GOFF CONNECTOR LLC

G35-D GENERAL PERMIT REGISTRATION APPLICATION

Connector Compressor Station
Harrison County, West Virginia

February, 2018

TECHNOLOGIES

APPLICATION FOR G35-D GENERAL PERMIT

Goff Connector LLC
Connector Compressor Station
Harrison County, West Virginia

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SECTION I

Application Form

dep	**west virginia** department of environmental protection	Division of Air Quality 601 57th Street SE Charleston, WV 25304 Phone (304) 926-0475 Fax (304) 926-0479 www.dep.wv.gov

G35-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 COMPRESSOR AND/OR DEHYDRATION FACILITIES

☒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): Goff Connector LLC

Federal Employer ID No. (FEIN): 82-3535826

Applicant's Mailing Address: 17806 IH-10, Suite 300

City: San Antonio	State: TX	ZIP Code: 78257

Facility Name: Connector Compressor Station

Operating Site Physical Address: Pigtail Run-Green Valley Rd.
If none available, list road, city or town and zip of facility.

City: Bridgeport	Zip Code: 26330	County: Harrison

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.23405N
Longitude: 80.17733W

SIC Code: 1311 NAICS Code: 211130	DAQ Facility ID No. (For existing facilities)

CERTIFICATION OF INFORMATION

This G35-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 G35-D Registration Application will be returned to the applicant. Furthermore, if the G35-D forms are not utilized, the application will be returned to the applicant. No substitution of forms is allowed.**

I hereby certify that Mike Hopkins 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 G35-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: Mike Hopkins Chief Operating Officer Phone: 918-284-1382 Fax: n/a
Email: mhopkins@fullstreameh.com Date: 2/8/2018

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

If applicable:
Environmental Contact
Name and Title: Chris Rumer, Project Scientist II Phone: 412-221-1100 ext. 216 Fax:
Email: crumer@se-env.com Date: 2/2/18

OPERATING SITE INFORMATION
Briefly describe the proposed new operation and/or any change(s) to the facility: Goff Connector LLC is proposing to install a natural gas compressor station. The compressor station will include: three (3) Caterpillar G3606 compressor engines, eight (8) Caterpillar G3608 compressor engines, two (2) auxiliary power sources, three (3) 175 MMscfd glycol dehydration units, five (5) 400-bbl produced water tanks, one (1) pig launcher, as well as various insignificant storage vessels such as: thirty (30) 500-gallon fresh oil tanks, ten (10) 1,000-gallon tanks, twenty (20) 500-gallon antifreeze/engine glycol tanks, three (3) 1,000 gallon triethylene glycol tanks, and two (2) 350-gallon methanol tanks.
Directions to the facility: From Bridgeport, WV, head east on Route 50 for 1.2 miles. Turn right onto WV-76E (0.7 mi). Continue straight onto Oral Lake Drive (3.4 mi.). Turn right onto Pigtail Run-Green Valley (0.7 mi). Turn left to stay on Pigtail Run-Green Valley (0.4 mi). Slight left onto Co Rte 77/7 (0.7 mi). Site is on the left at the fork.

ATTACHMENTS AND SUPPORTING DOCUMENTS	
I have enclosed the following required documents:	
Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22). ☐ Check attached to front of application. ☐ I wish to pay by electronic transfer. Contact for payment (incl. name and email address): ☐ I wish to pay by credit card. Contact for payment (incl. name and email address): ☒$500 (Construction, Modification, and Relocation) ☐$300 (Class II Administrative Update) ☒$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO 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 in its entirety)** – Attachment A	
☐ Siting Criteria Waiver (if applicable) – Attachment B	☒ Current Business Certificate – Attachment C
☒ Process Flow Diagram – Attachment D	☒ Process Description – Attachment E
☒ Plot Plan – Attachment F	☒ Area Map – Attachment G
☒ G35-D Section Applicability Form – Attachment H	☒ Emission Units/ERD Table – Attachment I
☒ Fugitive Emissions Summary Sheet – Attachment J	
☒ 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 K	
☒ Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment L	
☒ Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment M	
☒ Tanker Truck Loading Data Sheet (if applicable) – Attachment N	
☒ Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment O	
☒ Pneumatic Controllers Data Sheet – Attachment P	
☒ Centrifugal Compressor Data Sheet – Attachment Q	
☒ Reciprocating Compressor Data Sheet – Attachment R	
☒ Blowdown and Pigging Operations Data Sheet – Attachment S	
☐ Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment T	
☒ Emission Calculations (please be specific and include all calculation methodologies used) – Attachment U	
☒ Facility-wide Emission Summary Sheet(s) – Attachment V	
☒ Class I Legal Advertisement – Attachment W	
☒ 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 ☒

Connector Compressor Station will be the only Goff Connector facility in West Virginia at the time of installation.

ATTACHMENT C

Current Business Certificate

ATTACHMENT C – CURRENT BUSINESS CERTIFICATE

If the applicant is a resident of West Virginia, the applicant should provide a copy of the current Business Registration Certificate issued to them from the West Virginia Secretary of State's Office. If the applicant is not a resident of the State of West Virginia, the registrant should provide a copy of the Certificate of Authority/Authority of LLC/Registration. This information is required for all sources to operate a business in West Virginia regardless of whether it is a construction, modification, or administrative update.

If you are a new business to West Virginia and have applied to the West Virginia Secretary of State's Office for a business license, please include a copy of your application.

Please note: Under the West Virginia Bureau of Employment Programs, 96CSR1, the DAQ may not grant, issue, or renew approval of any permit, general permit registration, or Certificate to Operate to any employing unit whose account is in default with the Bureau of Employment Programs Unemployment Compensation Division.

State of West Virginia

Certificate

I, Mac Warner, Secretary of State,
of the State of West Virginia, hereby certify that

GOFF CONNECTOR LLC

has filed the appropriate registration documents in my office according to the provisions of the West Virginia Code and hereby declare the organization listed above as duly registered with the Secretary of State's Office.

Given under my hand and
the Great Seal of West Virginia
on this day of
December 08, 2017

Mac Warner

Secretary of State

ATTACHMENT D – PROCESS FLOW DIAGRAM

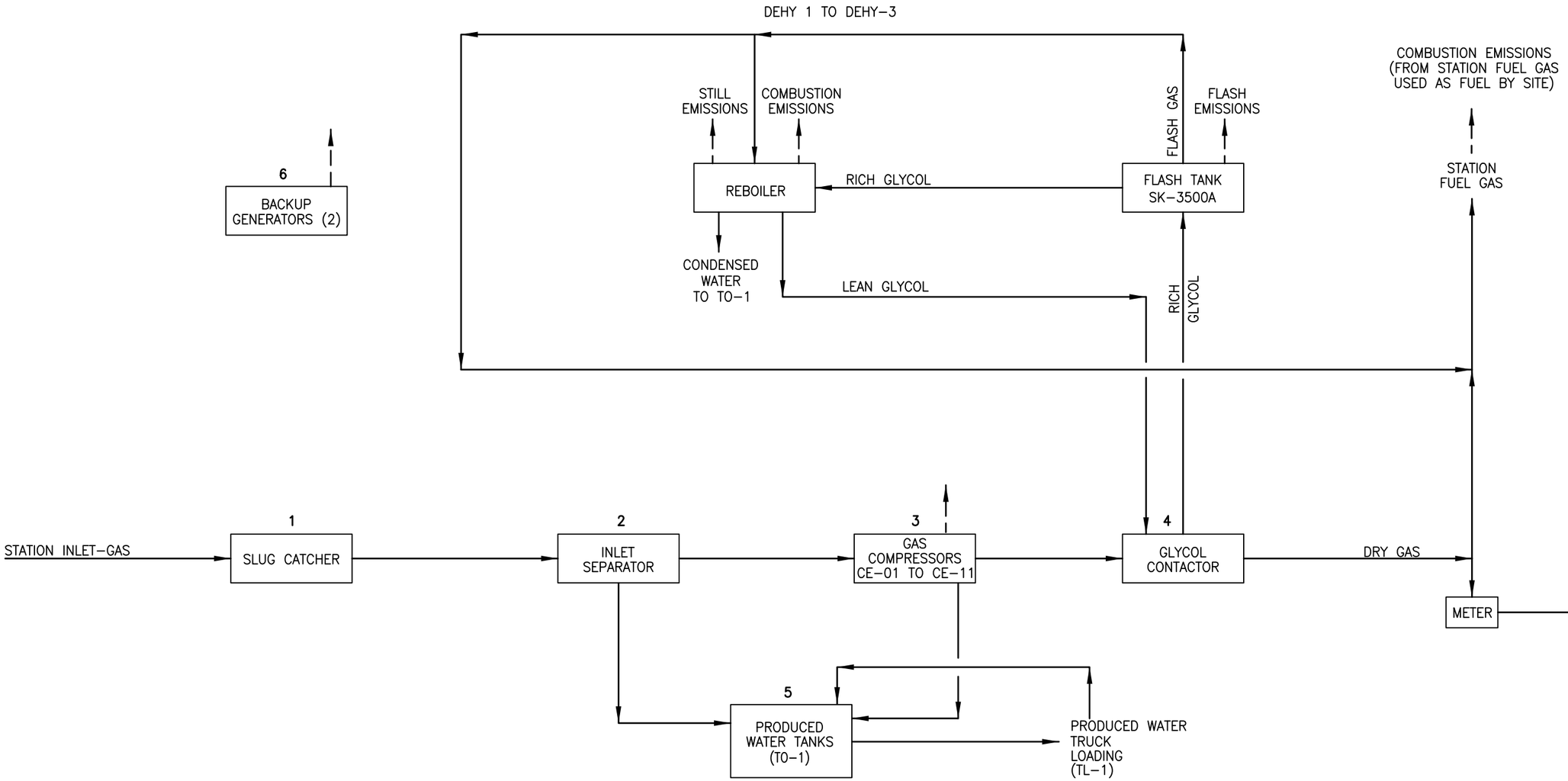
Provide a diagram or schematic that supplements the process description of the operation. The process flow diagram must show all sources, components or facets of the operation in an understandable line sequence of operation. The process flow diagram should include the emission unit ID numbers, the pollution control device ID numbers, and the emission point ID numbers consistent with references in other attachments of the application. For a proposed modification, clearly identify the process areas, emission units, emission points, and/or control devices that will be modified, and specify the nature and extent of the modification.

Use the following guidelines to ensure a complete process flow diagram:

- The process flow diagram shall logically follow the entire process from beginning to end.
- Identify each emission source and air pollution control device with proper and consistent emission unit identification numbers, emission point identification numbers, and control device identification numbers.
- The process flow lines may appear different for clarity. For example, dotted lines may be used for vapor flow and solid lines used for liquid flow and arrows for direction of flow.
- The process flow lines may be color coded. For example: new or modified equipment may be red; old or existing equipment may be blue; different stages of preparation such as raw material may be green; and, finished product or refuse, another color.

ATTACHMENT D

Process Flow Diagram



LEGEND:

— — ► AIR EMISSIONS

DRAWN BY	DJF
DATE	2/7/18
CHECKED BY	CMR
SET JOB NO.	218011–01
SET DWG FILE	CONNECTOR CS FDb01.dwg
DRAWING SCALE	N.T.S.

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

GOFF CONNECTOR, LLC

CONNECTOR COMPRESSOR STATION
HARRISON COUNTY, WEST VIRGINIA
BLOCK FLOW DIAGRAM

DRAWING NAME: FIGURE D1

REV. 0

ATTACHMENT E – PROCESS DESCRIPTION

Provide a detailed written description of the operation for which the applicant is seeking a permit. The process description is used in conjunction with the process flow diagram to provide the reviewing engineer a complete understanding of the activity at the operation. Describe in detail and order the complete process operation.

Use the following guidelines to ensure a complete Process Description:

- The process flow diagram should be prepared first and used as a guide when preparing the process description. The written description shall follow the logical order of the process flow diagram.
- All emission sources, emission points, and air pollution control devices must be included in the process description.
- When modifications are proposed, describe the modifications and the effect the changes will have on the emission sources, emission points, control devices and the potential emissions.
- Proper emission source ID numbers must be used consistently in the process description, the process flow diagram, the emissions calculations, and the emissions summary information provided.
- Include any additional information that may facilitate the reviewers understanding of the process operation.

The process description is required for all sources regardless of whether it is a construction, modification, or administrative update.

ATTACHMENT E

Project Description

Process Description
Connector Compressor Station

1. **Slug Catcher** Under normal operating conditions, inlet gas from the pipeline will flow directly to a slug catcher to remove any surges of free liquid (slugs) from the gas before compression. Liquids removed from the gas stream in this device are routed to the produced water tanks.

2. **Inlet Separator** Gas flows from the slug catcher to the inlet coalescing filter separator to remove any entrained liquids from the gas before compression. Liquids removed from the gas stream in this device are routed to the produced water tanks.

3. **Gas Compression** Gas compression will take place at Connector, each starter will be driven by natural gas from the fuel gas system. In order to perform routine maintenance on the compressors, they must be depressurized or blown down. The blowdowns for each unit are vented to the atmosphere. Each driver engine is equipped with a catalytic control unit to reduce CO and VOC emissions on the engine exhaust gases. As shown on the Process Flow Diagram, up to eleven compressors will be installed, three driven by CAT G3606 gas-fired driver engines and eight driven by CAT G3608 driver engines. Compressed gas flows through the discharge coalescing filter separator to remove any entrained liquids and/or compressor lube oil. The gas then flows to the three dehydration contactors

4. **Dehydration**. The purpose of gas dehydration is to remove water vapor from the natural gas by contacting it with tri-ethylene glycol in the contactor towers. Wet gas enters the free-water knockout at the bottom of the contactor towers. The gas ascends through a mist extractor where fine liquid particles are coalesced and removed. As the gas rises through the tower's packing, lean glycol, continually pumped to the top of the tower, is distributed and descends while absorbing the water from the gas stream. Dry gas exits the top of the absorber tower and passes through the glycol/gas heat exchanger. The gas then passes through a discharge separator where any entrained liquids are removed. Upon exiting the discharge filter, the vast majority of the gas passes through the station discharge meter and is injected into a pipeline exiting this facility. A portion of the gas is routed to the station fuel skid for use as fuel for the compressors as well as various other station equipment.

   Rich glycol from the contactor tower passes through the flash tanks where much of the entrained organic content flashes out of the glycol during a drop in pressure. After the flash tanks, the rich glycol then enters the re-boiler or still where it is heated via a natural gas-fired heater to drive off the captured water and remaining organics. The glycol is then suitable for re-use in the contactor tower. Gases from the still vent are comprised mostly of water vapor with lesser amounts of various molecular weight organic compounds. Gas that comes off the flash tanks is considered high quality and is routed directly to the re-boilers for use as fuel.

5. **Storage Tanks** Liquids in the produced water accumulation tanks will primarily be water from the dehydration units. A portion, however, will come from the inlet separator and pigging operations. These wastewater streams have flash losses. These nominal vapors are vented to the atmosphere. A maximum of 1500 BBL/month of wastewater will be routed to these tanks (up to 5 400 BBL tanks) prior to off-site disposal.

6. **Alternative Power Sources** Two backup generators are present for supplying station electrical needs in the event of a failure of local utility service. These are USEPA certified units that ares not being permitted as emergency generators. They are conservatively estimated to operate for 8,760 hours/year.

ATTACHMENT F

Plot Plan

ATTACHMENT F – PLOT PLAN

Provide an accurately scaled and detailed Plot Plan showing the locations of all emission units, emission points, and air pollution control devices. Show all emission units, affected facilities, enclosures, buildings and plant entrances and exits from the nearest public road(s) as appropriate. Note height, width and length of proposed or existing buildings and structures.

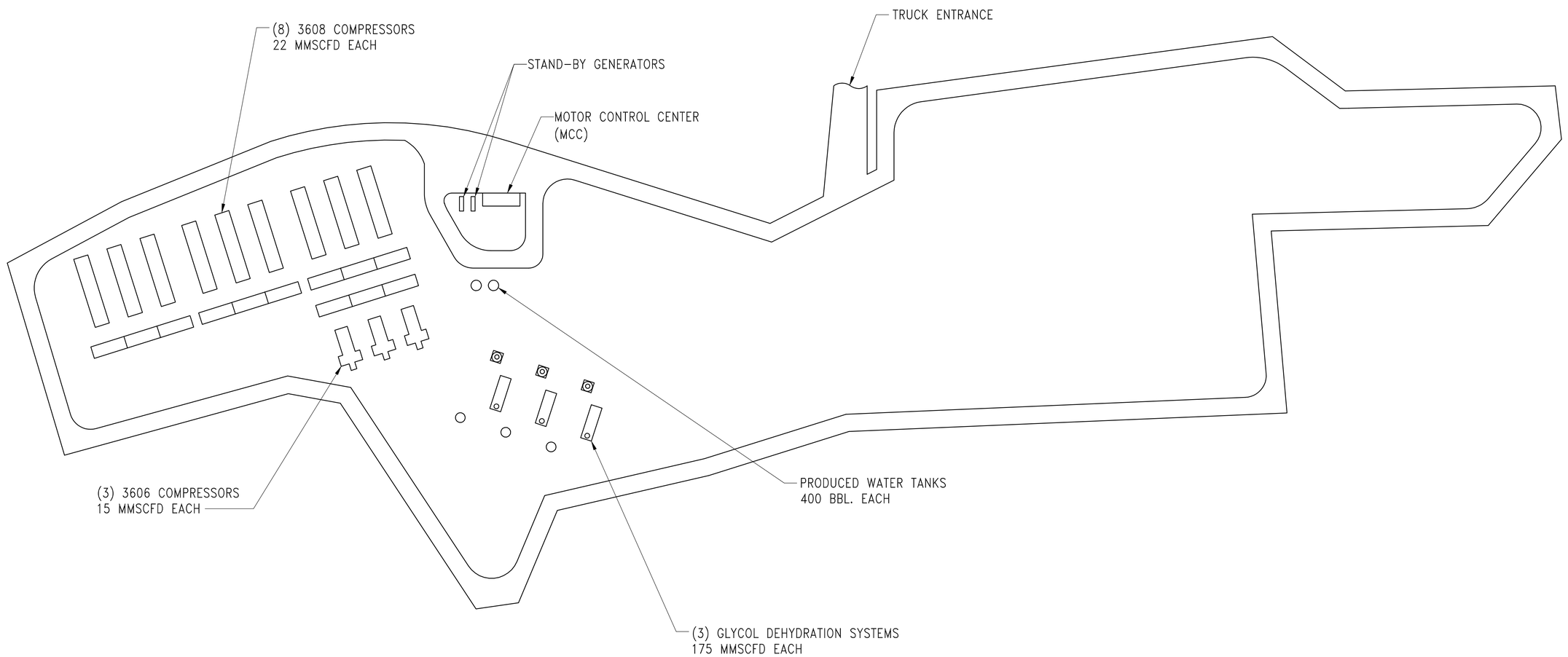
A scale between 1"=10' and 1"=200' should be used with the determining factor being the level of detail necessary to show operation or plant areas, affected facilities, emission unit sources, transfer points, etc. An overall small scale plot plan (e.g., 1"=300') should be submitted in addition to larger scale plot plans for process or activity areas (e.g., 1"=50') if the plant is too large to allow adequate detail on a single plot plan. Process or activity areas may be grouped for the enlargements as long as sufficient detail is shown.

Use the following guidelines to ensure a complete Plot Plan:

- Facility name
- Company name
- Company facility ID number (for existing facilities)
- Plot scale, north arrow, date drawn, and submittal date.
- Facility boundary lines
- Base elevation
- Lat/Long reference coordinates from the area map and corresponding reference point elevation
- Location of all point sources labeled with proper and consistent source identification numbers

This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

PLANT
NORTH



REVISIONS

REV.	DATE	DESCRIPTION	BY
A	1/19/18	ISSUED FOR REVIEW	ALM
B	1/22/18	ISSUED FOR REVIEW	SJK

DRAWN ALM	DATE 01/19/18	
CHECKED	DATE	
APPROVED	DATE	

CDMG
Part of the Stevens Family of Companies
EXPERIENCE. COMMITMENT. QUALITY.
Southpointe Industrial Park
150 Technology Drive
Canonsburg, Pennsylvania 15317

CLIENT NO.	CDMG NO.
	117221-01

CONNECTOR COMPRESSOR STATION
PERMIT PLOT PLAN

SCALE	DRAWING NO.	REV.
NONE	117221-PERMIT PLOT PLAN	B

ATTACHMENT G

Area Map

ATTACHMENT G – AREA MAP

Provide an Area Map showing the current or proposed location of the operation. On this map, identify plant or operation property lines, access roads and any adjacent dwelling, business, public building, school, church, cemetery, community or institutional building or public park within a 300' boundary circle of the collective emission units.

Please provide a 300' boundary circle on the map surrounding the proposed emission units collectively.

