vent as fuel and excess to EC-1/2 for destruction
No Flash Tank

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.9985	23.963	4.3733
Ethane	0.4697	11.272	2.0572
Propane	0.2965	7.116	1.2987
Isobutane	0.0599	1.437	0.2623
n-Butane	0.1412	3.389	0.6186
Isopentane	0.0407	0.978	0.1784
n-Pentane	0.0482	1.156	0.2109
n-Hexane	0.0197	0.474	0.0865
Cyclohexane	0.0076	0.181	0.0331
Other Hexanes	0.0251	0.603	0.1100
Heptanes	0.0304	0.730	0.1332
Benzene	0.0097	0.233	0.0426
Toluene	0.0336	0.807	0.1472
C8+ Heavies	0.0895	2.148	0.3920
Total Emissions	2.2703	54.487	9.9439
Total Hydrocarbon Emissions	2.2703	54.487	9.9439
Total VOC Emissions	0.8022	19.252	3.5135
Total HAP Emissions	0.0631	1.514	0.2763
Total BTEX Emissions	0.0433	1.040	0.1898

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr

Methane	49.9235	1198.164	218.6649
Ethane	23.4835	563.605	102.8579
Propane	14.8255	355.813	64.9359
Isobutane	2.9941	71.859	13.1143
n-Butane	7.0615	169.475	30.9292
Isopentane	2.0370	48.888	8.9220
n-Pentane	2.4078	57.787	10.5460
n-Hexane	0.9870	23.688	4.3230
Cyclohexane	0.3780	9.073	1.6558
Other Hexanes	1.2555	30.131	5.4989
Heptanes	1.5206	36.494	6.6601
Benzene	0.4862	11.668	2.1294
Toluene	1.6806	40.334	7.3610
C8+ Heavies	4.4743	107.384	19.5975
Total Emissions	113.5151	2724.362	497.1960

Total Hydrocarbon Emissions	113.5151	2724.362	497.1960
Total VOC Emissions	40.1080	962.593	175.6732
Total HAP Emissions	3.1537	75.690	13.8134
Total BTEX Emissions	2.1668	52.002	9.4904

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 60.00 deg. F
Excess Oxygen: 5.00 %
Combustion Efficiency: 98.00 %
Supplemental Fuel Requirement: 5.51e-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

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
Calculated Dry Gas Dew Point: 3.53 lbs. H2O/MMSCF

Temperature: 85.0 deg. F
Pressure: 500.0 psig
Dry Gas Flow Rate: 40.0000 MMSCF/day
Glycol Losses with Dry Gas: 0.1475 lb/hr
Wet Gas Water Content: Saturated
Calculated Wet Gas Water Content: 63.67 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio: 4.49 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.54%	94.46%
Carbon Dioxide	99.83%	0.17%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.96%	0.04%
Propane	99.93%	0.07%
Isobutane	99.89%	0.11%
n-Butane	99.85%	0.15%
Isopentane	99.84%	0.16%
n-Pentane	99.79%	0.21%
n-Hexane	99.63%	0.37%
Cyclohexane	98.38%	1.62%
Other Hexanes	99.72%	0.28%
Heptanes	99.26%	0.74%
Benzene	85.91%	14.09%
Toluene	79.32%	20.68%
C8+ Heavies	97.09%	2.91%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	38.66%	61.34%
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	0.33%	99.67%
n-Pentane	0.36%	99.64%
n-Hexane	0.41%	99.59%
Cyclohexane	3.05%	96.95%
Other Hexanes	0.77%	99.23%
Heptanes	0.45%	99.55%
Benzene	4.97%	95.03%
Toluene	7.88%	92.12%
C8+ Heavies	11.75%	88.25%

STREAM REPORTS:

WET GAS STREAM

Temperature: 85.00 deg. F
Pressure: 514.70 psia
Flow Rate: 1.67e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.34e-001	1.06e+002
Carbon Dioxide	1.51e-001	2.92e+002
Nitrogen	3.93e-001	4.85e+002
Methane	7.70e+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	8.43e+002
n-Pentane	2.62e-001	8.31e+002

n-Hexane	5.79e-002	2.20e+002
Cyclohexane	5.99e-003	2.22e+001
Other Hexanes	9.29e-002	3.52e+002
Heptanes	4.19e-002	1.85e+002
Benzene	9.99e-004	3.43e+000
Toluene	2.00e-003	8.10e+000
C8+ Heavies	2.00e-002	1.50e+002
Total Components	100.00	9.17e+004