This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

DRAWN BY	DJF
DATE	1/31/18
CHECKED BY	CMR
SET JOB NO.	218011
SET DWG FILE	CONNECTOR CS 300 FT RADm01.dwg
DRAWING SCALE	1"=200'

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

GOFF CONNECTOR, LLC

CONNECTOR COMPRESSOR STATION
HARRISON COUNTY, WEST VIRGINIA
300' RADIUS

DRAWING NAME	REV.
FIGURE G1	0

ATTACHMENT H

G35-D Section Applicability Form

General Permit G35-D Registration
Section Applicability Form

General Permit G35-D was developed to allow qualified applicants to seek registration for a variety of sources. These sources include storage vessels, gas production units, in-line heaters, heater treaters, glycol dehydration units and associated reboilers, pneumatic controllers, centrifugal compressors, reciprocating compressors, reciprocating internal combustion engines (RICEs), tank truck loading, fugitive emissions, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

General Permit G35-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 G35-D APPLICABLE SECTIONS	
X Section 5.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☐Section 6.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)
X Section 7.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa and/or NESHAP Subpart HH
X Section 8.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
☐Section 9.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO/OOOOa)
☐Section 10.0	Centrifugal Compressor Affected Facility (NSPS, Subpart OOOO/OOOOa)[2]
X Section 11.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO/OOOOa)[2]
X Section 12.0	Reciprocating Internal Combustion Engines, Generator Engines. Microturbine Generators
X Section 13.0	Tanker Truck Loading[3]
X Section 14.0	Glycol Dehydration Units[4]
X Section 15.0	Blowdown and Pigging Operations
X Section 16.0	Fugitive Emission Components (NSPS, Subpart OOOOa)

1 *Applicants that are subject to Section 5 may also be subject to Section 6 if the applicant is subject to the NSPS, Subpart OOOO/OOOOa control requirements or the applicable control device requirements of Section 7.*

2 *Applicants that are subject to Section 10 and 11 may also be subject to the applicable RICE requirements of Section 12.*

3 *Applicants that are subject to Section 13 may also be subject to control device and emission reduction device requirements of Section 7.*

4 *Applicants that are subject to Section 14 may also be subject to the requirements of Section 8 (reboilers). Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 7.*

ATTACHMENT I

Emission Units / Emission Reduction Devices (ERD)

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 K 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]
CE-01	S01	Caterpillar G3606 Compressor Engine	NEW	2006	1,775 hp	NEW	1C	N/A
CE-02	S02	Caterpillar G3606 Compressor Engine	NEW	2002	1,775 hp	NEW	2C	N/A
CE-03	S03	Caterpillar G3606 Compressor Engine	NEW	1998	1,775 hp	NEW	3C	N/A
CE-04	S04	Caterpillar G3608 Compressor Engine	NEW	After 2011	2,500 hp	NEW	4C	N/A
CE-05	S05	Caterpillar G3608 Compressor Engine	NEW	After 2011	2,500 hp	NEW	5C	N/A
CE-06	S06	Caterpillar G3608 Compressor Engine	NEW	After 2011	2,500 hp	NEW	6C	N/A
CE-07	S07	Caterpillar G3608 Compressor Engine	NEW	After 2011	2,500 hp	NEW	7C	N/A
CE-08	S08	Caterpillar G3608 Compressor Engine	NEW	After 2011	2,500 hp	NEW	8C	N/A
CE-09	S09	Caterpillar G3608 Compressor Engine	NEW	After 2011	2,500 hp	NEW	9C	N/A
CE-10	S10	Caterpillar G3608 Compressor Engine	NEW	After 2011	2,500 hp	NEW	10C	N/A
CE-11	S11	Caterpillar G3608 Compressor Engine	NEW	After 2011	2,500 hp	NEW	11C	N/A
GE-01	S12	Generac MG300 Generator (EPA Certified)	NEW	TBD	460 hp	NEW	N/A	N/A
GE-02	S13	Generac MG300 Generator (EPA Certified)	NEW	TBD	460 hp	NEW	N/A	N/A
DEHY-1	S14	175 MMscfd Glycol Dehydration Unit	NEW	TBD	175 MMscfd	NEW	N/A	N/A
DEHY-2	S15	175 MMscfd Glycol Dehydration Unit	NEW	TBD	175 MMscfd	NEW	N/A	N/A
DEHY-3	S16	175 MMscfd Glycol Dehydration Unit	NEW	TBD	175 MMscfd	NEW	N/A	N/A
REB1	S17	Reboiler	NEW	TBD	2 MMBtu/hr	NEW	N/A	N/A
REB2	S18	Reboiler	NEW	TBD	2 MMBtu/hr	NEW	N/A	N/A
REB3	S19	Reboiler	NEW	TBD	2 MMBtu/hr	NEW	N/A	N/A
TO-1	S20	Five (5) 400-bbl Produced Water Tanks	NEW	TBD	400 bbls	NEW	N/A	N/A

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

ATTACHMENT J

Fugitive Emissions Summary 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: Equipment Leaks

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

Is the facility subject to quarterly LDAR monitoring under 40CFR60 Subpart OOOOa? ☒ Yes ☐ No. If no, why?

Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)		
					VOC	HAP	GHG (CO_2e)
Pumps	☐ Yes ☒ No	6	EPA, "Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017), 11/95	☒ Gas ☐ Liquid ☐ Both	<0.01	<0.01	3.18
Valves	☒ Yes ☐ No	400	EPA, "Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017), 11/95	☒ Gas ☐ Liquid ☐ Both	0.14	<0.01	405.23
Safety Relief Valves	☒ Yes ☐ No	180	EPA, "Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017), 11/95	☒ Gas ☐ Liquid ☐ Both	0.12	<0.01	350.47
Open Ended Lines	☒ Yes ☐ No	8	EPA, "Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017), 11/95	☒ Gas ☐ Liquid ☐ Both	<0.01	<0.01	3.51
Sampling Connections	☐ Yes ☒ No			☐ Gas ☐ Liquid ☐ Both			
Connections (Not sampling)	☒ Yes ☐ No	1,400	EPA, "Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017), 11/95	☒ Gas ☐ Liquid ☐ Both	0.02	<0.01	62.46
Compressors	☒ Yes ☐ No	11	EPA, "Subpart W – Table W-1B" EPA, "Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017), 11/95	☒ Gas ☐ Liquid ☐ Both	<0.01	<0.01	21.9
Flanges	☒ Yes ☐ No	3,000	EPA, "Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017), 11/95	☒ Gas ☐ Liquid ☐ Both	0.09	<0.01	262.85
Other[1]	☐ Yes ☒ No			☐ Gas ☐ Liquid ☐ Both			

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

Please indicate if there are any closed vent bypasses (include component):

Specify all equipment used in the closed vent system (e.g. VRU, ERD, thief hatches, tanker truck loading, etc.)

ATTACHMENT K

Storage Vessel(s) Data Sheet(s)

ATTACHMENT K – 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

1. Bulk Storage Area Name TO-1	2. Tank Name PW-1; PW-2; PW-3; PW-4; PW-5
3. Emission Unit ID number TO-1	4. Emission Point ID number 1T
5. Date Installed , Modified or Relocated *(for existing tanks)* Was the tank manufactured after August 23, 2011? ☐ Yes ☐ No	6. Type of change: ☒ New construction ☐ New stored material ☐ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)* N/A	
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.	
9A. Tank Internal Diameter (ft.)	9B. Tank Internal Height (ft.)
10A. Maximum Liquid Height (ft.)	10B. Average Liquid Height (ft.)
11A. Maximum Vapor Space Height (ft.)	11B. Average Vapor Space Height (ft.)
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume".	
13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
14. Number of tank turnovers per year	15. Maximum tank fill rate (gal/min)
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]

Vacuum Setting 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**	

[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)			
21A. Shell Color:	21B. Roof Color:	21C. Year Last Painted:	
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): **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):	24B. If yes, for cone roof, provide slop (ft/ft):	
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:			
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):	36A. Minimum (°F):	36B. Maximum (°F):	
37. Avg. operating pressure range of tank (psig):	37A. Minimum (psig):	37B. Maximum (psig):	
38A. Minimum liquid surface temperature (°F):	38B. Corresponding vapor pressure (psia):		
39A. Avg. liquid surface temperature (°F):	39B. Corresponding vapor pressure (psia):		
40A. Maximum liquid surface temperature (°F):	40B. Corresponding vapor pressure (psia):		
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:			
41B. CAS number:			
41C. Liquid density (lb/gal):			
41D. Liquid molecular weight (lb/lb-mole):			
41E. Vapor molecular weight (lb/lb-mole):			
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			

41H. Months Storage per year. From: To:			
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.			

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]
DST-1	NEW	Fresh Oil	500 gallons
DST-2	NEW	Fresh Oil	500 gallons
DST-3	NEW	Fresh Oil	500 gallons
DST-4	NEW	Fresh Oil	500 gallons
DST-5	NEW	Fresh Oil	500 gallons
DST-6	NEW	Fresh Oil	500 gallons
DST-7	NEW	Fresh Oil	500 gallons
DST-8	NEW	Fresh Oil	500 gallons
DST-9	NEW	Fresh Oil	500 gallons
DST-10	NEW	Fresh Oil	500 gallons
DST-11	NEW	Fresh Oil	500 gallons
DST-12	NEW	Fresh Oil	500 gallons
DST-13	NEW	Fresh Oil	500 gallons
DST-14	NEW	Fresh Oil	500 gallons
DST-16	NEW	Fresh Oil	500 gallons
DST-17	NEW	Fresh Oil	500 gallons
DST-18	NEW	Fresh Oil	500 gallons
DST-19	NEW	Fresh Oil	500 gallons
DST-20	NEW	Fresh Oil	500 gallons
DST-21	NEW	Fresh Oil	500 gallons
DST-22	NEW	Fresh Oil	500 gallons
DST-23	NEW	Fresh Oil	500 gallons
DST-24	NEW	Fresh Oil	500 gallons
DST-25	NEW	Fresh Oil	500 gallons
DST-26	NEW	Fresh Oil	500 gallons
DST-27	NEW	Fresh Oil	500 gallons
DST-28	NEW	Fresh Oil	500 gallons
DST-29	NEW	Fresh Oil	500 gallons
DST-30	NEW	Fresh Oil	500 gallons
DST-31	NEW	Fresh Oil	1000 gallons
DST-32	NEW	Fresh Oil	1000 gallons
DST-33	NEW	Fresh Oil	1000 gallons
DST-34	NEW	Fresh Oil	1000 gallons
DST-35	NEW	Fresh Oil	1000 gallons
DST-36	NEW	Fresh Oil	1000 gallons
DST-37	NEW	Fresh Oil	1000 gallons
DST-38	NEW	Fresh Oil	1000 gallons
DST-39	NEW	Fresh Oil	1000 gallons
DST-40	NEW	Fresh Oil	1000 gallons
DST-41	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-42	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-43	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-44	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-45	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-46	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-47	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-48	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-49	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-50	NEW	Antifreeze Tanks, Engine Glycol	500 gallons

DST-51	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-52	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-53	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-54	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-55	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-56	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-57	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-58	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-59	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-60	NEW	Antifreeze Tanks, Engine Glycol	500 gallons
DST-61	NEW	Triethylene Glycol Makeup Tanks	1000 gallons
DST-62	NEW	Triethylene Glycol Makeup Tanks	1000 gallons
DST-63	NEW	Triethylene Glycol Makeup Tanks	1000 gallons
DST-64	NEW	Methanol	350 gallons
DST-65	NEW	Methanol	350 gallons
DST-66	NEW	Methanol	350 gallons

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the compressor station. 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.

June 13, 2014

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

For: SE Technologies, LLC
Building D, Second Floor
98 Vanadium Road

Date Sampled: 05/29/14

Date Analyzed: 06/04/14

Sample: W 73 2H

FLASH LIBERATION OF SEPARATOR WATER		
	Separator	**Stock Tank**
Pressure, psig	520	0
Temperature, °F	80	70
Gas Water Ratio (1)	------	3.88
Gas Specific Gravity (2)	------	0.598
Separator Volume Factor (3)	1.000	1.000

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

Piston No.: WF-130*

Base Conditions: 14.65 PSI & 60 °F

Certified: FESCO, Ltd. Alice, Texas

David Dannhaus 361-661-7015

June 12, 2014

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

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

Sample W 73 2H
Gas Liberated from Separator Water
From 520 psig & 80 °F to 0 psig & 70 °F

Date Sampled: 05/29/14

CHROMATOGRAPH EXTENDED ANALYSIS - SUMMATION REPORT - GPA 2286

COMPONENT	MOL%	GPM
Hydrogen Sulfide*	< 0.001	
Nitrogen	0.000	
Carbon Dioxide	1.508	
Methane	93.092	
Ethane	5.060	1.346
Propane	0.298	0.082
Isobutane	0.009	0.003
n-Butane	0.023	0.007
2-2 Dimethylpropane	0.000	0.000
Isopentane	0.000	0.000
n-Pentane	0.000	0.000
Hexanes	0.000	0.000
Heptanes Plus	0.010	0.003
Totals	100.000	1.441

Computed Real Characteristics Of Heptanes Plus:

Specific Gravity	3.057	(Air=1)
Molecular Weight	88.34	
Gross Heating Value	4247	BTU/CF

Computed Real Characteristics Of Total Sample:

Specific Gravity	0.598	(Air=1)
Compressibility (Z)	0.9977	
Molecular Weight	17.28	
Gross Heating Value		
Dry Basis	1038	BTU/CF
Saturated Basis	1021	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

Analyst: MR
Processor: AL
Cylinder ID: WF# 5 S

Certified: FESCO, Ltd. - Alice, Texas
David Dannhaus

David Dannhaus 361-661-7015

FESCO, Ltd.

CHROMATOGRAPH EXTENDED ANALYSIS
TOTAL REPORT - GPA 2286

COMPONENT	MOL %	GPM	WT %
Hydrogen Sulfide*	< 0.001		< 0.001
Nitrogen	0.000		0.000
Carbon Dioxide	1.508		3.841
Methane	93.092		86.433
Ethane	5.060	1.346	8.806
Propane	0.298	0.082	0.761
Isobutane	0.009	0.003	0.030
n-Butane	0.023	0.007	0.077
2,2 Dimethylpropane	0.000	0.000	0.000
Isopentane	0.000	0.000	0.000
n-Pentane	0.000	0.000	0.000
2,2 Dimethylbutane	0.000	0.000	0.000
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.000	0.000	0.000
2 Methylpentane	0.000	0.000	0.000
3 Methylpentane	0.000	0.000	0.000
n-Hexane	0.000	0.000	0.000
Methylcyclopentane	0.000	0.000	0.000
Benzene	0.003	0.001	0.014
Cyclohexane	0.002	0.001	0.010
2-Methylhexane	0.000	0.000	0.000
3-Methylhexane	0.000	0.000	0.000
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C7's	0.000	0.000	0.000
n-Heptane	0.000	0.000	0.000
Methylcyclohexane	0.001	0.000	0.006
Toluene	0.003	0.001	0.016
Other C8's	0.000	0.000	0.000
n-Octane	0.000	0.000	0.000
Ethylbenzene	0.000	0.000	0.000
M & P Xylenes	0.001	0.000	0.006
O-Xylene	0.000	0.000	0.000
Other C9's	0.000	0.000	0.000
n-Nonane	0.000	0.000	0.000
Other C10's	0.000	0.000	0.000
n-Decane	0.000	0.000	0.000
Undecanes (11)	0.000	0.000	0.000
Totals	100.000	1.441	100.000

Computed Real Characteristics Of Total Sample:

Specific Gravity	0.598	(Air=1)
Compressibility (Z)	0.9977	
Molecular Weight	17.28	
Gross Heating Value		
Dry Basis	1038	BTU/CF
Saturated Basis	1021	BTU/CF

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

Identification

User Identification:	Goff Connector - Connector CS
City:	Fairmont
State:	West Virginia
Company:	Goff Connector LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	Five (5) 400-bbl Produced Water Tanks

Tank Dimensions

Shell Height (ft):	20.00
Diameter (ft):	12.00
Liquid Height (ft) :	19.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	16,074.56
Turnovers:	47.03
Net Throughput(gal/yr):	756,000.00
Is Tank Heated (y/n):	N

Paint Characteristics

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

Roof Characteristics

Type:	Dome
Height (ft)	1.00
Radius (ft) (Dome Roof)	6.00

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

Goff Connector - Connector CS - Vertical Fixed Roof Tank
Fairmont, 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
Produced Water	All	58.50	49.32	67.67	53.39	0.3000	0.2000	0.4000	18.0800			0.00	

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

Goff Connector - Connector CS - Vertical Fixed Roof Tank
Fairmont, West Virginia

Annual Emission Calcaulations	
Standing Losses (lb):	29.3412
Vapor Space Volume (cu ft):	1,188.0456
Vapor Density (lb/cu ft):	0.0010
Vapor Space Expansion Factor:	0.0810
Vented Vapor Saturation Factor:	0.8569
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,188.0456
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	10.5046
Tank Shell Height (ft):	20.0000
Average Liquid Height (ft):	10.0000
Roof Outage (ft):	0.5046
Roof Outage (Dome Roof)	
Roof Outage (ft):	0.5046
Dome Radius (ft):	6.0000
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0010
Vapor Molecular Weight (lb/lb-mole):	18.0800
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.3000
Daily Avg. Liquid Surface Temp. (deg. R):	518.1654
Daily Average Ambient Temp. (deg. F):	50.3083
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	513.0583
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,202.9556
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0810
Daily Vapor Temperature Range (deg. R):	36.6923
Daily Vapor Pressure Range (psia):	0.2000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.3000
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.2000
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.4000
Daily Avg. Liquid Surface Temp. (deg R):	518.1654
Daily Min. Liquid Surface Temp. (deg R):	508.9923
Daily Max. Liquid Surface Temp. (deg R):	527.3385
Daily Ambient Temp. Range (deg. R):	19.1500
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8569
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.3000
Vapor Space Outage (ft):	10.5046
Working Losses (lb):	78.5494

Vapor Molecular Weight (lb/lb-mole):	18.0800
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.3000
Annual Net Throughput (gal/yr.):	756,000.0000
Annual Turnovers:	47.0308
Turnover Factor:	0.8045
Maximum Liquid Volume (gal):	16,074.5628
Maximum Liquid Height (ft):	19.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000

Total Losses (lb):	107.8906

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

Emissions Report for: Annual

Goff Connector - Connector CS - Vertical Fixed Roof Tank
Fairmont, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Produced Water	78.55	29.34	107.89

ATTACHMENT L

Natural Gas Fired Fuel Burning Unit(s) Data Sheet

ATTACHMENT L – 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]
REB1	S17	Glycol Dehydrator Unit Reboiler	NEW	NEW	2.0	1,038
REB2	S18	Glycol Dehydrator Unit Reboiler	NEW	NEW	2.0	1,038
REB3	S19	Glycol Dehydrator Unit Reboiler	NEW	NEW	2.0	1,038

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 M

Internal Combustion Engine Data Sheet

ATTACHMENT M – INTERNAL COMBUSTION ENGINE DATA SHEET

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

Emission Unit ID#[1]	CE-01	CE-02	CE-03
Engine Manufacturer/Model	Caterpillar G3606	Caterpillar 3606	Caterpillar 3606
Manufacturers Rated bhp/rpm	1,775/1,000	1,775/1,000	1,775/1,000
Source Status[2]	NS	NS	NS
Date Installed/ Modified/Removed/Relocated[3]	TBD	TBD	TBD
Engine Manufactured /Reconstruction Date[4]	9/15/1998	10/02/2002	10/27/2006
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]	4SLB	4SLB	4SLB
APCD Type[7]	OxCat	OxCat	OxCat
Fuel Type[8]	PQ	PQ	PQ
H_2S (gr/100 scf)	0	0	0
Operating bhp/rpm	1,775/1,000	1,775/1,000	1,775/1,000
BSFC (BTU/bhp-hr)	7,609	7,609	7,609
Hourly Fuel Throughput	13,062 ft^3/hr gal/hr	13,062 ft^3/hr gal/hr	13,062 ft^3/hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	114.42 $MMft^3$/yr gal/yr	114.42 $MMft^3$/yr gal/yr	114.42 $MMft^3$/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]**
MD	NO_x	1.96	8.57	1.96	8.57	1.96	8.57
MD	CO	0.74	3.24	0.74	3.24	0.74	3.24
MD	VOC	1.18	5.15	1.18	5.15	1.18	5.15
AP	SO_2	0.01	0.04	0.01	0.04	0.01	0.04
AP	PM_{10}	0.01	0.01	0.01	0.01	0.01	0.01
MD	Formaldehyde	0.16	0.67	0.16	0.67	0.16	0.67
AP/MD	Total HAPs	0.08	0.32	0.08	0.32	0.08	0.32
AP/EPA	GHG (CO_2e)	2251	9859	2251	9859	2251	9859

ATTACHMENT M – INTERNAL COMBUSTION ENGINE DATA SHEET							
Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form.*							
Emission Unit ID#[1]		CE-04		CE-05		CE-06	
Engine Manufacturer/Model		Caterpillar G3608		Caterpillar G3608		Caterpillar G3608	
Manufacturers Rated bhp/rpm		2,500/1,000		2,500/1,000		2,500/1,000	
Source Status[2]		NS		NS		NS	
Date Installed/ Modified/Removed/Relocated[3]		TBD		TBD		TBD	
Engine Manufactured /Reconstruction Date[4]		NEW		NEW		NEW	
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]		4SLB		4SLB		4SLB	
APCD Type[7]		OxCat		OxCat		OxCat	
Fuel Type[8]		PQ		PQ		PQ	
H_2S (gr/100 scf)		0		0		0	
Operating bhp/rpm		2,500/1,000		2,500/1,000		2,500/1,000	
BSFC (BTU/bhp-hr)		7,595		7,595		7,595	
Hourly Fuel Throughput		18,358 ft^3/hr gal/hr		18,358 ft^3/hr gal/hr		18,358 ft^3/hr gal/hr	
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)		160.82 $MMft^3$/yr gal/yr		160.82 $MMft^3$/yr gal/yr		160.82 $MMft^3$/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]**
MD	NO_x	1.66	7.25	1.66	7.25	1.66	7.25
MD	CO	0.94	4.09	0.94	4.09	0.94	4.09
MD	VOC	1.11	4.83	1.11	4.83	1.11	4.83
AP	SO_2	0.01	0.05	0.01	0.05	0.01	0.05
AP	PM_{10}	0.01	0.01	0.01	0.01	0.01	0.01
MD	Formaldehyde	0.14	0.58	0.14	0.58	0.14	0.58
AP/MD	Total HAPs	0.08	0.35	0.08	0.35	0.08	0.35
AP/EPA	GHG (CO_2e)	2895	12679	2895	12679	2895	12679

ATTACHMENT M – INTERNAL COMBUSTION ENGINE DATA SHEET

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

Emission Unit ID#[1]	CE-07	CE-08	CE-09
Engine Manufacturer/Model	Caterpillar G3608	Caterpillar G3608	Caterpillar G3608
Manufacturers Rated bhp/rpm	2,500/1,000	2,500/1,000	2,500/1,000
Source Status[2]	NS	NS	NS
Date Installed/ Modified/Removed/Relocated[3]	TBD	TBD	TBD
Engine Manufactured /Reconstruction Date[4]	NEW	NEW	NEW
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]	4SLB	4SLB	4SLB
APCD Type[7]	OxCat	OxCat	OxCat
Fuel Type[8]	PQ	PQ	PQ
H_2S (gr/100 scf)	0	0	0
Operating bhp/rpm	2,500/1,000	2,500/1,000	2,500/1,000
BSFC (BTU/bhp-hr)	7,595	7,595	7,595
Hourly Fuel Throughput	18,358 ft^3/hr gal/hr	18,358 ft^3/hr gal/hr	18,358 ft^3/hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	160.82 $MMft^3$/yr gal/yr	160.82 $MMft^3$/yr gal/yr	160.82 $MMft^3$/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]
MD	NO_x	1.66	7.25	1.66	7.25	1.66	7.25
MD	CO	0.94	4.09	0.94	4.09	0.94	4.09
MD	VOC	1.11	4.83	1.11	4.83	1.11	4.83
AP	SO_2	0.01	0.05	0.01	0.05	0.01	0.05
AP	PM_{10}	0.01	0.01	0.01	0.01	0.01	0.01
MD	Formaldehyde	0.14	0.58	0.14	0.58	0.14	0.58
AP/MD	Total HAPs	0.08	0.35	0.08	0.35	0.08	0.35
AP/EPA	GHG (CO_2e)	2895	12679	2895	12679	2895	12679