DRY GAS STREAM

Temperature: 85.00 deg. F
Pressure: 514.70 psia
Flow Rate: 1.67e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.44e-003	5.89e+000
Carbon Dioxide	1.51e-001	2.91e+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	2.61e-001	8.29e+002
n-Hexane	5.78e-002	2.19e+002
Cyclohexane	5.90e-003	2.18e+001
Other Hexanes	9.28e-002	3.51e+002
Heptanes	4.17e-002	1.84e+002
Benzene	8.59e-004	2.95e+000
Toluene	1.59e-003	6.42e+000
C8+ Heavies	1.94e-002	1.45e+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	1.50e+000	6.33e+001
Carbon Dioxide	1.18e-012	4.97e-011
Nitrogen	1.35e-013	5.71e-012
Methane	4.78e-018	2.02e-016
Ethane	8.54e-008	3.61e-006
Propane	6.79e-009	2.87e-007
Isobutane	1.22e-009	5.17e-008
n-Butane	2.68e-009	1.13e-007
Isopentane	1.61e-004	6.81e-003
n-Pentane	2.07e-004	8.73e-003
n-Hexane	9.63e-005	4.07e-003
Cyclohexane	2.82e-004	1.19e-002
Other Hexanes	2.32e-004	9.81e-003
Heptanes	1.63e-004	6.89e-003
Benzene	6.03e-004	2.54e-002
Toluene	3.40e-003	1.44e-001
C8+ Heavies	1.41e-002	5.96e-001
Total Components	100.00	4.22e+003

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 85.00 deg. F
Pressure: 514.70 psia
Flow Rate: 7.95e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.37e+001	4.16e+003
Water	3.69e+000	1.64e+002
Carbon Dioxide	1.65e-002	7.33e-001
Nitrogen	1.01e-002	4.49e-001
Methane	1.13e+000	4.99e+001
Ethane	5.29e-001	2.35e+001
Propane	3.34e-001	1.48e+001
Isobutane	6.75e-002	2.99e+000
n-Butane	1.59e-001	7.06e+000
Isopentane	4.61e-002	2.04e+000
n-Pentane	5.45e-002	2.42e+000
n-Hexane	2.23e-002	9.91e-001
Cyclohexane	8.79e-003	3.90e-001
Other Hexanes	2.85e-002	1.27e+000
Heptanes	3.44e-002	1.53e+000
Benzene	1.15e-002	5.12e-001

Toluene	4.11e-002	1.82e+000
C8+ Heavies	1.14e-001	5.07e+000
Total Components	100.00	4.44e+003

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 3.86e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	5.48e+001	1.00e+002
Carbon Dioxide	1.64e-001	7.33e-001
Nitrogen	1.58e-001	4.49e-001
Methane	3.06e+001	4.99e+001
Ethane	7.68e+000	2.35e+001
Propane	3.30e+000	1.48e+001
Isobutane	5.06e-001	2.99e+000
n-Butane	1.19e+000	7.06e+000
Isopentane	2.78e-001	2.04e+000
n-Pentane	3.28e-001	2.41e+000
n-Hexane	1.13e-001	9.87e-001
Cyclohexane	4.42e-002	3.78e-001
Other Hexanes	1.43e-001	1.26e+000
Heptanes	1.49e-001	1.52e+000
Benzene	6.12e-002	4.86e-001
Toluene	1.79e-001	1.68e+000
C8+ Heavies	2.58e-001	4.47e+000
Total Components	100.00	2.15e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 3.46e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	6.82e+001	9.98e-001
Ethane	1.71e+001	4.70e-001
Propane	7.37e+000	2.97e-001
Isobutane	1.13e+000	5.99e-002
n-Butane	2.66e+000	1.41e-001

Isopentane	6.19e-001	4.07e-002
n-Pentane	7.32e-001	4.82e-002
n-Hexane	2.51e-001	1.97e-002
Cyclohexane	9.85e-002	7.56e-003
Other Hexanes	3.19e-001	2.51e-002
Heptanes	3.33e-001	3.04e-002
Benzene	1.36e-001	9.72e-003
Toluene	4.00e-001	3.36e-002
C8+ Heavies	5.76e-001	8.95e-002
Total Components	100.00	2.27e+000

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

Identification

User Identification:	Happy 2016 Mod
City:	Huntington
State:	West Virginia
Company:	Jay-Bee Oil & Gas
Type of Tank:	Vertical Fixed Roof Tank
Description:	210 BBL Vertical, Fixed-Roof Condensate Tank Single Tank Determination

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:	58.00
Net Throughput(gal/yr):	477,066.70
Is Tank Heated (y/n):	N

Paint Characteristics

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

Roof Characteristics

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

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

Happy 2016 Mod - 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	56.69	48.70	64.69	52.55	2.7385	2.3081	3.2322	69.0000			92.00	Option 4: RVP=6, ASTM Slope=3

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

Happy 2016 Mod - Vertical Fixed Roof Tank
Huntington, West Virginia

Annual Emission Calculations	
Standing Losses (lb):	394.4042
Vapor Space Volume (cu ft):	399.2441
Vapor Density (lb/cu ft):	0.0341
Vapor Space Expansion Factor:	0.1379
Vented Vapor Saturation Factor:	0.5754
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):	0.0341
Vapor Molecular Weight (lb/lb-mole):	69.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.7385
Daily Avg. Liquid Surface Temp. (deg. R):	516.3645
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):	512.2183
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,202.9556
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1379
Daily Vapor Temperature Range (deg. R):	31.9767
Daily Vapor Pressure Range (psia):	0.9241
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.7385
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	2.3081
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	3.2322
Daily Avg. Liquid Surface Temp. (deg R):	516.3645
Daily Min. Liquid Surface Temp. (deg R):	508.3704
Daily Max. Liquid Surface Temp. (deg R):	524.3587
Daily Ambient Temp. Range (deg. R):	19.1500
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.5754
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	2.7385
Vapor Space Outage (ft):	5.0833
Working Losses (lb):	1,467.8652
Vapor Molecular Weight (lb/lb-mole):	69.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.7385
Annual Net Throughput (gal/yr.):	477,066.7041
Annual Turnovers:	58.0000
Turnover Factor:	0.6839
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):	1,862.2694

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

Emissions Report for: Annual

Happy 2016 Mod - Vertical Fixed Roof Tank
Huntington, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 6)	1,467.87	394.40	1,862.27

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	0.530	
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	0.376	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

GPM TOTAL C2+ 6.223

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	0.9964	

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	0.530	
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
Hexanes Plus	0.222	0.983	0.093
	100.000	100.000	6.223

GPM TOTAL C2+	6.223
GPM TOTAL C3+	2.243
GPM TOTAL iC5+	0.285

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% : 1.508

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	0.530	
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
Hexanes	0.151	0.615	0.060
Heptanes Plus	0.071	0.368	0.033
	100.000	100.000	6.223

GPM TOTAL C2+	6.223
GPM TOTAL C3+	2.243
GPM TOTAL iC5+	0.285

Physical Properties	**Total**	**C7+**
Relative Density Real Gas	0.7218	3.5570
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.

H03288

Date:
3/25/2014

Gas Analytical Services, Inc.
P.O. Box 1028, Bridgeport, WV 26330
4888 Water Street, Stonewood, WV 26301
Phone:(304) 623-0020 Fax: (304) 624-8076

Referred to: **Southern Petroleum Laboratories**
4790 NE Evangeline Thruway
Carencro, LA 70520
Attn: Patti Petro

Testing Requested
**SCF Base Conditions: P_b 14.73psia / T_b 60 F

	Client	Location	Date of Collection	Time of Collection	Cylinder Number	Sulfur Speciation (GPA-2199)	Total Sulfur (GPA-2199)	Extended Hydrocarbon $C_1...C_{6+}$ (GPA-2286)	Extended Hydrocarbon $C_1...C_{10+}$ (GPA-2286)	Extended Hydrocarbon $C_1...C_{14+}$ (GPA-2286)	Hydrocarbon Dewpoint	Gas Temperature (F)
1	Jay-Bee Oil & Gas	RPT 8H	3/25/2014	11:30	0339				X			
2	Jay-Bee Oil & Gas	RPT 8-2H	3/25/2014	11:45	0118				X			
3	Jay-Bee Oil & Gas	RPT 8-1H	3/25/2014	12:00	0258				X			
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

Please email results to:
lab@gasana.com

Submitted by:
Alan Ball, Lab Manger
Stonewood, WV Laboratory

Received by:

3/31/14

GAS ANALYTICAL SERVICES
205 Water Street, Stonewood, WV 26301
lab@gasana.com Phone: 304-623-0020

Sample Date: 3/25/13 Time:

Meter ID Number:

Company Name: JAY-BEE OIL & GAS INC

Sample Source: RPT 8 in

Sample Pressure: 340 PSI Sample Temp.:

Sample Type: ☐Wellhead ☒Sub-meter ☐Master Meter ☐Alternative Fuel ☐Source Analysis

Sampled By: D. Wilson
(Print and Sign) Who declares that this sample was obtained from the source indicated above.