ATTACHMENT M – INTERNAL COMBUSTION ENGINE DATA SHEET

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

Emission Unit ID#[1]	CE-10	CE-11	GE-01
Engine Manufacturer/Model	Caterpillar G3608	Caterpillar G3608	Generac MG300
Manufacturers Rated bhp/rpm	2,500/1,000	2,500/1,000	460 / 1,800
Source Status[2]	NS	NS	NS
Date Installed/ Modified/Removed/Relocated[3]	TBD	TBD	TBD
Engine Manufactured /Reconstruction Date[4]	NEW	NEW	NEW
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]	4SLB	4SLB	4SLB
APCD Type[7]	OxCat	OxCat	NSCR
Fuel Type[8]	PQ	PQ	PQ
H_2S (gr/100 scf)	0	0	0
Operating bhp/rpm	2,500/1,000	2,500/1,000	460
BSFC (BTU/bhp-hr)	7,595	7,595	7,000
Hourly Fuel Throughput	18,358 ft^3/hr gal/hr	18,358 ft^3/hr gal/hr	3,114 ft^3/hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	160.82 $MMft^3$/yr gal/yr	160.82 $MMft^3$/yr gal/yr	27.28 $MMft^3$/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]**
MD	NO_x	1.66	7.25	1.66	7.25	0.03	0.14
MD	CO	0.94	4.09	0.94	4.09	0.18	0.76
AP	VOC	1.11	4.83	1.11	4.83	0.38	1.67
AP	SO_2	0.01	0.05	0.01	0.05	<0.01	<0.01
AP	PM_{10}	0.01	0.01	0.01	0.01	<0.01	<0.01
AP/MD	Formaldehyde	0.14	0.58	0.14	0.58	0.17	0.75
AP/MD	Total HAPs	0.08	0.35	0.08	0.35	0.23	1.0
AP/EPA	GHG (CO_2e)	2895	12679	2895	12679	455	2015

ATTACHMENT M – 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]	GE-02		
Engine Manufacturer/Model	Generac MG300		
Manufacturers Rated bhp/rpm	460 / 1,800		
Source Status[2]	NS		
Date Installed/ Modified/Removed/Relocated[3]	TBD		
Engine Manufactured /Reconstruction Date[4]	NEW		
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]	4SLB		
APCD Type[7]	NSCR		
Fuel Type[8]	PQ		
H_2S (gr/100 scf)	0		
Operating bhp/rpm	460		
BSFC (BTU/bhp-hr)	7,000		
Hourly Fuel Throughput	3,114 ft^3/hr gal/hr	ft^3/hr gal/hr	ft^3/hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	27.28 $MMft^3$/yr gal/yr	$MMft^3$/yr gal/yr	$MMft^3$/yr gal/yr
Fuel Usage or Hours of Operation Metered	Yes ☒ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

Calculation Methodology[9]	**Pollutant[10]**	**Hourly PTE (lb/hr) [11]**	**Annual PTE (tons/year) [11]**	**Hourly PTE (lb/hr) [11]**	**Annual PTE (tons/year) [11]**	**Hourly PTE (lb/hr) [11]**	**Annual PTE (tons/year) [11]**
MD	NO_x	0.03	0.14				
MD	CO	0.18	0.76				
MD	VOC	0.03	0.14				
AP	SO_2	<0.01	<0.01				
AP	PM_{10}	<0.01	<0.01				
AP	Formaldehyde	0.03	0.14				
AP	Total HAPs	0.08	0.35				
AP/EPA	GHG (CO_2e)	455	2015				

***Note – Formaldehyde emissions are based of AP-42 for units GE-01 and GE-02. However, per the manufacturer's data sheet, the emission factor for these USEPA-certified generators for total hydrocarbons (THC) is 0.03 g/bhp-hr. Because methane and formaldehyde are not speciated, emission factors from AP-42 were utilized; thus, providing a significant overestimate to formaldehyde emissions.**

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

2 Enter the Source Status using the following codes:

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

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

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

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

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

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

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

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

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

8 Enter the Fuel Type using the following codes:

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

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

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

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

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

Engine Air Pollution Control Device
(Emission Unit ID# 1S-2S, use extra pages as necessary)

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

☐ NSCR ☐ SCR ☒ Oxidation Catalyst

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

Manufacturer: EmeraChem	Model #: EC-OX-PX-SQ-1500-3600-3500
Design Operating Temperature: 1,250 ºF	Design gas volume: 4,715 scfm
Service life of catalyst: 3	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: 11,850 acfm at 797 ºF	Operating temperature range for NSCR/Ox Cat: From 750 ºF to 1,250 ºF
Reducing agent used, if any:	Ammonia slip (ppm):

Pressure drop against catalyst bed (delta P): 12.0 (maximum) inches of H_2O

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions: There is a catalyst inlet temperature sensor. If the temperature exceeds a level set by the manufacturer (1,250ºF), the engine shuts down.

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)?

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,

Engine Air Pollution Control Device
(Emission Unit ID# 3S, use extra pages as necessary)

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

☐ NSCR ☐ SCR ☒ Oxidation Catalyst

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

Manufacturer: EmeraChem	Model #: EC-OX-PX-SQ-1500-3600-3500
Design Operating Temperature: 1,250 ºF	Design gas volume: 4,715 scfm
Service life of catalyst: 3	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: 11,850 acfm at 797 ºF	Operating temperature range for NSCR/Ox Cat: From 750 ºF to 1,250 ºF
Reducing agent used, if any:	Ammonia slip (ppm):

Pressure drop against catalyst bed (delta P): 12.0 (maximum) inches of H_2O

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions: There is a catalyst inlet temperature sensor. If the temperature exceeds a level set by the manufacturer (1,250ºF), the engine shuts down.

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)?

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, This engine was manufactured on October 27, 2006 and falls in the NSPS/NESHAP window.

Engine Air Pollution Control Device
(Emission Unit ID# 4S-11S, use extra pages as necessary)

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

☐ NSCR ☐ SCR ☒ Oxidation Catalyst

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

Manufacturer: EmeraChem	Model #: EC-OX-PX-SQ-1500-3600-3500
Design Operating Temperature: 1,250 ºF	Design gas volume: 6,255 scfm
Service life of catalyst: 3	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: 15,554 acfm at 783 ºF	Operating temperature range for NSCR/Ox Cat: From 750 ºF to 1,250 ºF
Reducing agent used, if any:	Ammonia slip (ppm):

Pressure drop against catalyst bed (delta P): 12.0 (maximum) inches of H_2O

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions: There is a catalyst inlet temperature sensor. If the temperature exceeds a level set by the manufacturer (1,250ºF), the engine shuts down.

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)?

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,

CDM Resource Management LLC

Date: 01/09/2018

Re: Engine Pedigree

Unit # 0030

In order to better assist your company with any of its state and federal permitting needs, CDM Resource Management LLC submits the following information in regards to the engine of the above referenced compressor package. This letter should provide the information necessary to answer any questions pertaining to, but not limited to, the NSPS for SI-RICE, Subpart JJJJ. This information is current as of above date.

Engine Make:	Caterpillar
Engine Model:	3606
Engine Serial Number:	3XF00189
Engine Type:	4SLB
Engine Category:	Existing
Engine Subcategory:	Non Certified
Engine NSPS Status:	Exempt
Engine Speed:	1000
Rated HP:	1775
Engine Manufacture Date:	9/15/1998

CDM Resource Management LLC

Date: 01/09/2018

Re: Engine Pedigree

Unit # 0153

In order to better assist your company with any of its state and federal permitting needs, CDM Resource Management LLC submits the following information in regards to the engine of the above referenced compressor package. This letter should provide the information necessary to answer any questions pertaining to, but not limited to, the NSPS for SI-RICE, Subpart JJJJ. This information is current as of above date.

Engine Make:	Caterpillar
Engine Model:	3606
Engine Serial Number:	4ZS00305
Engine Type:	4SLB
Engine Category:	Existing
Engine Subcategory:	Non Certified
Engine NSPS Status:	Exempt
Engine Speed:	1000
Rated HP:	1775
Engine Manufacture Date:	10/02/2002

CDM Resource Management LLC

Date: 01/09/2018

Re: Engine Pedigree

Unit # 0586

In order to better assist your company with any of its state and federal permitting needs, CDM Resource Management LLC submits the following information in regards to the engine of the above referenced compressor package. This letter should provide the information necessary to answer any questions pertaining to, but not limited to, the NSPS for SI-RICE, Subpart JJJJ. This information is current as of above date.

Engine Make:	Caterpillar
Engine Model:	3606
Engine Serial Number:	4ZS00703
Engine Type:	4SLB
Engine Category:	New
Engine Subcategory:	Non Certified
Engine NSPS Status:	Exempt
Engine Speed:	1000
Rated HP:	1775
Engine Manufacture Date:	10/27/2006

G3606

NON-CURRENT

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	9.2	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	GAV
AFTERCOOLER WATER INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
JACKET WATER OUTLET (°F):	190	**SITE CONDITIONS:**	
ASPIRATION:	TA	FUEL:	Fullstream Energy Harrison Co WV
COOLING SYSTEM:	JW, OC+AC	FUEL PRESSURE RANGE(psig):	42.8-47.0
CONTROL SYSTEM:	CIS/ADEM3	FUEL METHANE NUMBER:	89.3
EXHAUST MANIFOLD:	DRY	FUEL LHV (Btu/scf):	936
COMBUSTION:	LOW EMISSION	ALTITUDE(ft):	1500
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	MAXIMUM INLET AIR TEMPERATURE(°F):	100
		STANDARD RATED POWER:	1775 bhp@1000rpm

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(1)	bhp	1775	1775	1331	888
INLET AIR TEMPERATURE			°F	100	100	100	100
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(2)	Btu/bhp-hr	6860	6860	7102	7619
FUEL CONSUMPTION (HHV)		(2)	Btu/bhp-hr	7609	7609	7877	8451
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3)(4)	ft3/min	4921	4921	3806	2564
AIR FLOW	(WET)	(3)(4)	lb/hr	20924	20924	16181	10900
FUEL FLOW (60ºF, 14.7 psia)			scfm	217	217	168	120
INLET MANIFOLD PRESSURE		(5)	in Hg(abs)	74.3	74.3	57.9	41.2
EXHAUST TEMPERATURE - ENGINE OUTLET		(6)	°F	847	847	870	937
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(7)(4)	ft3/min	12211	12211	9611	6820
EXHAUST GAS MASS FLOW	(WET)	(7)(4)	lb/hr	21495	21495	16624	11217
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(8)(9)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(8)(9)	g/bhp-hr	2.74	2.74	2.74	2.74
THC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	6.30	6.30	6.51	6.77
NMHC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	0.94	0.94	0.98	1.02
NMNEHC (VOCs) (mol. wt. of 15.84)		(8)(9)(10)	g/bhp-hr	0.63	0.63	0.65	0.68
HCHO (Formaldehyde)		(8)(9)	g/bhp-hr	0.26	0.26	0.28	0.31
CO2		(8)(9)	g/bhp-hr	441	441	460	494
EXHAUST OXYGEN		(8)(11)	% DRY	12.8	12.8	12.1	11.1
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(12)	Btu/min	18753	18753	15596	13026
HEAT REJ. TO ATMOSPHERE		(12)	Btu/min	7103	7103	6619	6199
HEAT REJ. TO LUBE OIL (OC)		(12)	Btu/min	9132	9132	8667	8453
HEAT REJ. TO AFTERCOOLER (AC)		(12)(13)	Btu/min	17646	17646	9609	1869

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW)	(13)	Btu/min	20628
TOTAL AFTERCOOLER CIRCUIT (OC+AC)	(13)(14)	Btu/min	29487
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

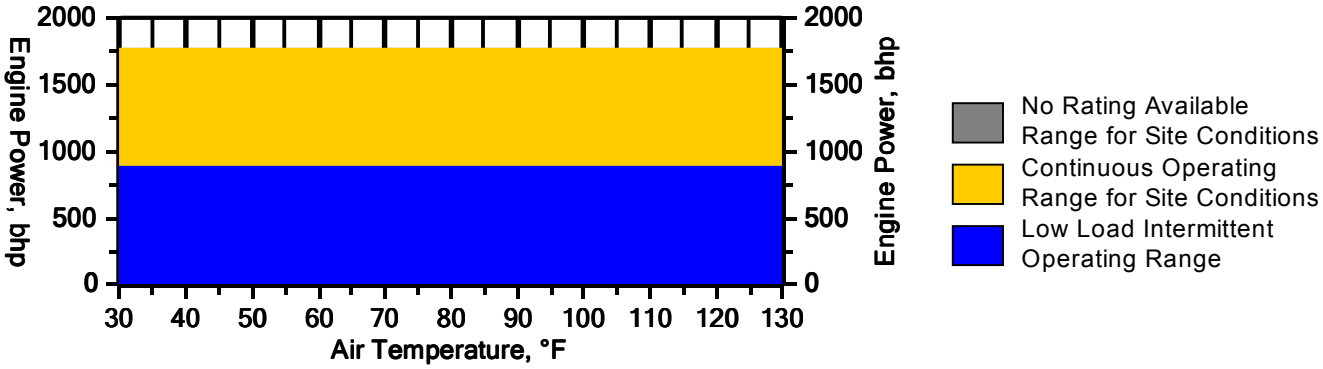
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature 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:
Data generated by Gas Engine Rating Pro Version 6.06.00
Ref. Data Set DM8605-07-001, 4ZS, Printed 15Nov2017

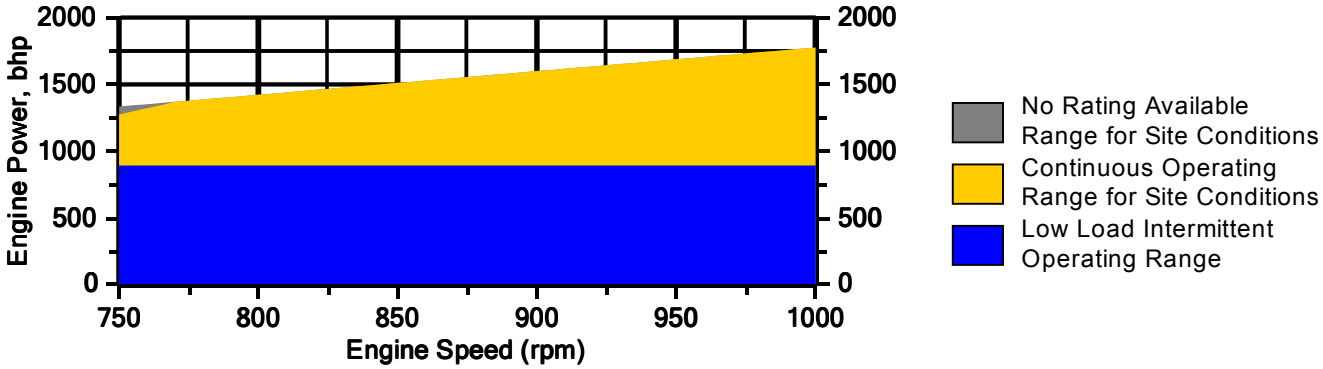
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1500 ft and 1000 rpm



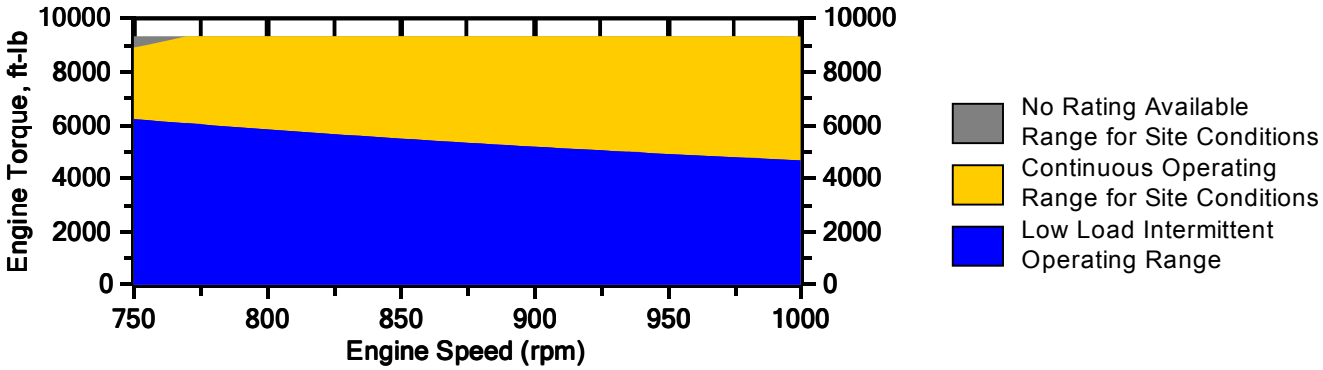
Engine Power vs. Engine Speed

Data represents speed sweep at 1500 ft and 100 ºF



Engine Torque vs. Engine Speed

Data represents speed sweep at 1500 ft and 100 ºF



Note: At site conditions of 1500 ft and 100°F inlet air temp., constant torque can be maintained down to 770 rpm. The minimum speed for loading at these conditions is 750 rpm.

NOTES

1. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.

2. Fuel consumption tolerance is ± 2.5% of full load data.

3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.

4. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.

5. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.

6. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.

7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.

8. Emissions data is at engine exhaust flange prior to any after treatment.

9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

10. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ

11. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.

12. Heat rejection values are nominal. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for radiation, ± 20% for lube oil circuit, and ± 5% for aftercooler circuit.

13. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.

14. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	95.8791	95.8791
Ethane	C2H6	3.4142	3.4142
Propane	C3H8	0.2210	0.2210
Isobutane	iso-C4H1O	0.0133	0.0133
Norbutane	nor-C4H1O	0.0198	0.0198
Isopentane	iso-C5H12	0.0038	0.0038
Norpentane	nor-C5H12	0.0022	0.0022
Hexane	C6H14	0.0026	0.0026
Heptane	C7H16	0.0016	0.0016
Nitrogen	N2	0.2624	0.2624
Carbon Dioxide	CO2	0.1770	0.1770
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0020	0.0020
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0006	0.0006
Octane	C8H18	0.0004	0.0004
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup:	Fullstream Energy
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	89.3
Lower Heating Value (Btu/scf):	936
Higher Heating Value (Btu/scf):	1038
WOBBE Index (Btu/scf):	1233
THC: Free Inert Ratio:	230.53
Total % Inerts (% N2, CO2, He):	0.44%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.77
Stoich A/F Ratio (Mass/Mass):	16.96
Specific Gravity (Relative to Air):	0.576
Fuel Specific Heat Ratio (K):	1.310

CONDITIONS AND DEFINITIONS

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

FUEL LIQUIDS

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

EmeraChem IC Engine Catalyst Sizing

Quote Reference Number: 180110-CDM-G3606 unit 0030

Customer & Project Information

Date:	1/10/2018
Customer Name:	CDM
Project Name:	Unit 0030
Application Engineer:	Kevan Riebschlaeger

Engine Operating Data

Engine Make	Caterpillar	
Engine Model	G3606	
Fuel Type	NG	
Engine Horsepower	1775	bhp
Engine Speed	1,000	rpm
Operating Hours	8760	hr/year
Combustion Cycle - 2 vs 4 cycle	4	
Lean Burn / Rich Burn	lean	

Engine Exhaust Flow Rate

Engine Exhaust Temperature	847	F
Catalyst Operating Temperature	797	F
Exhaust Gas Flow Rate	282,868	scfh
Exhaust Gas Flow Rate	11,850	acfm
Exhaust Gas Flow Rate	21,495	lb/hr
Exhaust Gas Oxygen Concentration	12.8%	
Exhaust Gas Water Concentration	12.0%	

Engine Uncontrolled Emissions

	NOx	CO	NMNEHC	CH2O
g/bhp-hr		2.74	0.89	0.26
g/MW-hr		3,674		
g/hr		4,864	1,580	462
lb/hr		10.72	3.48	1.02
tons/year		46.96	15.25	4.46
MW		28.00	15.84	30.00
scfh		145	83	13
mg/m3		607	197	58
ppmv (wet; actual O2)		513	295	45
ppmv (dry; actual O2)		583	335	52
ppmv (dry; 15% O2)		425	244	38

Engine NMNEHC measured as Methane.

Note:
1) NMNEHC values referenced here include formaldehyde. If the engine emissions data sheet used as a source for this quote excludes formaldehyde in the NMNEHC calculation, the two values must be combined before entry into the performance requirements definition in this tool.

2) The propane concentration is assumed to be less than 15% of the total volume of NMNEHC (including aldehydes) in the exhaust gas. If the concentration of propane is expected to be higher than this value, a

Emissions Requirement

	NOx	CO	NMNEHC	CH2O
g/bhp-hr		0.19	0.3	0.039
g/MW-hr				
g/hr		337	533	69
lb/hr		0.74	1.17	0.15
tons/year		3.26	5.14	0.67
MW		28.00	15.84	30.00
scfh		10	28	2
mg/m3		42	66	9
ppmv (wet; actual O2)		36	99	7
ppmv (dry; actual O2)		40	113	8
ppmv (dry; 15% O2)		29	82	6

Stack NMNEHC measured as Methane.

Catalyst DRE (%)

	NOx	CO	NMNEHC	CH2O	
DRE Required to Meet Emissions Limit		93.1	66.3	85.0	
DRE Guarantee		93.1	66.3	85.0	96,381
DRE Expected - Uncontaminated, Optimal Tuning		99.5	89.7	95.4	
g/bhp-hr Expected - Uncontaminated, Optimal Tuning		0.01	0.09	0.01	

CUSTOMER ALERT - Expected Performance is contingent upon conformance with EmeraChem's technical bulletin: EC-EN-108a - Achieving Ultra-High Emission Performance on Internal Combustion

Catalyst Information

Catalyst Part Number:	EC-OX-PX-SQ-1500-3600-3500	
Catalyst Type:	Performax Oxidation	
Warranty (years)	3	
Catalyst Formulation	Performax	
New Install or Replacement	Replacement	
Catalyst Shape	Rectangle	
Number of Catalyst Elements	3	
Modifications	Without Bonnet	
CPSI	300	
Foil Depth	3.5	inches
Width	15.000	inches
Length	36.000	inches
Catalyst Volume	3.28	ft3 (total)
Space Velocity	96,381	1/hr
Catalyst Weight	224.6	lb
Maximum Catalyst Pressure Drop	12.0	in. H2O
Catalyst Design Pressure Drop	2.4	in. H2O

Housing and Silencer Information

Housing Supplier:	Other
Silencer Part Number	
Silencer Attenuation	
Inlet Flange Size	
Outlet Flange Size	
Material	
Housing Orientation	
Inlet/Outlet Orientation	0.0
Side Inlet Clocking Position	
Catalyst Clocking Position	
Side Outlet Clocking Position	
Maximum System Pressure Drop	12.0
Total System Pressure Drop	0.0
Housing Modifications	

Comments:

Ask us how EmeraChem can save you 30% in oil change costs.

G3608

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	7.6	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	GAV
AFTERCOOLER - STAGE 2 INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 1 INLET (°F):	174	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	190	FUEL:	Fullstream Energy Harrison Co WV
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	58.0-70.3
COOLING SYSTEM:	JW+1AC, OC+2AC	FUEL METHANE NUMBER:	89.3
CONTROL SYSTEM:	ADEM4	FUEL LHV (Btu/scf):	936
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	1500
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	100
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.3	STANDARD RATED POWER:	2500 bhp@1000rpm
SET POINT TIMING:	18		

			MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING	**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER (WITHOUT FAN)	(2)	bhp	2500	2500	1875	1250
INLET AIR TEMPERATURE		°F	100	100	100	100
ENGINE DATA						
FUEL CONSUMPTION (LHV)	(3)	Btu/bhp-hr	6848	6848	7075	7573
FUEL CONSUMPTION (HHV)	(3)	Btu/bhp-hr	7595	7595	7847	8400
AIR FLOW (@inlet air temp, 14.7 psia) (WET)	(4)(5)	ft3/min	6520	6520	4941	3359
AIR FLOW (WET)	(4)(5)	lb/hr	27720	27720	21007	14282
FUEL FLOW (60ºF, 14.7 psia)		scfm	305	305	236	169
INLET MANIFOLD PRESSURE	(6)	in Hg(abs)	104.4	104.4	78.9	55.1
EXHAUST TEMPERATURE - ENGINE OUTLET	(7)	°F	833	833	876	941
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia) (WET)	(8)(5)	ft3/min	16057	16057	12591	8998
EXHAUST GAS MASS FLOW (WET)	(8)(5)	lb/hr	28520	28520	21626	14724
EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)	(9)(10)	g/bhp-hr	0.30	0.30	0.30	0.30
CO	(9)(10)	g/bhp-hr	2.49	2.49	2.49	2.50
THC (mol. wt. of 15.84)	(9)(10)	g/bhp-hr	4.41	4.41	4.68	4.75
NMHC (mol. wt. of 15.84)	(9)(10)	g/bhp-hr	0.41	0.41	0.43	0.44
NMNEHC (VOCs) (mol. wt. of 15.84)	(9)(10)(11)	g/bhp-hr	0.27	0.27	0.29	0.30
HCHO (Formaldehyde)	(9)(10)	g/bhp-hr	0.16	0.16	0.17	0.20
CO2	(9)(10)	g/bhp-hr	425	425	441	469
EXHAUST OXYGEN	(9)(12)	% DRY	11.3	11.3	11.1	10.7
HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(13)	Btu/min	27700	27700	23042	18866
HEAT REJ. TO ATMOSPHERE	(13)	Btu/min	11217	11217	11144	10451
HEAT REJ. TO LUBE OIL (OC)	(13)	Btu/min	12553	12553	11937	10885
HEAT REJ. TO A/C - STAGE 1 (1AC)	(13)(14)	Btu/min	24029	24029	11985	3189
HEAT REJ. TO A/C - STAGE 2 (2AC)	(13)(14)	Btu/min	8471	8471	5377	2739

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+1AC)	(14)(15)	Btu/min	55700
TOTAL STAGE 2 AFTERCOOLER CIRCUIT (OC+2AC)	(14)(15)	Btu/min	23958
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

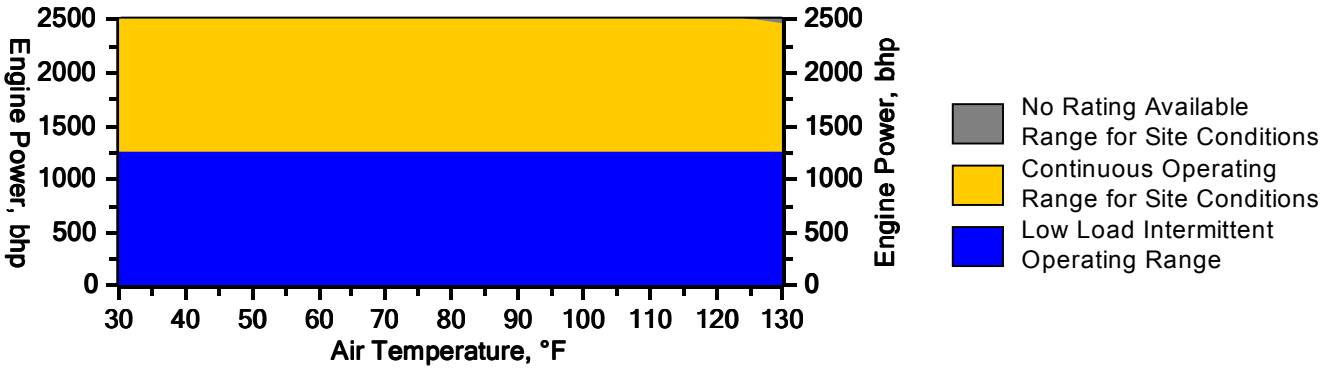
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature 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:
Data generated by Gas Engine Rating Pro Version 6.06.00
Ref. Data Set EM1410-04-001, Printed 15Nov2017

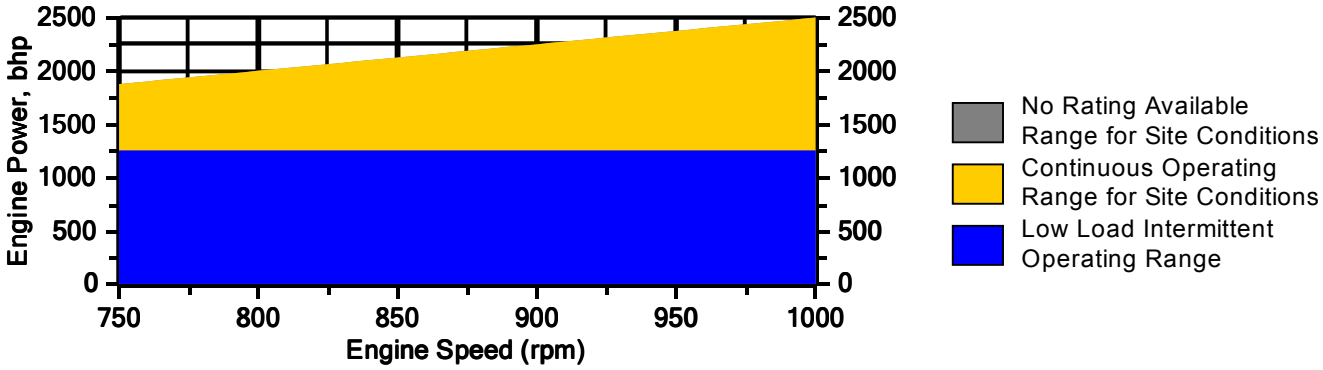
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1500 ft and 1000 rpm



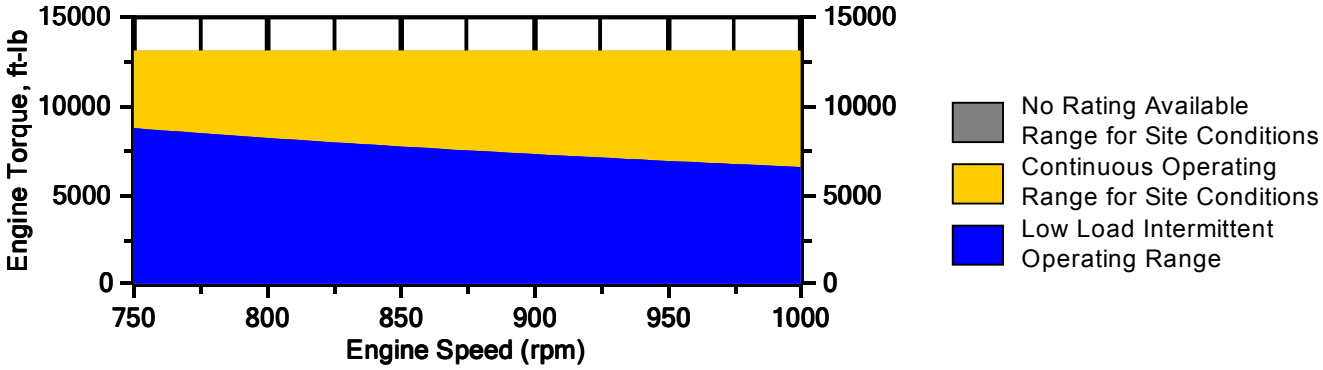
Engine Power vs. Engine Speed

Data represents speed sweep at 1500 ft and 100 ºF



Engine Torque vs. Engine Speed

Data represents speed sweep at 1500 ft and 100 ºF



Note: At site conditions of 1500 ft and 100°F inlet air temp., constant torque can be maintained down to 750 rpm. The minimum speed for loading at these conditions is 750 rpm.

NOTES

1. Fuel pressure range specified is to the engine gas shutoff valve (GSOV). Additional fuel train components should be considered in pressure and flow calculations.

2. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.

3. Fuel consumption tolerance is ± 2.5% of full load data.

4. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.

5. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.

6. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.

7. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.

8. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.

9. Emissions data is at engine exhaust flange prior to any after treatment.

10. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate the maximum values expected under steady state conditions. Fuel methane number cannot vary more than ± 3. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

11. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ

12. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.

13. Heat rejection values are nominal. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for radiation, ± 20% for lube oil circuit, and ± 5% for aftercooler circuit.

14. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.

15. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	95.8791	95.8791
Ethane	C2H6	3.4142	3.4142
Propane	C3H8	0.2210	0.2210
Isobutane	iso-C4H1O	0.0133	0.0133
Norbutane	nor-C4H1O	0.0198	0.0198
Isopentane	iso-C5H12	0.0038	0.0038
Norpentane	nor-C5H12	0.0022	0.0022
Hexane	C6H14	0.0026	0.0026
Heptane	C7H16	0.0016	0.0016
Nitrogen	N2	0.2624	0.2624
Carbon Dioxide	CO2	0.1770	0.1770
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0020	0.0020
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0006	0.0006
Octane	C8H18	0.0004	0.0004
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup:	Fullstream Energy
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	89.3
Lower Heating Value (Btu/scf):	936
Higher Heating Value (Btu/scf):	1038
WOBBE Index (Btu/scf):	1233
THC: Free Inert Ratio:	230.53
Total % Inerts (% N2, CO2, He):	0.44%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.77
Stoich A/F Ratio (Mass/Mass):	16.96
Specific Gravity (Relative to Air):	0.576
Fuel Specific Heat Ratio (K):	1.310

CONDITIONS AND DEFINITIONS

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

FUEL LIQUIDS

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

EmeraChem IC Engine Catalyst Sizing

Quote Reference Number: 180125-CDM-G3608A4 4 elem R1

Customer & Project Information

Date:	1/25/2018
Customer Name:	CDM
Project Name:	3608A4
Application Engineer:	Kevan Riebschlaeger

Engine Operating Data

Engine Make	Caterpillar	
Engine Model	G3608A4	
Fuel Type	NG	
Engine Horsepower	2500	bhp
Engine Speed	1,000	rpm
Operating Hours	8760	hr/year
Combustion Cycle - 2 vs 4 cycle	4	
Lean Burn / Rich Burn	lean	

Engine Exhaust Flow Rate

Engine Exhaust Temperature	833	F
Catalyst Operating Temperature	783	F
Exhaust Gas Flow Rate	375,315	scfh
Exhaust Gas Flow Rate	15,554	acfm
Exhaust Gas Flow Rate	28,520	lb/hr
Exhaust Gas Oxygen Concentration	11.3%	
Exhaust Gas Water Concentration	12.0%	

Engine Uncontrolled Emissions

	NOx	CO	NMNEHC	CH2O
g/bhp-hr		2.49	0.43	0.16
g/MW-hr		3,339		
g/hr		6,225	1,075	400
lb/hr		13.72	2.37	0.88
tons/year		60.11	10.38	3.86
MW		28.00	15.84	30.00
scfh		186	57	11
mg/m3		586	101	38
ppmv (wet; actual O2)		495	151	30
ppmv (dry; actual O2)		562	172	34
ppmv (dry; 15% O2)		346	106	21

Engine NMNEHC measured as Methane.

Note:
1) NMNEHC values referenced here include formaldehyde. If the engine emissions data sheet used as a source for this quote excludes formaldehyde in the NMNEHC calculation, the two values must be combined before entry into the performance requirements definition in this tool.

2) The propane concentration is assumed to be less than 15% of the total volume of NMNEHC (including aldehydes) in the exhaust gas. If the concentration of propane is expected to be higher than this value, a

Emissions Requirement

	NOx	CO	NMNEHC	CH2O
g/bhp-hr		0.17	0.2	0.024
g/MW-hr				
g/hr		425	500	60
lb/hr		0.94	1.10	0.13
tons/year		4.10	4.83	0.58
MW		28.00	15.84	30.00
scfh		13	26	2
mg/m3		40	47	6
ppmv (wet; actual O2)		34	70	4
ppmv (dry; actual O2)		38	80	5
ppmv (dry; 15% O2)		24	49	3

Stack NMNEHC measured as Methane.

Catalyst DRE (%)

	NOx	CO	NMNEHC	CH2O	
DRE Required to Meet Emissions Limit		93.2	53.5	85.0	
DRE Guarantee		93.2	53.5	85.0	95,910
DRE Expected - Uncontaminated, Optimal Tuning		99.5	89.4	95.2	
g/bhp-hr Expected - Uncontaminated, Optimal Tuning		0.012	0.045	0.008	

CUSTOMER ALERT - Expected Performance is contingent upon conformance with EmeraChem's technical bulletin: EC-EN-108a - Achieving Ultra-High Emission Performance on Internal Combustion

Catalyst Information

Catalyst Part Number:	EC-OX-PX-SQ-1500-3600-3500	
Catalyst Type:	Performax Oxidation	
Warranty (years)	3	
Catalyst Formulation	Performax	
New Install or Replacement	Replacement	
Catalyst Shape	Rectangle	
Number of Catalyst Elements	4	
Modifications	Without Bonnet	
CPSI	300	
Foil Depth	3.5	inches
Width	15.000	inches
Length	36.000	inches
Catalyst Volume	4.38	ft3 (total)
Space Velocity	95,910	1/hr
Catalyst Weight	271.4	lb
Maximum Catalyst Pressure Drop	12.0	in. H2O
Catalyst Design Pressure Drop	2.3	in. H2O

Housing and Silencer Information

Housing Supplier:	Other
Silencer Part Number	
Silencer Attenuation	
Inlet Flange Size	
Outlet Flange Size	
Material	
Housing Orientation	
Inlet/Outlet Orientation	0.0
Side Inlet Clocking Position	
Catalyst Clocking Position	
Side Outlet Clocking Position	
Maximum System Pressure Drop	12.0
Total System Pressure Drop	0.0
Housing Modifications	

Comments:

Ask us how EmeraChem can save you 30% in oil change costs.

STATEMENT OF EXHAUST EMISSIONS
2018 SPARK-IGNITED GENERATORS
INDUSTRIAL SERIES - SCAQMD CERTIFIED
STATIONARY EMERGENCY

	Model	Engine	EPA Engine Family	Fuel	CAT Req'd *	SCAQMD CEP #	EPA Cert #	Grams/bhp-hr.			Rated RPM	BHP	Fuel Flow (lb/hr)
								THC	NOx	CO			
Small Spark Ignited Engines - SSIE (SORE)	QTA25	2.4	JGNXB02.42NN	NG	No	NR	JGNXB02.42NN-006	2.14	2.37	93.95	1800	38.39	16.52
	QTA25	2.4	JGNXB02.42NL	LPG	No	NR	JGNXB02.42NL-066	1.43	4.38	86.18	1800	43.29	17.59
	SG035	5.4	JGNXB05.42L1	NG	Yes	530212	JGNXB05.42L1-015	0.38	0.22	0.64	1800	81.95	24.91
	SG035	5.4	JGNXB05.42L2	LPG	Yes	530215	JGNXB05.42L2-016	0.04	0.10	0.70	1800	81.70	29.13
	SG040	5.4	JGNXB05.42L1	NG	Yes	530212	JGNXB05.42L1-015	0.38	0.22	0.64	1800	81.95	24.91
	SG040	5.4	JGNXB05.42L2	LPG	Yes	530215	JGNXB05.42L2-016	0.04	0.10	0.70	1800	81.70	29.13
	SG045	5.4	JGNXB05.42L1	NG	Yes	530212	JGNXB05.42L1-015	0.38	0.22	0.64	1800	81.95	24.91
	SG045	5.4	JGNXB05.42L2	LPG	Yes	530215	JGNXB05.42L2-016	0.04	0.10	0.70	1800	81.70	29.13
	SG050	5.4	JGNXB05.42L1	NG	Yes	530212	JGNXB05.42L1-015	0.38	0.22	0.64	1800	81.95	24.91
	SG050	5.4	JGNXB05.42L2	LPG	Yes	530215	JGNXB05.42L2-016	0.04	0.10	0.70	1800	81.70	29.13
	SG050	6.8	JGNXB06.82L5	NG	Yes	470347	JGNXB06.82L5-032	0.21	0.02	0.19	1800	85.65	33.10
	SG050	6.8	JGNXB06.82L6	LPG	Yes	470347	JGNXB06.82L6-017	0.01	0.05	0.50	1800	85.92	34.14
	SG060	6.8	JGNXB06.82L5	NG	Yes	468721	JGNXB06.82L5-032	0.22	0.02	0.35	1800	99.58	37.58
	SG060	6.8	JGNXB06.82L6	LPG	Yes	468721	JGNXB06.82L6-017	0.01	0.01	0.76	1800	99.15	38.69
	SG070	6.8	JGNXB06.82L3	NG	Yes	470208	JGNXB06.82L3-030	0.20	0.04	0.49	1800	110.64	41.00
	SG070	6.8	JGNXB06.82L4	LPG	Yes	470208	JGNXB06.82L4-031	0.08	0.07	0.91	1800	112.42	42.35
	SG080	8.0	JGNXB08.02L1	NG	Yes	575822	JGNXB08.02L1-033	0.42	0.51	0.07	1800	125.69	39.76
	SG080	8.0	JGNXB08.02L2	LPG	Yes	575823	JGNXB08.02L2-034	0.04	0.13	0.30	1800	127.89	44.69
Large Spark Ignited Engines (LSIE)	SG100	9.0	JGNXB08.92O1	NG	Yes	598551	JGNXB08.92O1-040	0.00	0.12	0.03	1800	153.00	53.24
	SG100	9.0	JGNXB08.92O2	LPV	Yes	598559	JGNXB08.92O2-001	0.01	0.20	0.22	1800	142.30	54.35
	SG130,150	9.0	JGNXB08.92C3	NG	Yes	573276	JGNXB08.92C3-039	0.10	0.03	0.02	1800	230.30	71.97
	SG130,150 (DF)	9.0	JGNXB08.92C3	NG/LPV	Yes	573273	JGNXB08.92C3-039	0.10	0.03	0.02	1800	230.30	71.97
	SG130,150 (DF)	9.0	JGNXB08.92C3	NG/LPL	Yes	573271	JGNXB08.92C3-039	0.10	0.03	0.02	1800	230.30	71.97
	SG130, 150	9.0	JGNXB08.92C4	LPV	Yes	573267	JGNXB08.92C4-022	0.02	0.57	1.30	1800	230.30	75.43
	SG130, 150	9.0	JGNXB08.92C4	LPL	Yes	573269	JGNXB08.92C4-022	0.02	0.57	1.30	1800	230.30	75.43
	SG150,175,200	14.2L	JGNXB14.22C1	NG	Yes	575824	JGNXB14.22C1-043	0.06	0.05	0.39	1800	304.00	98.54
	SG230, 250	14.2L	JGNXB14.22C1	NG	Yes	575826	JGNXB14.22C1-043	0.04	0.02	0.23	1800	374.00	120.84
	SG275, 300	14.2L	JGNXB14.22C1	NG	Yes	575828	JGNXB14.22C1-043	0.03	0.03	0.17	1800	460.00	142.87
	MG150, 200	14.2L	JGNXB14.22C1	NG	Yes	575825	JGNXB14.22C1-043	0.06	0.05	0.39	1800	304.00	98.54
	MG250	14.2L	JGNXB14.22C1	NG	Yes	575827	JGNXB14.22C1-043	0.04	0.02	0.23	1800	374.00	120.84
	MG300	14.2L	JGNXB14.22C1	NG	Yes	575829	JGNXB14.22C1-043	0.03	0.03	0.17	1800	460.00	142.87
	SG350, 400	21.9	JGNXB21.92C1	NG	Yes	558477	JGNXB21.92C1-044	0.18	0.14	0.82	1800	636.00	201.17
	MG350, 400	21.9	JGNXB21.92C1	NG	Yes	558478	JGNXB21.92C1-044	0.18	0.14	0.82	1800	636.00	201.17
	SG350,400 (LPF)	21.9	JGNXB21.92C1	NG	Yes	573266	JGNXB21.92C1-044	0.18	0.14	0.82	1800	636.00	201.17
	MG350,400 (LPF)	21.9	JGNXB21.92C1	NG	Yes	573265	JGNXB21.92C1-044	0.18	0.14	0.82	1800	636.00	201.17
	SG450	21.9	JGNXB21.92C3	NG	Yes	593191	JGNXB21.92C3-045	0.14	0.08	0.39	1800	673.10	211.85
	MG450	21.9	JGNXB21.92C3	NG	Yes	NA	JGNXB21.92C3-045	0.14	0.08	0.39	1800	673.10	211.85
	SG450 (LPF)	21.9	JGNXB21.92C3	NG	Yes	593192	JGNXB21.92C3-045	0.10	0.08	0.13	1800	674.14	208.84
	MG450 (LPF)	21.9	JGNXB21.92C3	NG	Yes	NA	JGNXB21.92C3-045	0.10	0.08	0.13	1800	674.14	208.84
	SG500	25.8	JGNXB25.82C1	NG	Yes	583438	JGNXB25.82C1-023	0.07	0.07	0.05	1800	777.00	244.49
	MG500	25.8	JGNXB25.82C1	NG	Yes	583438	JGNXB25.82C1-023	0.07	0.07	0.05	1800	777.00	244.49

* Three-Way Catalyst (TWC)
NR: Not Required
DF: Dual Fuel
LPF: Units with optional Low Pressure Fuel system
NA: Not Available
Refer to page 2 for definitions and advisory notes.