Comments: Standard ANALYSIS

Send Results To: Randy Brooks

Analysis Type: ☐Standard ☐Extended

14B0248 001A

GAS ANALYTICAL SERVICES
205 Water Street, Stonewood, WV 26301
lab@gasana.com Phone: 304-623-0020

Sample Date: 3/25/14 Time: 11:45A

Meter ID Number:

Company Name: JAY-BEE OIL & GAS INC.

Sample Source: RPTS-2h

Sample Pressure: 320 PSI Sample Temp.:

Sample Type: ☐Wellhead ☒Sub-meter ☐Master Meter ☐Alternative Fuel ☐Source Analysis

Sampled By: D. WILSON
(Print and Sign) Who declares that this sample was obtained from the source indicated above.

Comments: Extended ANALYSIS

Send Results To: Randy Brooks

Analysis Type: ☐Standard ☐Extended

2A

GAS ANALYTICAL SERVICES
205 Water Street, Stonewood, WV 26301
lab@gasana.com Phone: 304-623-0020

Sample Date: 3/25/14 Time: 12:06P

Meter ID Number:

Company Name: JAY-BEE OIL & GAS INC.

Sample Source: RPTS-1h

Sample Pressure: 290 PSI Sample Temp.:

Sample Type: ☐Wellhead ☒Sub-meter ☐Master Meter ☐Alternative Fuel ☐Source Analysis

Sampled By: D. WILSON
(Print and Sign) Who declares that this sample was obtained from the source indicated above.

Comments: Extended ANALYSIS

Send Results To: Randy Brooks

Analysis Type: ☐Standard ☐Extended

3A

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: 14.650 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

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 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

ATTACHMENT U

Facility-Wide Controlled Emissions Summary Sheet

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	0.150	0.657	0.126	0.552	0.008	0.036	0.001	0.004	0.011	0.050	0.011	0.050	0.003	0.015	181.1	793.4
2E	0.150	0.657	0.126	0.552	0.008	0.036	0.001	0.004	0.011	0.050	0.011	0.050	0.003	0.015	181.1	793.4
3E	0.150	0.657	0.126	0.552	0.008	0.036	0.001	0.004	0.011	0.050	0.011	0.050	0.003	0.015	181.1	793.4
4E	0.150	0.657	0.126	0.552	0.008	0.036	0.001	0.004	0.011	0.050	0.011	0.050	0.003	0.015	181.1	793.4
5E	0.150	0.657	0.126	0.552	0.008	0.036	0.001	0.004	0.011	0.050	0.011	0.050	0.003	0.015	181.1	793.4
6E	0.150	0.657	0.126	0.552	0.008	0.036	0.001	0.004	0.011	0.050	0.011	0.050	0.003	0.015	181.1	793.4
7E	0.150	0.657	0.126	0.552	0.008	0.036	0.001	0.004	0.011	0.050	0.011	0.050	0.003	0.015	181.1	793.4
8E	0.150	0.657	0.126	0.552	0.008	0.036	0.001	0.004	0.011	0.050	0.011	0.050	0.003	0.015	181.1	793.4
9E	0.150	0.657	0.126	0.552	0.008	0.036	0.001	0.004	0.011	0.050	0.011	0.050	0.003	0.015	181.1	793.4
10E	0.150	0.657	0.126	0.552	0.008	0.036	0.001	0.004	0.011	0.050	0.011	0.050	0.003	0.015	181.1	793.4
11E	0.050	0.219	0.042	0.184	0.003	0.012	0.0003	0.001	0.004	0.017	0.004	0.017	0.001	0.005	60.4	264.5
12E	0.030	0.131	0.025	0.110	0.002	0.007	1.80E-04	0.001	0.002	0.010	0.002	0.010	0.001	0.003	36.2	158.7
13E	0.050	0.219	0.042	0.184	0.003	0.012	3.00E-04	0.001	0.004	0.017	0.004	0.017	0.001	0.005	60.4	264.5
14E	0.223	0.977	0.754	3.30	0.594	2.60	6.00E-04	0.003	0.029	0.129	0.029	0.129	0.006	0.028	333	1,457
15E	0.223	0.977	0.754	3.30	0.594	2.60	6.00E-04	0.003	0.029	0.129	0.029	0.129	0.006	0.028	333	1,457
16E	0.185	0.81	0.370	1.62	0.04	0.18	0.0004	0.0017	0.013	0.057	0.013	0.057	0.126	0.553	89.7	393.0
17E	0.470	2.06	2.33	10.20	4.12	0.91	3.00E-04	0.001	0.024	0.106	0.024	0.106	0.58	0.133	797.7	3,494.0
18E	0.470	2.06	2.33	10.20	4.12	0.91	3.00E-04	0.001	0.024	0.106	0.024	0.106	0.58	0.133	797.7	3,494.0
22E	0.001	0.006	0.001	0.005	7.15E-05	3.13E-04	7.80E-06	3.42E-05	9.88E-05	4.33E-04	9.88E-05	4.33E-04	0.001	0.003	1.6	6.88
23E	1.52	6.66	0.52	2.27	1.40	6.13	<0.01	0.03	0.11	0.50	0.11	0.50	12.32	53.97	1,750	7,666
TOTAL	4.73	20.7	8.42	36.9	19.2	49.8	0.019	0.082	0.36	1.57	0.36	1.57	13.7	55.0	6,099	26,716

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	0.000	5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
2E	1.13E-04	4.93E-04	3.15E-06	0.000	5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
3E	1.13E-04	4.93E-04	3.15E-06	0.000	5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
4E	1.13E-04	4.93E-04	3.15E-06	0.000	5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
5E	1.13E-04	4.93E-04	3.15E-06	0.000	5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
6E	1.13E-04	4.93E-04	3.15E-06	0.000	5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
7E	1.13E-04	4.93E-04	3.15E-06	0.000	5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
8E	1.13E-04	4.93E-04	3.15E-06	0.000	5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
9E	1.13E-04	4.93E-04	3.15E-06	0.000	5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
10E	1.13E-04	4.93E-04	3.15E-06	0.000	5.10E-06	2.23E-05					0.003	0.012	0.003	0.012
11E	3.75E-05	1.64E-04	1.05E-06	0.000	1.70E-06	7.45E-06					0.001	0.004	0.001	0.004
12E	2.25E-05	9.86E-05	6.30E-07	0.000	1.02E-06	4.47E-06					0.001	0.002	0.001	0.002
13E	3.75E-05	1.64E-04	1.05E-06	0.000	1.70E-06	7.45E-06					0.001	0.004	0.001	0.004
14E	2.90E-04	0.001	0.007	0.031	0.025	0.108					0.016	0.071	0.048	0.211
15E	2.90E-04	0.001	0.007	0.031	0.025	0.108					0.016	0.071	0.048	0.211
16E	0.015	0.065	0.001	0.0046	3.71E-04	0.002	1.65E-05	7.22E-05	1.30E-04	5.68E-04			0.022	0.096
17E	2.38E-04	0.001	2.11E-03	0.001	0.005	0.002					0.124	0.027	0.135	0.034
18E	2.38E-04	0.001	2.11E-03	0.001	0.005	0.002					0.124	0.027	0.135	0.034
22E			2.73E-08	1.20E-07	4.42E-08	1.94E-07					2.34E-05	1.03E-04	2.45E-05	1.07E-04
23E	0.32	1.41	<0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	0.01	0.01	0.06	0.53	2.31
TOTAL	0.338	1.48	0.029	0.110	0.074	0.285	1.06E-03	0.005	0.010	0.044	0.569	1.46	1.22	4.21

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

PLANNED PUBLIC NOTICE

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 Walnut Fork Road, near Alma, in Tyler County, West Virginia. The latitude and longitude coordinates are: 39.469846, -80.750799.

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

20.7 tons of Nitrogen Oxides per year
36.9 tons of Carbon Monoxide per year
29.3 tons of Particulate Matter per year
57.4 tons of Volatile Organic Compounds per year
0.08 tons of Sulfur Dioxide per year
1.48 tons of Formaldehyde per year
0.11 tons of Benzene per year
0.29 tons of Toluene per year
1.70 tons of Hexane per year
4.49 tons of Total Hazardous Air Pollutants per year
26,804 tons of Greenhouse Gases per year

Startup of operation is planned to begin on or about the 1st day of March, 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