STATEMENT OF EXHAUST EMISSIONS
2018 SPARK-IGNITED GENERATORS
INDUSTRIAL SERIES - SCAQMD CERTIFIED
STATIONARY EMERGENCY

2018 EPA SPARK-IGNITED EXHAUST EMISSIONS DATA

Effective since 2009, the EPA has implemented exhaust emissions regulations on stationary spark-ignited (gaseous) engine generators for emergency applications. All Generac spark-ignited gensets, including SG, MG, QTA, QT and RG series gensets that are built with engines manufactured in 2009 and later meet the requirements of 40CFR part 60 subpart JJJJ and are EPA certified. These generator sets are labeled as EPA Certified with decals affixed to the engines' valve covers.

The attached documents summarize the general information relevant to EPA certification on these generator sets. This information can be used for submittal data and for permitting purposes, if required. These documents include the following information:

EPA Engine Family
The EPA Engine Family is assigned by the Manufacturer under EPA guidelines for certification purposes and appears on the EPA certificate.

Catalyst Required
Indicates whether a three-way catalyst (TWC) and Air/Fuel Ratio control system are required on the generator set to meet EPA certification requirements. Generally, units rated 80kW and smaller do not require a TWC to meet EPA certification requirements. Please note that some units that do not require a TWC to meet EPA requirements do need one if the California SCAQMD option is selected. Please see "California SCAQMD" below for additional information on this option.

Combination Catalyst or Separate Catalyst
SG and MG series generator sets typically utilize a single combination catalyst/silencer as part of meeting EPA certification requirements. Many QT and RG series generator sets use the same engines as SG series units, but have different exhaust configurations that require the use of conventional silencers with additional separate catalysts installed.

EPA Certificate Number
Upon certification by the EPA, a Certificate Number is assigned by the EPA.

Emissions Actuals - Grams/bhp-hr
Actual exhaust emission data for Total Hydrocarbons (THC), Nitrogen Oxides (NOx) and Carbon Monoxide (CO) that were submitted to EPA and are official data of record for certification. This data can be used for permitting if necessary. Values are expressed in grams per brake horsepower-hour; to convert to grams/kW-hr, multiply by 1.341. Please see advisory notes below for further information.

California Units, SCAQMD CEP Number
A separate low-emissions option is available on many Generac gaseous-fueled generator sets to comply with the more stringent South Coast Air Quality Management District requirements that are recognized in certain areas in California. Gensets that include this option are also EPA Certified.

General Advisory Note to Dealers
The information provided here is proprietary to Generac and its' authorized dealers. This information may only be disseminated upon request, to regulatory governmental bodies for emissions permitting purposes or to specifying organizations as submittal data when expressly required by project specifications, and shall remain confidential and not open to public viewing. This information is not intended for compilation or sales purposes and may not be used as such, nor may it be reproduced without the expressed written permission of Generac Power Systems, Inc.

Advisory Notes on Emissions Actuals
- The stated values are actual exhaust emission test measurements obtained from units representative of the generator types and engines described.
- Values are official data of record as submitted to the EPA and SCAQMD for certification purposes. Testing was conducted in accordance with prevailing EPA protocols, which are typically accepted by SCAQMD and other regional authorities.
- No emission values provided are to be construed as guarantees of emissions levels for any given Generac generator unit.
- Generac Power Systems reserves the right to revise this information without prior notice.
- Consult state and local regulatory agencies for specific permitting requirements.
- The emissions performance data supplied by the equipment manufacturer is only one element required toward completion of the permitting and installation process. State and local regulations may vary on a case-by-case basis and must be consulted by the permit applicant/equipment owner prior to equipment purchase or installation. The data supplied herein by Generac Power Systems cannot be construed as a guarantee of installability of the generator set.
- The emission values provided are the result of multi-mode, weighted scale testing in accordance with EPA testing regulations, and may not be representative of any specific load point.
- The emission values provided are not to be construed as emission limits.

Generac Power Systems, Inc. | P.O. Box 8 | Waukesha, WI 53187
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Bulletin 10000028606
Rev. B 01/24/18

ATTACHMENT N

Tanker Truck Loading Data Sheet

ATTACHMENT N – TANKER TRUCK LOADING DATA SHEET

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

Truck Loadout Collection Efficiencies

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

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

Compliance with this requirement shall be demonstrated by keeping records of the applicable MACT or NSPS Annual Leak Test certification for ***every*** truck and railcar loaded/unloaded. This requirement can be satisfied if the trucking company provided certification that its entire fleet was compliant. This certification must be submitted in writing to the Director of the DAQ. These additional requirements must be noted in the Registration Application and will be noted on the issued G35-D Registration.

Emission Unit ID#: TL-1	Emission Point ID#: TL-1	Year Installed/Modified: 2018
Emission Unit Description: Truck Loading		
Loading Area Data		
Number of Pumps: 5	Number of Liquids Loaded: 1	Max number of trucks loading at one (1) time: 1
Are tanker trucks pressure tested for leaks at this or any other location? ☐ Yes ☐ No ☒ Not Required If Yes, Please describe:		
Provide description of closed vent system and any bypasses. N/A		
Are any of the following truck loadout systems utilized? ☐ Closed System to tanker truck passing a MACT level annual leak test? ☐ Closed System to tanker truck passing a NSPS level annual leak test? ☒ Closed System to tanker truck not passing an annual leak test and has vapor return?		

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

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	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)	2.08		
Max. Annual Throughput (1000 gal/yr)	756		
Loading Method[1]	BF		
Max. Fill Rate (gal/min)	43.75		
Average Fill Time (min/loading)	120		
Max. Bulk Liquid Temperature (ºF)	75		
True Vapor Pressure[2]	NA		
Cargo Vessel Condition[3]	None		
Control Equipment or Method[4]	NA		
Max. Collection Efficiency (%)	NA		

Max. Control Efficiency (%)		NA		
Max.VOC Emission Rate	Loading (lb/hr)	0.014		
	Annual (ton/yr)	0.001		
Max.HAP Emission Rate	Loading (lb/hr)	0.000		
	Annual (ton/yr)	0.000		
Estimation Method[5]		MB		

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

Glycol Dehydration Unit(s) Data Sheet

ATTACHMENT O – 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: TBD	Model: TBD
Max. Dry Gas Flow Rate: 175 mmscf/day	Reboiler Design Heat Input: 2.0 MMBTU/hr
Design Type: ☒ TEG ☐ DEG ☐ EG	Source Status[1]: NS
Date Installed/Modified/Removed[2]: TBD	Regenerator Still Vent APCD/ERD[3]: NA
Control Device/ERD ID#[3]: NA	Fuel HV (BTU/scf): 1034
H_2S Content (gr/100 scf): 0	Operation (hours/year): 8,760
Pump Rate (scfm): 0 (Electric-Driven Pneumatic)	
Water Content (wt %) in: Wet Gas: Saturated	Dry Gas: 5.5 lb H2O/MMscf

Is the glycol dehydration unit exempt from 40CFR63 Section 764(d)? X 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 X 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. X Yes ☐ No

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

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

Recycling the glycol dehydration unit back to the flame zone of the reboiler.
☐ Yes ☒ No
If yes:
Is the reboiler configured to accept flash drum vapors (straight from the glycol dehydrator)? ☒ Yes ☐ No
Is the reboiler configured to accept still vent vapors (after a condenser)? ☐ Yes ☒ No
Is the reboiler configured to accept both in the same operation? ☐ 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 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 (%)
VOC (Flash)	
BTEX (Flash)	
Total HAPs (Flash)	

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)
REB1/S17 REB2/S18 REB3/S19	Reboiler Vent	AP-42	NO_x	0.20	0.86
		AP-42	CO	0.17	0.73
		AP-42	VOC	0.01	0.05
		AP-42	SO_2	<0.01	<0.01

		AP-42	PM_{10}	0.02	0.07
		Subpart W	GHG (CO_2e)	236.69	1,037
DEHY-1/S14 DEHY-2/S15 DEHY-3/S16	Glycol Regenerator Still Vent	GRI-GlyCalc™	VOC	0.92	4.01
		GRI-GlyCalc™	Benzene	0.08	0.34
		GRI-GlyCalc™	Toluene	0.13	0.57
		GRI-GlyCalc™	Ethylbenzene	0.18	0.76
		GRI-GlyCalc™	Xylenes	0.25	1.07
		GRI-GlyCalc™	n-Hexane	0.02	0.50
DEHY-1/S14 DEHY-2/S15 DEHY-3/S16	Glycol Flash Tank	GRI-GlyCalc™	VOC	0.71	3.08
		GRI-GlyCalc™	Benzene	0.03	0.011
		GRI-GlyCalc™	Toluene	0.004	0.015
		GRI-GlyCalc™	Ethylbenzene	0.003	0.014
		GRI-GlyCalc™	Xylenes	0.004	0.014
		GRI-GlyCalc™	n-Hexane	0.008	0.032

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 compressor station 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.

Gas Analytical Services

CHARLESTON, WV
304-677-9926

Good
LELAP Certification #
04048

Customer	: 0034 - MK MIDSTREAM	**Date Sampled**	: 12/13/2016
Station ID	: 2601	**Date Analyzed**	: 12/19/2016
Cylinder ID	: 0280	**Effective Date**	: 01/01/2017
Producer	:	**Cyl Pressure**	: 625
Lease	: GOFF WEST	**Temp**	: 60
Area	: 190 - UNKNOWN	**Cylinder Type**	: Spot
State	: WV	**Sample By**	: HT

COMPONENT	MOL %	GPM@14.73(PSIA)
Methane	96.8791	0.000
Ethane	3.4142	0.915
Propane	0.2210	0.061
Iso-Butane	0.0133	0.004
Normal-Butane	0.0198	0.006
Neo-Pentane	0.0006	0.000
Iso-Pentane	0.0038	0.001
Normal-Pentane	0.0022	0.001
Nitrogen	0.2624	0.000
Carbon-Dioxide	0.1770	0.000
Oxygen	0.0020	0.000
BENZENE	0.0000	0.000
ETHYLBENZENE	0.0000	0.000
TOLUENE	0.0000	0.000
M-XYLENE/P-XYLENE	0.0000	0.000
C6's	0.0026	0.001
C8's	0.0004	0.000
C9's	0.0000	0.000
C7's	0.0016	0.001
C10's	0.0000	0.000
C11's	0.0000	0.000
C12's	0.0000	0.000
TOTAL	100.0000	0.990

Compressibility Factor (Z) @ 14.73 @ 60 Deg. F = 0.9979 — **C5+ GPM** : 0.00200

Ideal Gravity: 0.5761 — **Real Gravity**: 0.5771 — **C5+ Mole %** : 0.0106

BTU @ (PSIA)	@14.65	@14.696	@14.73	@15.025
Ideal GPM	0.983	0.986	0.989	1.008
Ideal BTU Dry	1,032.69	1,035.94	1,038.33	1,059.13
Ideal BTU Sat	1,014.62	1,017.86	1,020.26	1,041.05
Real GPM	0.985	0.989	0.991	1.011
Real BTU Dry	1,034.91	1,038.16	1,040.57	1,061.46
Real BTU Sat	1,017.14	1,020.40	1,022.81	1,043.70

Comments:

Gas Analysis performed in accordance with GPA 2286 — **Sample Count** : 220000003

Analytical Calculations performed in accordance with GPA 2172 — **COC** :

Measurement Analyst: _____ **Ashley Free**

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Goff Compressor Station
File Name: C:\Rogers_Files\Fullstream\175MMCFD RAD 1-22-18.ddf
Date: February 02, 2018

DESCRIPTION:

Description: Preliminary Run
175 MMSCFD
Inlet Gas at 1220 psi
60% Flash Gas Control Via Fuel for
Re-Boiler
Glycol Recirc. Rate of 2.85

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 100.00 deg. F
Pressure: 1220.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.1770
Nitrogen	0.2624
Methane	95.8791
Ethane	3.4142
Propane	0.2210
Isobutane	0.0133
n-Butane	0.0198
Isopentane	0.0044
n-Pentane	0.0022
n-Hexane	0.0013
Other Hexanes	0.0013
Heptanes	0.0016
Benzene	0.0001
Toluene	0.0001
Ethylbenzene	0.0001
Xylenes	0.0001
C8+ Heavies	0.0040

DRY GAS:

Flow Rate: 175.0 MMSCF/day
Water Content: 5.5 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Recirculation Ratio: 2.9 gal/lb H2O

PUMP:

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

Flash Control: Combustion device
Flash Control Efficiency: 60.00 %
Temperature: 210.0 deg. F
Pressure: 35.0 psig

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Goff Compressor Station
File Name: C:\Rogers_Files\Fullstream\175MMCFD RAD 1-22-18.ddf
Date: January 22, 2018

DESCRIPTION:

Description: Preliminary Run
175 MMSCFD
Inlet Gas at 1220 psi
60% Flash Gas Control Via Fuel for
Re-Boiler
Glycol Recirc. Rate of 2.85

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	1.2696	30.471	5.5610
Ethane	0.6190	14.857	2.7114
Propane	0.1593	3.822	0.6975
Isobutane	0.0196	0.472	0.0861
n-Butane	0.0435	1.044	0.1906
Isopentane	0.0109	0.262	0.0479
n-Pentane	0.0080	0.192	0.0350
n-Hexane	0.0112	0.269	0.0491
Other Hexanes	0.0075	0.181	0.0330
Heptanes	0.0353	0.847	0.1546
Benzene	0.0770	1.848	0.3372
Toluene	0.1287	3.088	0.5635
Ethylbenzene	0.1717	4.121	0.7520
Xylenes	0.2430	5.831	1.0642
Total Emissions	2.8044	67.305	12.2832
Total Hydrocarbon Emissions	2.8044	67.305	12.2832
Total VOC Emissions	0.9157	21.977	4.0108
Total HAP Emissions	0.6315	15.157	2.7661
Total BTEX Emissions	0.6203	14.888	2.7170

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	12.2344	293.625	53.5866
Ethane	2.2134	53.121	9.6946
Propane	0.2745	6.589	1.2025
Isobutane	0.0268	0.643	0.1173
n-Butane	0.0490	1.177	0.2148
Isopentane	0.0124	0.297	0.0542
n-Pentane	0.0077	0.184	0.0335
n-Hexane	0.0072	0.172	0.0314
Other Hexanes	0.0060	0.145	0.0265
Heptanes	0.0135	0.324	0.0591
Benzene	0.0025	0.061	0.0111

Toluene	0.0033	0.079	0.0144
Ethylbenzene	0.0030	0.073	0.0132
Xylenes	0.0031	0.074	0.0136
C8+ Heavies	0.2938	7.052	1.2870
Total Emissions	15.1507	363.616	66.3599
Total Hydrocarbon Emissions	15.1507	363.616	66.3599
Total VOC Emissions	0.7029	16.870	3.0787
Total HAP Emissions	0.0191	0.459	0.0838
Total BTEX Emissions	0.0120	0.287	0.0524

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	30.5860	734.063	133.9665
Ethane	5.5335	132.803	24.2366
Propane	0.6864	16.472	3.0062
Isobutane	0.0669	1.606	0.2932
n-Butane	0.1226	2.943	0.5371
Isopentane	0.0309	0.742	0.1355
n-Pentane	0.0191	0.460	0.0839
n-Hexane	0.0179	0.430	0.0785
Other Hexanes	0.0151	0.363	0.0662
Heptanes	0.0338	0.810	0.1478
Benzene	0.0063	0.152	0.0278
Toluene	0.0082	0.198	0.0361
Ethylbenzene	0.0076	0.181	0.0331
Xylenes	0.0078	0.186	0.0340
C8+ Heavies	0.7346	17.630	3.2175
Total Emissions	37.8767	909.040	165.8998
Total Hydrocarbon Emissions	37.8767	909.040	165.8998
Total VOC Emissions	1.7573	42.174	7.6968
Total HAP Emissions	0.0478	1.148	0.2095
Total BTEX Emissions	0.0299	0.718	0.1310

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	13.5040	324.096	59.1476
Ethane	2.8324	67.978	12.4060
Propane	0.4338	10.411	1.9000
Isobutane	0.0464	1.114	0.2033
n-Butane	0.0926	2.221	0.4054
Isopentane	0.0233	0.559	0.1021
n-Pentane	0.0157	0.376	0.0685
n-Hexane	0.0184	0.441	0.0805
Other Hexanes	0.0136	0.326	0.0595
Heptanes	0.0488	1.171	0.2137
Benzene	0.0795	1.909	0.3484
Toluene	0.1320	3.167	0.5780
Ethylbenzene	0.1747	4.193	0.7653
Xylenes	0.2461	5.906	1.0778
C8+ Heavies	0.2938	7.052	1.2870
Total Emissions	17.9550	430.921	78.6431
Total Hydrocarbon Emissions	17.9550	430.921	78.6431
Total VOC Emissions	1.6186	38.847	7.0895

Total HAP Emissions	0.6507	15.616	2.8499
Total BTEX Emissions	0.6323	15.175	2.7694

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction
Methane	139.5275	59.1476	57.61
Ethane	26.9479	12.4060	53.96
Propane	3.7038	1.9000	48.70
Isobutane	0.3792	0.2033	46.38
n-Butane	0.7276	0.4054	44.29
Isopentane	0.1834	0.1021	44.33
n-Pentane	0.1189	0.0685	42.33
n-Hexane	0.1276	0.0805	36.90
Other Hexanes	0.0992	0.0595	40.02
Heptanes	0.3024	0.2137	29.33
Benzene	0.3650	0.3484	4.56
Toluene	0.5996	0.5780	3.61
Ethylbenzene	0.7851	0.7653	2.53
Xylenes	1.0982	1.0778	1.86
C8+ Heavies	3.2175	1.2870	60.00
Total Emissions	178.1830	78.6431	55.86
Total Hydrocarbon Emissions	178.1830	78.6431	55.86
Total VOC Emissions	11.7076	7.0895	39.45
Total HAP Emissions	2.9756	2.8499	4.22
Total BTEX Emissions	2.8480	2.7694	2.76

EQUIPMENT REPORTS:

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:	3.94	lbs. H2O/MMSCF
Temperature:	100.0	deg. F
Pressure:	1220.0	psig
Dry Gas Flow Rate:	175.0000	MMSCF/day
Glycol Losses with Dry Gas:	3.7018	lb/hr
Wet Gas Water Content:	Saturated	
Calculated Wet Gas Water Content:	50.54	lbs. H2O/MMSCF
Specified Lean Glycol Recirc. Ratio:	2.85	gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	7.79%	92.21%
Carbon Dioxide	99.86%	0.14%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%

Ethane	99.97%	0.03%
Propane	99.95%	0.05%
Isobutane	99.94%	0.06%
n-Butane	99.92%	0.08%
Isopentane	99.93%	0.07%
n-Pentane	99.91%	0.09%
n-Hexane	99.86%	0.14%
Other Hexanes	99.89%	0.11%
Heptanes	99.78%	0.22%
Benzene	94.45%	5.55%
Toluene	92.27%	7.73%
Ethylbenzene	91.21%	8.79%
Xylenes	87.71%	12.29%
C8+ Heavies	99.44%	0.56%

FLASH TANK

Flash Control: Combustion device
Flash Control Efficiency: 60.00 %
Flash Temperature: 210.0 deg. F
Flash Pressure: 35.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.66%	0.34%
Carbon Dioxide	23.01%	76.99%
Nitrogen	3.83%	96.17%
Methane	3.99%	96.01%
Ethane	10.06%	89.94%
Propane	18.83%	81.17%
Isobutane	22.69%	77.31%
n-Butane	26.19%	73.81%
Isopentane	26.49%	73.51%
n-Pentane	29.80%	70.20%
n-Hexane	38.80%	61.20%
Other Hexanes	33.97%	66.03%
Heptanes	51.36%	48.64%
Benzene	92.77%	7.23%
Toluene	94.45%	5.55%
Ethylbenzene	96.22%	3.78%
Xylenes	97.31%	2.69%
C8+ Heavies	11.62%	88.38%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	28.01%	71.99%
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	1.89%	98.11%
n-Pentane	1.68%	98.32%
n-Hexane	1.29%	98.71%
Other Hexanes	2.94%	97.06%
Heptanes	0.97%	99.03%
Benzene	5.39%	94.61%
Toluene	8.37%	91.63%
Ethylbenzene	10.82%	89.18%
Xylenes	13.29%	86.71%
C8+ Heavies	103.51%	-3.51%

STREAM REPORTS:

WET GAS STREAM

Temperature: 100.00 deg. F
Pressure: 1234.70 psia
Flow Rate: 7.30e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.06e-001	3.69e+002
Carbon Dioxide	1.77e-001	1.50e+003
Nitrogen	2.62e-001	1.41e+003
Methane	9.58e+001	2.96e+005
Ethane	3.41e+000	1.97e+004
Propane	2.21e-001	1.87e+003
Isobutane	1.33e-002	1.49e+002
n-Butane	1.98e-002	2.21e+002
Isopentane	4.40e-003	6.10e+001
n-Pentane	2.20e-003	3.05e+001
n-Hexane	1.30e-003	2.15e+001
Other Hexanes	1.30e-003	2.15e+001
Heptanes	1.60e-003	3.08e+001
Benzene	9.99e-005	1.50e+000
Toluene	9.99e-005	1.77e+000
Ethylbenzene	9.99e-005	2.04e+000
Xylenes	9.99e-005	2.04e+000
C8+ Heavies	4.00e-003	1.31e+002
Total Components	100.00	3.21e+005

DRY GAS STREAM

Temperature: 100.00 deg. F
Pressure: 1234.70 psia
Flow Rate: 7.29e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	8.31e-003	2.87e+001
Carbon Dioxide	1.77e-001	1.49e+003
Nitrogen	2.62e-001	1.41e+003
Methane	9.59e+001	2.96e+005
Ethane	3.41e+000	1.97e+004

Propane	2.21e-001	1.87e+003
Isobutane	1.33e-002	1.48e+002
n-Butane	1.98e-002	2.21e+002
Isopentane	4.40e-003	6.10e+001
n-Pentane	2.20e-003	3.05e+001
n-Hexane	1.30e-003	2.15e+001
Other Hexanes	1.30e-003	2.15e+001
Heptanes	1.60e-003	3.07e+001
Benzene	9.45e-005	1.42e+000
Toluene	9.23e-005	1.63e+000
Ethylbenzene	9.12e-005	1.86e+000
Xylenes	8.77e-005	1.79e+000
C8+ Heavies	3.98e-003	1.30e+002
Total Components	100.00	3.21e+005

LEAN GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 1.56e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	8.65e+003
Water	1.50e+000	1.32e+002
Carbon Dioxide	2.43e-012	2.14e-010
Nitrogen	2.01e-013	1.76e-011
Methane	1.22e-017	1.07e-015
Ethane	3.31e-008	2.90e-006
Propane	3.92e-010	3.44e-008
Isobutane	2.96e-011	2.60e-009
n-Butane	4.69e-011	4.12e-009
Isopentane	2.39e-006	2.10e-004
n-Pentane	1.55e-006	1.36e-004
n-Hexane	1.67e-006	1.46e-004
Other Hexanes	2.61e-006	2.29e-004
Heptanes	3.95e-006	3.47e-004
Benzene	4.99e-005	4.39e-003
Toluene	1.34e-004	1.18e-002
Ethylbenzene	2.37e-004	2.08e-002
Xylenes	4.24e-004	3.73e-002
C8+ Heavies	1.14e-003	9.99e-002
Total Components	100.00	8.78e+003

RICH GLYCOL STREAM

Temperature: 100.00 deg. F
Pressure: 1234.70 psia
Flow Rate: 1.64e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.44e+001	8.65e+003
Water	5.15e+000	4.72e+002
Carbon Dioxide	2.33e-002	2.14e+000
Nitrogen	1.92e-003	1.76e-001
Methane	3.48e-001	3.19e+001

Ethane	6.71e-002	6.15e+000
Propane	9.23e-003	8.46e-001
Isobutane	9.45e-004	8.66e-002
n-Butane	1.81e-003	1.66e-001
Isopentane	4.59e-004	4.21e-002
n-Pentane	2.98e-004	2.73e-002
n-Hexane	3.20e-004	2.93e-002
Other Hexanes	2.50e-004	2.29e-002
Heptanes	7.57e-004	6.94e-002
Benzene	9.57e-004	8.77e-002
Toluene	1.62e-003	1.49e-001
Ethylbenzene	2.18e-003	2.00e-001
Xylenes	3.14e-003	2.88e-001
C8+ Heavies	9.07e-003	8.31e-001
Total Components	100.00	9.16e+003

FLASH TANK OFF GAS STREAM

Temperature: 210.00 deg. F
Pressure: 49.70 psia
Flow Rate: 8.53e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	3.91e+000	1.58e+000
Carbon Dioxide	1.66e+000	1.64e+000
Nitrogen	2.69e-001	1.69e-001
Methane	8.49e+001	3.06e+001
Ethane	8.19e+000	5.53e+000
Propane	6.93e-001	6.86e-001
Isobutane	5.12e-002	6.69e-002
n-Butane	9.39e-002	1.23e-001
Isopentane	1.91e-002	3.09e-002
n-Pentane	1.18e-002	1.91e-002
n-Hexane	9.25e-003	1.79e-002
Other Hexanes	7.81e-003	1.51e-002
Heptanes	1.50e-002	3.38e-002
Benzene	3.61e-003	6.34e-003
Toluene	3.98e-003	8.25e-003
Ethylbenzene	3.17e-003	7.56e-003
Xylenes	3.25e-003	7.76e-003
C8+ Heavies	1.92e-001	7.35e-001
Total Components	100.00	4.13e+001

FLASH TANK GLYCOL STREAM

Temperature: 210.00 deg. F
Flow Rate: 1.63e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.48e+001	8.65e+003
Water	5.16e+000	4.70e+002
Carbon Dioxide	5.39e-003	4.91e-001
Nitrogen	7.40e-005	6.75e-003
Methane	1.39e-002	1.27e+000

Ethane	6.79e-003	6.19e-001
Propane	1.75e-003	1.59e-001
Isobutane	2.15e-004	1.96e-002
n-Butane	4.77e-004	4.35e-002
Isopentane	1.22e-004	1.11e-002
n-Pentane	8.91e-005	8.13e-003
n-Hexane	1.25e-004	1.14e-002
Other Hexanes	8.52e-005	7.77e-003
Heptanes	3.91e-004	3.56e-002
Benzene	8.92e-004	8.14e-002
Toluene	1.54e-003	1.40e-001
Ethylbenzene	2.11e-003	1.93e-001
Xylenes	3.07e-003	2.80e-001
C8+ Heavies	1.06e-003	9.65e-002
Total Components	100.00	9.12e+003

FLASH GAS EMISSIONS

Flow Rate: 1.94e+003 scfh
Control Method: Combustion Device
Control Efficiency: 60.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	5.46e+001	5.03e+001
Carbon Dioxide	2.88e+001	6.49e+001
Nitrogen	1.18e-001	1.69e-001
Methane	1.49e+001	1.22e+001
Ethane	1.44e+000	2.21e+000
Propane	1.22e-001	2.75e-001
Isobutane	8.99e-003	2.68e-002
n-Butane	1.65e-002	4.90e-002
Isopentane	3.35e-003	1.24e-002
n-Pentane	2.07e-003	7.66e-003
n-Hexane	1.62e-003	7.17e-003
Other Hexanes	1.37e-003	6.05e-003
Heptanes	2.63e-003	1.35e-002
Benzene	6.34e-004	2.54e-003
Toluene	6.99e-004	3.30e-003
Ethylbenzene	5.56e-004	3.02e-003
Xylenes	5.71e-004	3.10e-003
C8+ Heavies	3.37e-002	2.94e-001
Total Components	100.00	1.31e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 7.18e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.94e+001	3.39e+002
Carbon Dioxide	5.90e-002	4.91e-001
Nitrogen	1.27e-003	6.75e-003
Methane	4.18e-001	1.27e+000
Ethane	1.09e-001	6.19e-001

Propane	1.91e-002	1.59e-001
Isobutane	1.79e-003	1.96e-002
n-Butane	3.96e-003	4.35e-002
Isopentane	8.01e-004	1.09e-002
n-Pentane	5.85e-004	7.99e-003
n-Hexane	6.88e-004	1.12e-002
Other Hexanes	4.63e-004	7.54e-003
Heptanes	1.86e-003	3.53e-002
Benzene	5.21e-003	7.70e-002
Toluene	7.38e-003	1.29e-001
Ethylbenzene	8.54e-003	1.72e-001
Xylenes	1.21e-002	2.43e-001
Total Components	100.00	3.42e+002

ANNUAL AIR-COOLED CONDENSER PERFORMANCE:

ANNUAL AIR-COOLED CONDENSER PERFORMANCE

Nearest Site for Air Temperature Data: Charleston, WV

Ambient Air Dry Bulb Temperature (deg. F)	Frequency (%)	Condenser Outlet Temperature (deg. F)
<=50	39.66	<=70
51-55	8.12	71-75
56-60	8.65	76-80
61-65	9.55	81-85
66-70	11.00	86-90
71-75	9.30	91-95
76-80	6.39	96-100
81-85	4.50	101-105
86-90	2.27	106-110
91-95	0.49	111-115
96-100	0.06	116-120
>100	0.01	>120

Condenser outlet temperature approach to ambient: 20.00 deg. F

Annual air-cooled condenser emissions and control efficiency:

	Uncontrolled emissions tons/year	Controlled emissions tons/year	% Control
Benzene	0.342	0.342	0.00
BTEX	2.739	2.739	0.00
Total HAP	2.794	2.794	0.00
VOC	4.288	4.288	0.00

ATTACHMENT P

Pneumatic Controllers Data Sheet

ATTACHMENT P – 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. 20

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. 20

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 Q

Centrifugal Compressor Data Sheet

ATTACHMENT Q – CENTRIFUGAL COMPRESSOR DATA SHEET

Are there any centrifugal compressors at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list:

Emission Unit ID#	Compressor Description

Are there any centrifugal compressors at this facility that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list:

Emission Unit ID#	Compressor Description

ATTACHMENT R

Reciprocating Compressor Data Sheet

ATTACHMENT R – RECIPROCATING COMPRESSOR DATA SHEET

Are there any reciprocating compressors at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list:

Emission Unit ID#	Compressor Description

Are there any reciprocating compressors at this facility that commenced construction, modification or reconstruction after September 18, 2015?

☒ Yes ☐ No

Please list:

Emission Unit ID#	Compressor Description
CE-01	Natural gas compressor driven by G3606 Cat engine
CE-02	Natural gas compressor driven by G3606 Cat engine
CE-03	Natural gas compressor driven by G3606 Cat engine
CE-04	Natural gas compressor driven by G3608 Cat engine
CE-05	Natural gas compressor driven by G3608 Cat engine
CE-06	Natural gas compressor driven by G3608 Cat engine
CE-07	Natural gas compressor driven by G3608 Cat engine
CE-08	Natural gas compressor driven by G3608 Cat engine
CE-09	Natural gas compressor driven by G3608 Cat engine
CE-10	Natural gas compressor driven by G3608 Cat engine
CE-11	Natural gas compressor driven by G3608 Cat engine

ATTACHMENT S

Blowdown and Pigging Operations Data Sheet

ATTACHMENT S – BLOWDOWN AND PIGGING OPERATIONS DATA SHEET

Will there be any blowdown and pigging operations that occur at this facility?

☒ Yes ☐ No

Please list:

Type of Event	# of Events (event/yr)	Amount Vented per event (scf/event)	MW of vented gas (lb/lb-mol)	Total Emissions (ton/yr)	VOC weight fraction	VOC emissions (ton/yr)
Compressor Blowdown	440	4,500	0.991	42.02	0.753	0.88
Compressor Startup	440	4,500	0.991	42.02	0.753	0.88
Plant Shutdown	4	900,000	0.991	764	0.753	16.28
Low Pressure Pig Venting	0	N/A	N/A	N/A	N/A	N/A
High Pressure Pig Venting	2	8,916	0.991	0.38	0.753	0.01

Type of Event	# of Events (event/yr)	Amount Vented per event (scf/event)	MW of vented gas (lb/lb-mol)	Total Emissions (ton/yr)	HAP weight fraction	HAP emissions (ton/yr)
Compressor Blowdown	440	4,500	0.991	42.02	0.013	0.033
Compressor Startup	440	4,500	0.991	42.02	0.013	0.033
Plant Shutdown	4	900,000	0.991	764	0.013	0.55
Low Pressure Pig Venting	0	N/A	N/A	N/A	N/A	N/A
High Pressure Pig Venting	2	8,916	0.991	0.38	0.013	0.000

ATTACHMENT U

Emissions Calculations

ATTACHMENT T – 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:	Make/Model:
Primary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No
Secondary Control Device ID:	Make/Model: N/A
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No

VAPOR COMBUSTION
(Including Enclosed Combustors)

General Information

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

Control Device Information

Type of Vapor Combustion Control?

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

Manufacturer: Model:	Hours of operation per year?

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

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

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 (scfm)	Heat Value of Waste Gas Stream BTU/ft^3	Exit Velocity of the Emissions Stream (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 scfh	Heat Input per Pilot BTU/hr	Will automatic re-ignition be used? ☐ Yes ☐ No

If automatic re-ignition is used, please describe the method.

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).*

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.

CONDENSER		
General Information		
Control Device ID#:	Installation Date: ☐ New ☐ Modified ☐ Relocated	
Manufacturer:	Model:	Control Device Name:
Control Efficiency (%):		
Manufacturer's required temperature range for control efficiency. °F		
Describe the warning and/or alarm system that protects against operation when unit is not meeting the design requirements:		
Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty.		
Additional information attached? ☐ Yes ☐ No Please attach copies of manufacturer's data sheets.		
Is condenser routed to a secondary APCD or ERD? ☐ Yes ☐ No		

ADSORPTION SYSTEM

General Information

Control Device ID#:	Installation Date: ☐ New ☐ Modified ☐ Relocated	
Manufacturer:	Model:	Control Device Name:
Design Inlet Volume: scfm	Adsorbent charge per adsorber vessel and number of adsorber vessels:	
Length of Mass Transfer Zone supplied by the manufacturer:	Adsorber diameter: ft Adsorber area: ft^2	
Adsorbent type and physical properties:	Overall Control Efficiency (%):	
Working Capacity of Adsorbent (%):		

Operating Parameters

Inlet volume: scfm @ °F	
Adsorption time per adsorption bed (life expectancy):	Breakthrough Capacity (lbs of VOC/100 lbs of adsorbent):
Temperature range of carbon bed adsorber. °F - °F	

Control Device Technical Data

Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)

Describe the warning and/or alarm system that protects against operation when unit is not meeting the design requirements:
Has the control device been tested by the manufacturer and certified?
Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty.
Additional information attached? ☐ Yes ☐ No Please attach copies of manufacturer's data sheets, drawings, and performance testing.

VAPOR RECOVERY UNIT

General Information

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

Device Information

Manufacturer:
Model:

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

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

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

Additional information attached? ☐ Yes ☐ No

Please attach copies of manufacturer's data sheets, drawings, and performance testing.

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

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

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

ATTACHMENT U

Emissions Calculations

ATTACHMENT U – EMISSIONS CALCULATIONS

Provide detailed potential to emit (PTE) emission calculations for criteria and hazardous air pollutants (HAPs) for each emission point identified in the application. For hazardous air pollutants and volatile organic compounds (VOCs), the speciated emission calculations must be included.

Use the following guidelines to ensure complete emission calculations:

- All emission sources and fugitive emissions are included in the emission calculations, as well as all methods used to calculate the emissions.
- Proper emission point identification numbers and APCD and ERD identification numbers are used consistently in the emission calculations that are used throughout the application.
- A printout of the emission summary sheets is attached to the registration application.
- Printouts of any modeling must be included with the emission calculations. The modeling printout must show all inputs/outputs or assumptions that the modeled emissions are based upon.
- If emissions are provided from the manufacturer, the manufacturer's documentation and/or certified emissions must also be included.
- The emission calculations results must match the emissions provided on the emissions summary sheet.
- If calculations are based on a compositional analysis of the gas, attach the laboratory analysis. Include the following information: the location that the sample was taken as representative; the date the sample was taken; and, if the sample is considered representative, the reasons that it is considered representative (same gas field, same formation and depth, distance from actual site, etc.).
- Potential to emit (PTE) from the main or backup control device may be calculated based on the highest emission from a control device that could handle the stream, plus any intrinsic emission such as those from pilot flames.
- Provide any additional clarification as necessary. Additional clarification or information is especially helpful when reviewing modeling calculations to assist the engineer in understanding the basis of assumptions and/or inputs.

Please follow specific guidance provided on the emissions summary sheet when providing the calculations.

Goff Connector LLC - Connector CS

February 7, 2018

POTENTIAL AIR EMISSIONS

Emissions are for EACH Emissions Unit unless noted otherwise

Company ID	Permit # or Status	Emission Unit	Process Unit	Process Unit SCC	Maximum Hourly Throughput	Maximum Annual Throughput	Throughput Units	Annual Hours of Operation	No of Units	Pollutant	Capture Efficiency	Point Control Efficiency	Point Control	Fugitive Control Efficiency	Fugitive Control	EF	EF Units	EF Conversion Factor	EF Conversion Factor Units	Uncontrolled Emissions lb/hr	Uncontrolled Emissions tpy	Point Emissions Controlled lb/hr	Point Emissions Controlled tpy	Fugitive Emissions Controlled lb/hr	Fugitive Emissions Controlled tpy	Total Controlled (Point + Fugitive) lb/hr	Total Controlled (Point + Fugitive) tpy	Emission Factor Source / Notes
	NEW		**Gas Compressor Engine (SCC = 20200254)**																									
CE-01			Make = Caterpillar	20200254	1,775		bhp	8760	3	NOx	100%					0.5	g/bhp-hr	0.002204624	lb/g	1.957	8.57	1.957	8.570	0.000	0.000	1.957	8.570	Manufacturer
CE-02			Model = G3606		1,775		bhp	8760	3	CO	100%	93.10%	Catalyst			2.74	g/bhp-hr	0.002204624	lb/g	10.722	46.96	0.740	3.240	0.000	0.000	0.740	3.240	Manufacturer
CE-03			Engine Type = NG Lean Burn		1,775		bhp	8760	3	VOC	100%	66.30%	Catalyst			0.89	g/bhp-hr	0.002204624	lb/g	3.483	15.25	1.174	5.141	0.000	0.000	1.174	5.141	Manufacturer
			Fuel Consumption (HHV) =		1,775		bhp	8760	3	CO2	100%					441	g/bhp-hr	0.002204624	lb/g	1725.725	7558.67	1725.725	7558.675	0.000	0.000	1725.725	7558.675	Manufacturer
			7609 BTU/BHP-HR		1,775		bhp	8760	3	Formaldehyde	100%	85.00%	Catalyst			0.26	g/bhp-hr	0.002204624	lb/g	1.017	4.46	0.153	0.668	0.000	0.000	0.153	0.668	Manufacturer
			Non-Certified Engine		1,775		bhp	8760	3	TOC	100%					6.3	g/bhp-hr	0.002204624	lb/g	24.653	107.98	24.653	107.981	0.000	0.000	24.653	107.981	Manufacturer
			Construction date		1,775		bhp	8760	3	CH4	100%					5.36	g/bhp-hr	0.002204624	lb/g	20.975	91.87	20.975	91.870	0.000	0.000	20.975	91.870	Manufacturer
			Unit #0586: 10/27/2006		13.506		MMBtu	8760	3	SO2	100%					5.88E-04	lb/MMBtu			0.008	0.03	0.008	0.035	0.000	0.000	0.008	0.035	AP-42 (4-stroke lean burn)
			Unit #0153: 10/02/2002		13.506		MMBtu	8760	3	PM10	100%					7.71E-05	lb/MMBtu			0.001	0.00	0.001	0.005	0.000	0.000	0.001	0.005	AP-42 (4-stroke lean burn)
			Unit #0030: 09/15/1998		13.506		MMBtu	8760	3	PM2.5	100%					7.71E-05	lb/MMBtu			0.001	0.00	0.001	0.005	0.000	0.000	0.001	0.005	AP-42 (4-stroke lean burn)
					13.506		MMBtu	8760	3	PM	100%					9.91E-03	lb/MMBtu			0.134	0.59	0.134	0.586	0.000	0.000	0.134	0.586	AP-42 (4-stroke lean burn)
					13.506		MMBtu	8760	3	N2O	100%					0.0002205	lb/MMBtu			0.003	0.01	0.003	0.013	0.000	0.000	0.003	0.013	40 CFR 98, Table C-2
					13.506		MMBtu	8760	3	acrolein	100%	66.30%	Catalyst			0.0052942	lb/MMBtu			0.072	0.31	0.024	0.106	0.000	0.000	0.024	0.106	AP-42 (4-stroke lean burn)
					13.506		MMBtu	8760	3	acetaldehyde	100%	66.30%	Catalyst			0.00836	lb/MMBtu			0.113	0.49	0.038	0.167	0.000	0.000	0.038	0.167	AP-42 (4-stroke lean burn)
					13.506		MMBtu	8760	3	biphenyl	100%	66.30%	Catalyst			0.0002184	lb/MMBtu			0.003	0.01	0.001	0.004	0.000	0.000	0.001	0.004	AP-42 (4-stroke lean burn)
					13.506		MMBtu	8760	3	benzene	100%	66.30%	Catalyst			0.0004532	lb/MMBtu			0.006	0.03	0.002	0.009	0.000	0.000	0.002	0.009	AP-42 (4-stroke lean burn)
					13.506		MMBtu	8760	3	toluene	100%	66.30%	Catalyst			0.0004202	lb/MMBtu			0.006	0.02	0.002	0.008	0.000	0.000	0.002	0.008	AP-42 (4-stroke lean burn)
					13.506		MMBtu	8760	3	Ethylbenzene	100%	66.30%	Catalyst			4.09E-05	lb/MMBtu			0.001	0.00	0.000	0.001	0.000	0.000	0.000	0.001	AP-42 (4-stroke lean burn)
					13.506		MMBtu	8760	3	Xylenes	100%	66.30%	Catalyst			0.0001895	lb/MMBtu			0.003	0.01	0.001	0.004	0.000	0.000	0.001	0.004	AP-42 (4-stroke lean burn)
					13.506		MMBtu	8760	3	methanol	100%	66.30%	Catalyst			0.002575	lb/MMBtu			0.035	0.15	0.012	0.051	0.000	0.000	0.012	0.051	AP-42 (4-stroke lean burn)
					13.506		MMBtu	8760	3	n-hexane	100%	66.30%	Catalyst			0.0011433	lb/MMBtu			0.015	0.07	0.005	0.023	0.000	0.000	0.005	0.023	AP-42 (4-stroke lean burn)
					13.506		MMBtu	8760	3	HAPs											5.562	0.238	1.041	0.000	0.000	0.238	1.041	AP-42 (4-stroke lean burn)
	NEW		**Gas Compressor Engine (SCC = 20200254 Int Comb)**																									
CE-04			Make = Caterpillar	20200254	2,500		bhp	8760	8	NOx	100%					0.3	g/bhp-hr	0.002204624	lb/g	1.653	7.24	1.653	7.242	0.000	0.000	1.653	7.242	Manufacturer
CE-05			Model = G3608		2,500		bhp	8760	8	CO	100%	93.20%	Catalyst			2.49	g/bhp-hr	0.002204624	lb/g	13.724	60.11	0.933	4.087	0.000	0.000	0.933	4.087	Manufacturer
CE-06			Engine Type = NG Lean Burn		2,500		bhp	8760	8	VOC	100%	53.50%	Catalyst			0.43	g/bhp-hr	0.002204624	lb/g	2.370	10.38	1.102	4.827	0.000	0.000	1.102	4.827	Manufacturer
CE-07			Fuel Consumption (HHV) =		2,500		bhp	8760	8	CO2	100%					425	g/bhp-hr	0.002204624	lb/g	2342.413	10259.77	2342.413	10259.771	0.000	0.000	2342.413	10259.771	Manufacturer
CE-08			7595 BTU/BHP-HR		2,500		bhp	8760	8	CH4	100%					4	g/bhp-hr	0.002204624	lb/g	22.046	96.56	22.046	96.563	0.000	0.000	22.046	96.563	Manufacturer
CE-09			Construction date = 2016 or 2017		2,500		bhp	8760	8	Formaldehyde	100%	85.00%	Catalyst			0.16	g/bhp-hr	0.002204624	lb/g	0.882	3.86	0.132	0.579	0.000	0.000	0.132	0.579	Manufacturer
CE-10			Non-Certified Engine		2,500		bhp	8760	8	TOC	100%					4.738	g/bhp-hr	0.002204624	lb/g	26.114	114.38	26.114	114.378	0.000	0.000	26.114	114.378	Manufacturer
CE-11					18.988		MMBtu	8760	8	SO2	100%					5.88E-04	lb/MMBtu			0.011	0.05	0.011	0.049	0.000	0.000	0.011	0.049	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	PM10	100%					7.71E-05	lb/MMBtu			0.001	0.01	0.001	0.006	0.000	0.000	0.001	0.006	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	PM2.5	100%					7.71E-05	lb/MMBtu			0.001	0.01	0.001	0.006	0.000	0.000	0.001	0.006	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	PM	100%					9.91E-03	lb/MMBtu			0.188	0.82	0.188	0.824	0.000	0.000	0.188	0.824	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	N2O	100%					0.0002205	lb/MMBtu			0.004	0.02	0.004	0.018	0.000	0.000	0.004	0.018	40 CFR 98, Table C-2
					18.988		MMBtu	8760	8	acrolein	100%	53.50%	Catalyst			0.0052942	lb/MMBtu			0.101	0.44	0.047	0.205	0.000	0.000	0.047	0.205	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	acetaldehyde	100%	53.50%	Catalyst			0.00836	lb/MMBtu			0.159	0.70	0.074	0.323	0.000	0.000	0.074	0.323	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	biphenyl	100%	53.50%	Catalyst			0.0002184	lb/MMBtu			0.004	0.02	0.002	0.008	0.000	0.000	0.002	0.008	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	benzene	100%	53.50%	Catalyst			0.0004532	lb/MMBtu			0.009	0.04	0.004	0.018	0.000	0.000	0.004	0.018	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	toluene	100%	53.50%	Catalyst			0.0004202	lb/MMBtu			0.008	0.03	0.004	0.016	0.000	0.000	0.004	0.016	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	Ethylbenzene	100%	53.50%	Catalyst			4.09E-05	lb/MMBtu			0.001	0.00	0.000	0.002	0.000	0.000	0.000	0.002	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	Xylenes	100%	53.50%	Catalyst			0.0001895	lb/MMBtu			0.004	0.02	0.002	0.007	0.000	0.000	0.002	0.007	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	methanol	100%	53.50%	Catalyst			0.002575	lb/MMBtu			0.049	0.21	0.023	0.100	0.000	0.000	0.023	0.100	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	n-hexane	100%	53.50%	Catalyst			0.0011433	lb/MMBtu			0.022	0.10	0.010	0.044	0.000	0.000	0.010	0.044	AP-42 (4-stroke lean burn)
					18.988		MMBtu	8760	8	HAPs										1.237	5.417	0.297	1.302	0.000	0.000	0.297	1.302	AP-42 (4-stroke lean burn)
	NEW		**Alternate Power Source**																									
GE-01			Make = Generac	20200254	460		bhp	8760	2	NOx	100%					0.03	g/bhp-hr	0.002204624	lb/g	0.030	0.13	0.030	0.133	0.000	0.000	0.030	0.133	Manufacturer
GE-02			Model = SG275, 300		460		bhp	8760	2	CO	100%					0.17	g/bhp-hr	0.002204624	lb/g	0.172	0.76	0.172	0.755	0.000	0.000	0.172	0.755	Manufacturer
			Engine Type = NG Lean Burn		3.220		bhp	8760	2	VOC	100%					0.118	lb/MMBtu			0.380	1.66	0.380	1.664	0.000	0.000	0.380	1.664	Manufacturer
			7000 BTU/BHP-HR		3.220		MMBtu	8760	2	CO2	100%					110	lb/MMBtu			354.200	1551.40	354.200	1551.396	0.000	0.000	354.200	1551.396	AP-42 (4-stroke lean burn)
			Certified Engines		3.220		MMBtu	8760	2	CH4	100%					1.25	lb/MMBtu			4.025	17.63	4.025	17.630	0.000	0.000	4.025	17.630	AP-42 (4-stroke lean burn)
					3.220		bhp	8760	2	Formaldehyde	100%					0.0528	lb/MMBtu			0.170	0.74	0.170	0.745	0.000	0.000	0.170	0.745	Manufacturer
					3.220		bhp	8760	2	TOC	100%					1.47	lb/MMBtu			4.733	20.73	4.733	20.732	0.000	0.000	4.733	20.732	Manufacturer
					3.220		MMBtu	8760	2	SO2	100%					5.88E-04	lb/MMBtu			0.002	0.01	0.002	0.008	0.000	0.000	0.002	0.008	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	PM10	100%					7.71E-05	lb/MMBtu			0.000	0.00	0.000	0.001	0.000	0.000	0.000	0.001	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	PM2.5	100%					7.71E-05	lb/MMBtu			0.000	0.00	0.000	0.001	0.000	0.000	0.000	0.001	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	PM	100%					9.91E-03	lb/MMBtu			0.032	0.14	0.032	0.140	0.000	0.000	0.032	0.140	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	N2O	100%					0.0002205	lb/MMBtu			0.001	0.00	0.001	0.003	0.000	0.000	0.001	0.003	40 CFR 98, Table C-2
					3.220		MMBtu	8760	2	acrolein	100%					0.0052942	lb/MMBtu			0.017	0.07	0.017	0.075	0.000	0.000	0.017	0.075	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	acetaldehyde	100%					0.00836	lb/MMBtu			0.027	0.12	0.027	0.118	0.000	0.000	0.027	0.118	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	biphenyl	100%					0.0002184	lb/MMBtu			0.001	0.00	0.001	0.003	0.000	0.000	0.001	0.003	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	benzene	100%					0.0004532	lb/MMBtu			0.001	0.01	0.001	0.006	0.000	0.000	0.001	0.006	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	toluene	100%					0.0004202	lb/MMBtu			0.001	0.01	0.001	0.006	0.000	0.000	0.001	0.006	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	Ethylbenzene	100%					4.09E-05	lb/MMBtu			0.000	0.00	0.000	0.001	0.000	0.000	0.000	0.001	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	Xylenes	100%					0.0001895	lb/MMBtu			0.001	0.00	0.001	0.003	0.000	0.000	0.001	0.003	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	methanol	100%					0.002575	lb/MMBtu			0.008	0.04	0.008	0.036	0.000	0.000	0.008	0.036	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	n-hexane	100%					0.0011433	lb/MMBtu			0.004	0.02	0.004	0.016	0.000	0.000	0.004	0.016	AP-42 (4-stroke lean burn)
					3.220		MMBtu	8760	2	HAPs										0.230	1.008	0.230	1.008	0.000	0.000	0.230	1.008	AP-42 (4-stroke lean burn)
	NEW		**175 MMSCFD Dehydration Unit (each)**																									
DEHY-1			**Reboiler 1**	31000302	2.000		MMBtu	8760	3	NOx	100%					100	Lbs/MMCF	0.000980392	scf/BTU	0.1961	0.8588	0.1961	0.8588	0.0000	0.0000	0.1961	0.8588	AP-42, Table 1.4
DEHY-2			**Reboiler 2**		2.000		MMBtu	8760	3	CO	100%					84	Lbs/MMCF	0.000980392	scf/BTU	0.1647	0.7214	0.1647	0.7214	0.0000	0.0000	0.1647	0.7214	AP-42, Table 1.4
DEHY-3			**Reboiler 3**		2.000		MMBtu	8760	3	CO2	100%					120000	Lbs/MMCF	0.000980392	scf/BTU	235.2941	1030.5882	235.2941	1030.5882	0.0000	0.0000	235.2941	1030.5882	AP-42, Table 1.4
			SCC = 31000302		2.000		MMBtu	8760	3	VOC	100%					5.5	Lbs/MMCF	0.000980392	scf/BTU	0.0108	0.0472	0.0108	0.0472	0.0000	0.0000	0.0108	0.0472	AP-42, Table 1.4
					2.000		MMBtu	8760	3	TOC	100%					11	Lbs/MMCF	0.000980392	scf/BTU	0.0216	0.0945	0.0216	0.0945	0.0000	0.0000	0.0216	0.0945	EPA Webfire for SCC 31000404
					2.000		MMBtu	8760	3	PM	100%					7.6	Lbs/MMCF	0.000980392	scf/BTU	0.0149	0.0653	0.0149	0.0653	0.0000	0.0000	0.0149	0.0653	AP-42, Table 1.4
					2.000		MMBtu	8760	3	PM10	100%					7.6	Lbs/MMCF	0.000980392	scf/BTU	0.0149	0.0653	0.0149	0.0653	0.0000	0.0000	0.0149	0.0653	AP-42, Table 1.4
					2.000		MMBtu	8760	3	PM2.5	100%					7.6	Lbs/MMCF	0.000980392	scf/BTU	0.0149	0.0653	0.0149	0.0653	0.0000	0.0000	0.0149	0.0653	AP-42, Table 1.4
					2.000		MMBtu	8760	3	SO2	100%					0.6	Lbs/MMCF	0.000980392	scf/BTU	0.0012	0.0052	0.0012	0.0052	0.0000	0.0000	0.0012	0.0052	AP-42, Table 1.4
					2.000		MMBtu	8760	3	CH4	100%					2.3	Lbs/MMCF	0.000980392	scf/BTU	0.0045	0.0198	0.0045	0.0198	0.0000	0.0000	0.0045	0.0198	AP-42, Table 1.4
					2.000		MMBtu	8760	3	N2O	100%					2.2	Lbs/MMCF	0.000980392	scf/BTU	0.0043	0.0189	0.0043	0.0189	0.0000	0.0000	0.0043	0.0189	AP-42, Table 1.4
			Still Vent + Flash Gas	31000303				8760	3	TOC	100%		Reboiler							40.6811	178.1832	17.9550	78.6431	0.0000	0.0000	17.9550	78.6431	GlyCalc - Flash gas routes to the reboiler (results in 60% control)
			175 MMscfd glycol dehydration unit.					8760	3	VOC	100%		Reboiler							2.6730	11.7077	1.6186	7.0895	0.0000	0.0000	1.6186	7.0895	GlyCalc - Flash gas routes to the reboiler (results in 60% control)
			60% of flash gas will route to					8760	3	CH4	100%		Reboiler							31.8556	139.5275	13.5040	59.1476	0.0000	0.0000	13.5040	59.1476	GlyCalc - Flash gas routes to the reboiler (results in 60% control)
			reboiler					8760	3	HAPs	100%		Reboiler							0.6793	2.9753	0.6507	2.8499	0.0000	0.0000	0.6507	2.8499	GlyCalc - Flash gas routes to the reboiler (results in 60% control)
								8760	3	n-Hexane	100%		Reboiler							0.0291	0.1275	0.0184	0.0805	0.0000	0.0000	0.0184	0.0805	GlyCalc - Flash gas routes to the reboiler (results in 60% control)
								8760	3	Benzene	100%		Reboiler							0.0833	0.3649	0.0795	0.3484	0.0000	0.0000	0.0795	0.3484	GlyCalc - Flash gas routes to the reboiler (results in 60% control)
								8760	3	Toluene	100%		Reboiler							0.1367	0.5988	0.1320	0.5780	0.0000	0.0000	0.1320	0.5780	GlyCalc - Flash gas routes to the reboiler (results in 60% control)
								8760	3	Ethylbenzene	100%		Reboiler							0.1793	0.7853	0.1747	0.7653	0.0000	0.0000	0.1747	0.7653	GlyCalc - Flash gas routes to the reboiler (results in 60% control)
								8760	3	Xylenes	100%		Reboiler							0.2508	1.0985	0.2461	1.0778	0.0000	0.0000	0.2461	1.0778	GlyCalc - Flash gas routes to the reboiler (results in 60% control)

POTENTIAL AIR EMISSIONS

Company ID	Permit # or Status	Emission Unit	Process Unit	Process Unit SCC	Maximum Hourly Throughput	Maximum Annual Throughput	Throughput Units	Annual Hours of Operation	No of Units	Pollutant	Capture Efficiency	Point Control Efficiency	Point Control	Fugitive Control Efficiency	Fugitive Control	EF	EF Units	EF Conversion Factor	EF Conversion Factor Units	Emissions are for EACH Emissions Unit unless noted otherwise: Uncontrolled Emissions lb/hr	Uncontrolled Emissions tpy	Point Emissions Controlled lb/hr	Point Emissions Controlled tpy	Fugitive Emissions Controlled lb/hr	Fugitive Emissions Controlled tpy	Total Controlled (Point + Fugitive) lb/hr	Total Controlled (Point + Fugitive) tpy	Emission Factor Source / Notes
			Total Dehy Potential Emissions							PM										0.0149	0.0653	0.0149	0.0653	0.0000	0.0000	0.0149	0.0653	
			Reboiler + Still Vent							PM10										0.0149	0.0653	0.0149	0.0653	0.0000	0.0000	0.0149	0.0653	
			Total Emissions are Per Dehy							PM2.5										0.0149	0.0653	0.0149	0.0653	0.0000	0.0000	0.0149	0.0653	
										SO2										0.0012	0.0052	0.0012	0.0052	0.0000	0.0000	0.0012	0.0052	
										NOx										0.1961	0.8588	0.1961	0.8588	0.0000	0.0000	0.1961	0.8588	
										CO										0.1647	0.7214	0.1647	0.7214	0.0000	0.0000	0.1647	0.7214	
										TOC										0.0216	0.0945	0.0216	0.0945	0.0000	0.0000	0.0216	0.0945	
										VOC										0.0108	0.0472	0.0108	0.0472	0.0000	0.0000	0.0108	0.0472	
										Lead										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										CO2										235.2941	1030.5882	235.2941	1030.5882	0.0000	0.0000	235.2941	1030.5882	
										CH4										0.0045	0.0198	0.0045	0.0198	0.0000	0.0000	0.0045	0.0198	
										N2O										0.0043	0.0189	0.0043	0.0189	0.0000	0.0000	0.0043	0.0189	
										HAPs										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										n-Hexane										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										Benzene										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										Toluene										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										Ethylbenzene										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										Xylenes										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	NEW	**FIVE (5) 400-bbl PRODUCED WATER TANKS (SCC = 31000213 = Industrial Processes > Oil and Gas Production > Natural Gas Production > Produced Water Storage Tank)**																										
T01			**Flash Gas**	31000213				8760	1	TOC	100%									0.36924	1.6173	0.369	1.617	0.000	0.000	0.369	1.617	See Produced Water tab
T02								8760	1	VOC	100%									0.00353	0.0155	0.004	0.015	0.000	0.000	0.004	0.015	See Produced Water tab
T03								8760	1	CO2	100%									0.01475	0.0646	0.015	0.065	0.000	0.000	0.015	0.06460	See Produced Water tab
T04								8760	1	CH4	100%									0.33189	1.4537	0.332	1.454	0.000	0.000	0.332	1.45E+00	See Produced Water tab
T05								8760	1	HAPs	100%									0.00008	0.0003	0.000	0.000	0.000	0.000	0.000	0.000	See Produced Water tab
								8760	1	n-Hexane	100%									0.00000	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	See Produced Water tab
			Working and Breathing Losses			107.89	lbs	8760	1	TOC	100%					0.967	lb/lb			0.01191	0.0522	0.012	0.052	0.000	0.000	0.012	0.052	See Tanks 4.09d Output
						107.89	lbs	8760	1	VOC	100%					0.035	lb/lb			0.00043	0.0019	0.000	0.002	0.000	0.000	0.000	0.002	See Tanks 4.09d Output
						107.89	lbs	8760	1	CO2	100%					0.032	lb/lb			0.00039	0.0017	0.000	0.002	0.000	0.000	0.000	0.002	See Tanks 4.09d Output
						107.89	lbs	8760	1	CH4	100%					0.776	lb/lb			0.00956	0.0419	0.010	0.042	0.000	0.000	0.010	0.042	See Tanks 4.09d Output
						107.89	lbs	8760	1	HAPs	100%					0.000	lb/lb			0.00000	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	See Tanks 4.09d Output
						107.89	lbs	8760	1	n-Hexane	100%					0.000	lb/lb			0.00000	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	See Tanks 4.09d Output
			TOTAL EMISSIONS							TOC										0.381	1.669	0.381	1.669	0.000	0.000	0.381	1.669	Flash + Working/Breathing
										VOC										0.004	0.017	0.004	0.017	0.000	0.000	0.004	0.017	Flash + Working/Breathing
										CO2										0.015	0.066	0.015	0.066	0.000	0.000	0.015	0.066	Flash + Working/Breathing
										CH4										0.341	1.496	0.341	1.496	0.000	0.000	0.341	1.496	Flash + Working/Breathing
										HAPs										7.74E-05	0.000	0.000	0.000	0.000	0.000	7.74E-05	3.39E-04	Flash + Working/Breathing
										n-Hexane										5.72E-07	0.000	0.000	0.000	0.000	0.000	5.72E-07	2.51E-06	Flash + Working/Breathing
	NEW	**FUGITIVE EQUIPMENT LEAKS (SCC = 31000220)**																										
			Fugitive Equipment Leaks	31000220				8760	1	TOC										10.815	47.371	0.000	0.000	10.815	47.371	10.815	47.371	See Equipment Leaks tab
			(see Equipment Leaks tab)					8760	1	VOC										0.082	0.360	0.000	0.000	0.082	0.360	0.082	0.360	See Equipment Leaks tab
								8760	1	CO2										0.051	0.223	0.000	0.000	0.051	0.223	0.051	0.223	See Equipment Leaks tab
								8760	1	CH4										10.061	44.069	0.000	0.000	10.061	44.069	10.061	44.069	See Equipment Leaks tab
								8760	1	HAPs										0.001	0.006	0.000	0.000	0.001	0.006	0.001	0.006	See Equipment Leaks tab
								8760	1	n-Hexane										0.001	0.006	0.000	0.000	0.001	0.006	0.001	0.006	See Equipment Leaks tab
	NEW	**FUGITIVE - BLOWDOWNS (SCC = 30600402)**																										
			G3608Compressor Blowdowns	30600402	4,500	180,000	SCF		8	TOC	100%					0.991	lb/lb	0.0428	lb/scf	190.85	3.82	190.85	3.82	0.00	0.00	190.85	3.82	From inlet gas analysis
			4,500 scf per blowdown		4,500	180,000	SCF		8	VOC	100%					0.008	lb/lb	0.1200	lb/scf	4.07	0.08	4.07	0.08	0.00	0.00	4.07	0.08	From inlet gas analysis
			40 Blowdowns per year per unit		4,500	180,000	SCF		8	CH4	100%					0.922	lb/lb	0.0423	lb/scf	175.47	3.51	175.47	3.51	0.00	0.00	175.47	3.51	From inlet gas analysis
					4,500	180,000	SCF		8	HAPs	100%					0.000	lb/lb	0.2274	lb/scf	0.14	0.00	0.14	0.00	0.00	0.00	0.14	0.003	From inlet gas analysis
					4,500	180,000	SCF		8	n-Hexane	100%					0.000	lb/lb	0.2274	lb/scf	0.14	0.00	0.14	0.00	0.00	0.00	0.14	0.003	From inlet gas analysis
			G3606 Compressor Blowdowns	30600402	4,500	180,000	SCF		3	TOC	100%					0.991	lb/lb	0.0428	lb/scf	190.85	3.82	190.85	3.82	0.00	0.00	190.85	3.82	From inlet gas analysis
			4,500 scf per blowdown		4,500	180,000	SCF		3	VOC	100%					0.008	lb/lb	0.1200	lb/scf	4.07	0.08	4.07	0.08	0.00	0.00	4.07	0.08	From inlet gas analysis
			40 Blowdowns per year per unit		4,500	180,000	SCF		3	CH4	100%					0.922	lb/lb	0.0423	lb/scf	175.47	3.51	175.47	3.51	0.00	0.00	175.47	3.51	From inlet gas analysis
					4,500	180,000	SCF		3	HAPs	100%					0.000	lb/lb	0.2274	lb/scf	0.14	0.00	0.14	0.00	0.00	0.00	0.14	0.003	From inlet gas analysis
					4,500	180,000	SCF		3	n-Hexane	100%					0.000	lb/lb	0.2274	lb/scf	0.14	0.00	0.14	0.00	0.00	0.00	0.14	0.003	From inlet gas analysis
			Engine Startups	30600402	4,500	180,000	SCF		11	TOC	100%					0.991	lb/lb	0.0428	lb/scf	190.85	3.82	190.85	3.82	0.00	0.00	190.85	3.817	From inlet gas analysis
			4,500 scf per blowdown		4,500	180,000	SCF		11	VOC	100%					0.008	lb/lb	0.1200	lb/scf	4.07	0.08	4.07	0.08	0.00	0.00	4.07	0.081	From inlet gas analysis
			40 Startups per year per unit		4,500	180,000	SCF		11	CH4	100%					0.922	lb/lb	0.0423	lb/scf	175.47	3.51	175.47	3.51	0.00	0.00	175.47	3.509	From inlet gas analysis
					4,500	180,000	SCF		11	HAPs	100%					0.000	lb/lb	0.2274	lb/scf	0.14	0.00	0.14	0.00	0.00	0.00	0.14	0.003	From inlet gas analysis
					4,500	180,000	SCF		11	n-Hexane	100%					0.000	lb/lb	0.2274	lb/scf	0.14	0.00	0.14	0.00	0.00	0.00	0.14	0.003	From inlet gas analysis
			Station Blowdown	30600402	9,000,000	3.60E+07	SCF		1	TOC	100%					0.991	lb/lb	0.0428	lb/scf	381690.07	763.38	381690.07	763.38	0.00	0.00	381690.07	763.380	From inlet gas analysis
			9,000,000 scf per blowdown		9,000,000	3.60E+07	SCF		1	VOC	100%					0.008	lb/lb	0.1200	lb/scf	8135.79	16.27	8135.79	16.27	0.00	0.00	8135.79	16.272	From inlet gas analysis
			4 station blowdowns per year		9,000,000	3.60E+07	SCF		1	CH4	100%					0.922	lb/lb	0.0423	lb/scf	350940.03	701.88	350940.03	701.88	0.00	0.00	350940.03	701.880	From inlet gas analysis
					9,000,000	3.60E+07	SCF		1	HAPs	100%					0.000	lb/lb	0.2274	lb/scf	274.82	0.55	274.82	0.55	0.00	0.00	274.82	0.550	From inlet gas analysis
					9,000,000	3.60E+07	SCF		1	n-Hexane	100%					0.000	lb/lb	0.2274	lb/scf	274.82	0.55	274.82	0.55	0.00	0.00	274.82	0.550	From inlet gas analysis
			TOTAL BLOWDOWN EMISSIONS		9,013,500	39,960,000	SCF			TOC						0.991	lb/lb	0.0428	lb/scf	385888.661	847.352	385888.661	847.352	0.000	0.000	385888.661	847.352	Total from All Blowdowns
										VOC						0.008	lb/lb	0.1200	lb/scf	8225.287	18.061	8225.287	18.061	0.000	0.000	8225.287	18.061	Total from All Blowdowns
										CH4						0.922	lb/lb	0.0423	lb/scf	354800.372	779.087	354800.372	779.087	0.000	0.000	354800.372	779.087	Total from All Blowdowns
										HAPs						0.000	lb/lb	0.2274	lb/scf	277.840	0.610	277.840	0.610	0.000	0.000	277.840	0.610	Total from All Blowdowns
										n-Hexane						0.000	lb/lb	0.2274	lb/scf	277.840	0.610	277.840	0.610	0.000	0.000	277.840	0.610	Total from All Blowdowns
	NEW	**FUGITIVE - PIGGING OPERATIONS (SCC = 31000211)**																										
			Pigging Operations	31000211	8,916	17,831	scf		1	TOC	100%					0.991	lb/lb	0.0428	lb/scf	378.109	0.38	378.11	0.38	0.00	0.00	378.11	0.378	See Pigging Operations tab
			8,916 scf/event		8,916	17,831	scf		1	VOC	100%					0.008	lb/lb	0.1200	lb/scf	8.059	0.01	8.06	0.01	0.00	0.00	8.06	0.008	See Pigging Operations tab
			2 events/year		8,916	17,831	scf		1	CH4	100%					0.922	lb/lb	0.0423	lb/scf	347.647	0.35	347.65	0.35	0.00	0.00	347.65	0.348	See Pigging Operations tab
					8,916	17,831	scf		1	HAPs	100%					0.000	lb/lb	0.2274	lb/scf	0.272	0.00	0.27	0.00	0.00	0.00	0.27	0.000	See Pigging Operations tab
					8,916	17,831	scf		1	n-Hexane	100%					0.000	lb/lb	0.2274	lb/scf	0.272	0.00	0.27	0.00	0.00	0.00	0.27	0.000	See Pigging Operations tab
	NEW	**FUGITIVE TRUCK LOADING (PRODUCED WATER) (SCC = 31000299 Industrial Processes > Oil and Gas Production > Natural Gas Production > Other Not Classified)**																										
			125 bbl/truck	31000299	5.25	756	Mgal	8760	1	TOC	100%					0.075	lb/Mgal			0.391	0.028	0.391	0.028	0.000	0.000	0.391	0.028	See Truck Loading tab; Based on unloading one (1) tank per day
			1500 bbl loaded per month		5.25	756	Mgal	8760	1	VOC	100%					0.003	lb/Mgal			0.014	0.001	0.014	0.001	0.000	0.000	0.014	0.001	See Truck Loading tab; Based on unloading one (1) tank per day
			Max one truck loaded per hour		5.25	756	Mgal	8760	1	CO2	100%					0.002	lb/Mgal			0.013	0.001	0.013	0.001	0.000	0.000	0.013	0.001	See Truck Loading tab; Based on unloading one (1) tank per day
					5.25	756	Mgal	8760	1	CH4	100%					0.058	lb/Mgal			0.304	0.022	0.304	0.022	0.000	0.000	0.304	0.022	See Truck Loading tab; Based on unloading one (1) tank per day
					5.25	756	Mgal	8760	1	HAPs	100%					0.000	lb/Mgal			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	See Truck Loading tab; Based on unloading one (1) tank per day
					5.25	756	Mgal	8760	1	n-Hexane	100%					0.000	lb/Mgal			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	See Truck Loading tab; Based on unloading one (1) tank per day
	NEW	**FUGITIVE - PAVED AND UNPAVED ROADS**																										
			Unpaved Roads	S0100201	1.52	261.8	VMT	8760	1	PM2.5	0%					0.10	lb/VMT			0.151	0.01	0.000	0.000	0.15	0.01	0.151	0.013	See Unpaved Roads tab
					1.52	261.8	VMT	8760	1	PM10	0%					1.00	lb/VMT			1.509	0.13	0.000	0.000	1.51	0.13	1.509	0.130	See Unpaved Roads tab
					1.52	261.8	VMT	8760	1	PM	0%					4.26	lb/VMT			6.461	0.56	0.000	0.000	6.46	0.56	6.461	0.558	See Unpaved Roads tab

POTENTIAL AIR EMISSIONS

Emissions are for EACH Emissions Unit unless noted otherwise

Company ID	Permit # or Status	Emission Unit	Process Unit	Process Unit SCC	Maximum Hourly Throughput	Maximum Annual Throughput	Throughput Units	Annual Hours of Operation	No of Units	Pollutant	Capture Efficiency	Point Control Efficiency	Point Control	Fugitive Control Efficiency	Fugitive Control	EF	EF Units	EF Conversion Factor	EF Conversion Factor Units	Uncontrolled Emissions		Point Emissions Controlled		Fugitive Emissions Controlled		Total Controlled (Point + Fugitive)		Emission Factor Source / Notes
																				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
										TOTALS (Does not include Emissions labeled as FUGITIVE for major source determination)										Uncontrolled		Point Controlled		Fugitive Controlled		Total Controlled (Point + Fugitive)		
																				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
										NOx										19.75	86.49	19.75	86.49	0.00	0.00	19.75	86.49	
										CO										142.80	625.45	10.52	46.10	0.00	0.00	10.52	46.10	
										VOC										38.22	167.42	17.99	78.79	0.00	0.00	17.99	78.79	
										CO2										25330.78	110948.82	25330.78	110948.82	0.00	0.00	25330.78	110948.82	
										Formaldehyde										10.45	45.76	1.86	8.13	0.00	0.00	1.86	8.13	
										TOC										425.64	1864.31	346.65	1518.32	10.82	47.37	357.46	1565.69	
										CH4										343.27	1503.51	288.21	1262.37	0.00	0.00	288.21	1262.37	
										SO2										0.12	0.53	0.12	0.53	0.00	0.00	0.12	0.53	
										PM10										0.06	0.26	0.06	0.26	0.00	0.00	0.06	0.26	
										PM2.5										0.06	0.26	0.06	0.26	0.00	0.00	0.06	0.26	
										PM										2.02	8.83	2.02	8.83	0.00	0.00	2.02	8.83	
										N2O										0.06	0.25	0.06	0.25	0.00	0.00	0.06	0.25	
										acrolein										1.05	4.61	0.48	2.10	0.00	0.00	0.48	2.10	
										acetaldehyde										1.66	7.28	0.76	3.32	0.00	0.00	0.76	3.32	
										biphenyl										0.04	0.19	0.02	0.09	0.00	0.00	0.02	0.09	
										benzene										0.34	1.49	0.28	1.23	0.00	0.00	0.28	1.23	
										toluene										0.49	2.16	0.43	1.90	0.00	0.00	0.43	1.90	
										Ethylbenzene										0.55	2.39	0.53	2.31	0.00	0.00	0.53	2.31	
										Xylenes										0.79	3.46	0.76	3.31	0.00	0.00	0.76	3.31	
										methanol										0.51	2.24	0.23	1.02	0.00	0.00	0.23	1.02	
										n-hexane										0.31	1.38	0.16	0.70	0.00	0.00	0.16	0.70	
										HAPs										12.39	70.97	5.50	24.11	0.00	0.00	5.50	24.11	

PIGGING EMISSIONS (One Pig Launcher)

PIG RECEIVER

Given:

Length =	**30**	feet				
Diameter =	**2**	feet				
Q_a =	**94.25**	Cubic feet	yields	**2.66879553**	Cubic Meters	Volume of Compressor
P_i=	**83.36**	Atm	yields	**8446.45**	kPa	Pressure of Pipeline
T_i =	**25.00**	Deg C	yields	**298.15**	Deg K	Temperature in Pipeline
P_f=	**1.00**	Atm	yields	**101.33**	kPa	Ambient Pressure (Usually 1 ATM)
T_f=	**25.00**	Deg C	yields	**298.15**	Deg K	Ambient Temperature (Usually 10-25 Deg. C or Standard Temp -15Deg. C)
z_i=	**0.84311**					
z_f=	**1.00111**					

Q_t= **252.460** **Cubic Meters** **or** **8915.56** **Cubic Feet**

Based on EPA's Addendum 1 to the Oil and Gas Production Protocol, Version 1.1 , Equation 22-23

$Q_t=Q_a \times (T_s/P_s) \times (Pi/(z_i*T_i)) - (P_f/(z_f*T_f))$

$Q_a = pi \times r^2 \times h$

Where :

Q_t = Total volume of gas released in cubic meters at STP (15 Deg C and 1 Atm)

Q_a = Actual volume of gas at process conditions in cubic meters

P_s = Standard Pressure in kPa (101.3)

T_s = Standard Temperature in K (288.1)

z = Compressibility factor for the gas

i = initial pressure and temperature

f = final temperature and pressure (generally STP)

PIGGING EMISSIONS (One Pig Launcher)

COMPRESSIBILITY FACTOR (z_i)

Given:

Pressure = **68.03** ATM. yields **6893.1** kPa or **1000** psi
Temperature = **25** °C

Compressibility Factor (z_i) = 0.843113

Based on EPA's Addendum 1 to the Oil and Gas Production Protocol, Version 1.1 , Equation 22.25

$$z = a + bp + cT + dp^2 + eT^2 + fpT$$

Where :

p= Pressure in kPa
T= Temperature in degrees celsius
a= 9.9187E-01
b= -3.3501E-05
c= 6.9652E-04
d= 6.3134E-10
e= -8.6023E-06
f= 2.3290E-07

COMPRESSIBILITY FACTOR (z_f)

Given:

Pressure = **1** ATM. yields **101.33** kPa or **14.7** psi
Temperature = **25** °C

Compressibility Factor (z_f) = 1.001109

Based on EPA's Addendum 1 to the Oil and Gas Production Protocol, Version 1.1 , Equation 22.25

$$z = a + bp + cT + dp^2 + eT^2 + fpT$$

Where :

p= Pressure in kPa
T= Temperature in degrees celsius
a= 9.9187E-01
b= -3.3501E-05
c= 6.9652E-04
d= 6.3134E-10
e= -8.6023E-06
f= 2.3290E-07

TRUCK LOADING EMISSIONS (Produced Water)

Truck Loading

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=	0.07453	lbs/1000 gallons
Saturation Factor	S=	0.6	
True Vapor Pressure	P=	0.3	psia
Molecular Weight of Vapors	M=	17.28	lb/lb-mol
Temperature	T=	520	deg R

Goff Connector LLC - Connector CS

Flash Emission Calculations

Using Gas-Oil Ratio Method

Site specific data			
Estimated Gas-water-ratio	=	3.88	scf/bbl
Throughput	=	18,000	bbl/yr
Stock tank gas molecular weight	=	17.28	g/mole

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

Equations

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

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

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

E_{spec} = Flash emission from constituent

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

Flash Emissions

Constituent	TPY
Total	1.6819
VOC	**0.0155**
Nitrogen	0.00E+00
Carbon Dioxide	6.46E-02
Methane	1.45E+00
Ethane	1.48E-01
Propane	1.28E-02
Isobutane	5.05E-04
n-Butane	1.30E-03
2,2 Dimethylpropane	0.00E+00
Isopentane	0.00E+00
n-Pentane	0.00E+00
2,2 Dimethylbutane	0.00E+00
Cyclopentane	0.00E+00
2,3 Dimethylbutane	0.00E+00
2 Methylpentane	0.00E+00
3 Methylpentane	0.00E+00
n-Hexane	0.00E+00
Methylcyclopentane	0.00E+00
Benzene	2.35E-04
Cyclohexane	1.68E-04
2-Methylhexane	0.00E+00
3-Methylhexane	0.00E+00
2,2,4 Trimethylpentane	0.00E+00
Other C7's	0.00E+00
n-Heptane	0.00E+00
Methylcyclohexane	1.01E-04
Toluene	2.69E-04
Other C8's	0.00E+00
n-Octane	0.00E+00
Ethylbenzene	0.00E+00
M & P Xylenes	1.01E-04
O-Xylene	0.00E+00
Other C9's	0.00E+00
n-Nonane	0.00E+00
Other C10's	0.00E+00
n-Decane	0.00E+00
Undecanes (11)	0.00E+00

E_{TOT}

Sum of C3+

Goff Connector LLC - Connector CS

Equipment Leaks (Fugitive) Emissions

Emission Source	Quantity	% Leaking at any time	Emission Factor(1)	VOC %	VOC lb/hr	CO2 %	CO2 lb/hr	CH4 %	CH4 lb/hr	TOC %	TOC lb/hr	n-Hexane %	n-Hexane lb/hr
Light Oil Fugitive Sources													
Gas Fugitive Sources													
Flanges (FL)	3,000	100%	8.58E-04	0.75%	1.9E-02	0.47%	1.2E-02	92.18%	2.4E+00	99.1%	2.6E+00	0.01%	3.5E-04
Valves (V)	400	100%	9.90E-03	0.75%	3.0E-02	0.47%	1.8E-02	92.18%	3.7E+00	99.1%	3.9E+00	0.01%	5.3E-04
Pump Seals (P)	6	100%	5.28E-03	0.75%	2.4E-04	0.47%	1.5E-04	92.18%	2.9E-02	99.1%	3.1E-02	0.01%	4.3E-06
Open Ended Lines (OEL)	8	100%	4.40E-03	0.75%	2.7E-04	0.47%	1.6E-04	92.18%	3.2E-02	99.1%	3.5E-02	0.01%	4.7E-06
Connectors (C)	1400	100%	4.40E-04	0.75%	4.6E-03	0.47%	2.9E-03	92.18%	5.7E-01	99.1%	6.1E-01	0.01%	8.3E-05
Pressure Relief Valves (PRV)	180	100%	1.94E-02	0.75%	2.6E-02	0.47%	1.6E-02	92.18%	3.2E+00	99.1%	3.5E+00	0.01%	4.7E-04
Others	11	100%	1.94E-02	0.75%	1.6E-03	0.47%	9.9E-04	92.18%	2.0E-01	99.1%	2.1E-01	0.01%	2.9E-05
TOTALS					0.0822		0.0510		10.061		10.815		0.0015

Notes

1 Emission Factor Units are in lb/hr/source
2 Gas Fugitive Sources % pollutant is from Fuel Gas Analysis
3 Emission Factors Data Source
4 Component count based on 40 CFR 98 Table W-1B

	Oil & Gas Production Emission Factors (1)					
Component:	**Light Oil** kg / hr / source	**Heavy Oil** kg / hr / source	**Gas** kg / hr / source	**Light Oil** lb / hr / source	**Heavy Oil** lb / hr / source	**Gas** lb / hr / source
Flanges (FL)	1.10E-04	3.90E-07	3.90E-04	2.42E-04	8.58E-07	8.58E-04
Valves (V)	2.50E-03	8.40E-06	4.50E-03	5.50E-03	1.85E-05	9.90E-03
Pump Seals (P)	1.30E-02	3.20E-05	2.40E-03	2.86E-02	7.04E-05	5.28E-03
Open Ended Lines (OEL)	1.40E-03	1.40E-04	2.00E-03	3.08E-03	3.08E-04	4.40E-03
Connectors (C)	2.10E-04	7.50E-06	2.00E-04	4.62E-04	1.65E-05	4.40E-04
Pressure Relief Valves (PRV)	7.50E-03	3.20E-05	8.80E-03	1.65E-02	7.04E-05	1.94E-02
Others	7.50E-03	3.20E-05	8.80E-03	1.65E-02	7.04E-05	1.94E-02

(1) Factors from: Table 2-4 of "Protocol for Equipment Leak Emission Estimates", (EPA-453/R-95-017), USEPA, 11/95

Unpaved Roads Fugitive Emissions

Source: AP-42, 5th edition, Section 13.2.2 Unpaved Roads

Silt content of road surface material, %	s	3.1	%	From http://www.epa.gov/ttnchie1/ap42/ch13/related/c13s02-2.html
Mean Vehicle Weight	W	53	tons	
Number of days per year with precipitation > 0.01 in.	p	140	days	

Equation Constants and Emission Factor

Description	variable	PM-2.5	PM-10	PM
Particle size multiplier, lb/VMT	k	0.15	1.5	4.9
Constant	a	0.9	0.9	0.7
Constant	b	0.45	0.45	0.45
Emission Factor, lb/VMT	EF	0.10	1.00	4.26

EF = (k * (s/12)^a * (W/3)^b) * ((365-p)/365) — US EPA AP-42, Section 13.2.2 (11/06), Equation 1a and 2

Total Trucks per hour	1		
Total Trucks per year	173		
Vehicle travel data and control efficiency			
Length of facility road	4000	feet one way	Tanker trucks typically have a width of 8.2 ft
Vehicle miles traveled per trip	1.52	VMT	
Maximum trips per hour	1.00		
Vehicle miles traveled per hour	1.52	VMT	
Maximum trips per year	173		
Vehicle miles traveled per year	262	VMT	
Control			
Control Efficiency	95%	Gravel + Watering	

Note: If using Gravel + Watering, the control efficiency is 95%

Goff Connector LLC
Fuel Gas Analysis Information

Connector Compressor Station
Harrison 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	TOC	% of VOC
Nitrogen, N2	0.2624	0.074	0.003	0.441			-		0.0026		
Carbon Dioxide, CO2	0.1770	0.078	0.003	0.467			-		0.0018		
Hydrogen Sulfide, H2S		-	-	-			-		-		
Helium, He		-	-	-			-		-		
Oxygen, O2	0.0020	0.001	0.000	0.004			-		0.0000		
Methane, CH4	95.8791	15.382	0.531	92.183	871.9	968.4	9.137		0.9569	92.183	
Ethane, C2H6	3.4142	1.027	0.035	6.153	55.3	60.4	0.569		0.0339	6.153	
Propane	0.2210	0.097	0.003	0.584	5.1	5.6	0.053	0.584	0.0022	0.584	
Iso-Butane	0.0133	0.008	0.000	0.046	0.4	0.4	0.004	0.046	0.0001	0.046	
Normal Butane	0.0198	0.012	0.000	0.069	0.6	0.6	0.006	0.069	0.0002	0.069	
Iso Pentane	0.0038	0.003	0.000	0.016	0.1	0.2	0.001	0.016	0.0000	0.016	
Normal Pentane	0.0028	0.002	0.000	0.012	0.1	0.1	0.001	0.012	0.0000	0.012	
Hexanes	0.0026	0.002	0.000	0.013	0.1	0.1	0.001	0.013	0.0000	0.013	1.7825%
Heptane +	0.0020	0.002	0.000	0.012	0.1	0.1	0.001	0.012	0.0000	0.012	
	100.0	16.686	0.576	100.000	933.8	1,035.9	9.774	0.753	0.9977	99.089	

Ideal Gross (HHV)	1,035.9
Ideal Gross (sat'd)	1,018.7
	-
Real Gross (HHV)	1,038.3
Real Net (LHV)	935.9

Goff Connector LLC
Flash Gas Analysis Information

Connector Compressor Station
Harrison County, WV

Dehy Flash Gas Composition Information

From GRI-GLYCALC Output

	Flash Gas mole %	Flash 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	TOC
Nitrogen, N2		-	-	-			-		-	
Carbon Dioxide, CO2	1.2300	0.541	0.019	3.201			-		0.0123	
Hydrogen Sulfide, H2S		-	-	-			-		-	
Water	0.3810	0.015	0.001	0.090			-		0.0038	
Oxygen, O2		-	-	-			-		-	
Methane, CH4	81.8000	13.123	0.453	77.595	743.9	826.2	7.796		0.8164	77.595
Ethane, C2H6	8.6900	2.613	0.090	15.451	140.7	153.8	1.449		0.0862	15.451
Propane	1.0200	0.450	0.016	2.660	23.6	25.7	0.243	2.660	0.0100	2.660
Iso-Butane	0.1160	0.067	0.002	0.399	3.5	3.8	0.036	0.399	0.0011	0.399
Normal Butane	0.1340	0.078	0.003	0.461	4.0	4.4	0.041	0.461	0.0013	0.461
Iso Pentane	0.0221	0.016	0.001	0.094	0.8	0.9	0.008	0.094	0.0002	0.094
Normal Pentane	0.0099	0.007	0.000	0.042	0.4	0.4	0.004	0.042	0.0001	0.042
n-Hexane	0.0009	0.001	0.000	0.005	0.0	0.0	0.000	0.005	0.0000	0.005
Heptane +	0.0005	0.000	0.000	0.003	0.0	0.0	0.000	0.003	0.0000	0.003
	93.4	16.912	0.584		916.9	1,015.1	9.578	3.663	0.9314	96.709

Ideal Gross (HHV)	1,015.1
Ideal Gross (sat'd)	998.2
	-
Real Gross (HHV)	1,089.9
Real Net (LHV)	984.5

ATTACHMENT V – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

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

Emission Point ID#	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		GHG (CO_2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-01	1.96	8.57	0.74	3.24	1.18	5.15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2,251	9,860
CE-02	1.96	8.57	0.74	3.24	1.18	1.58	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2,251	9,860
CE-03	1.96	8.57	0.74	3.24	1.18	1.58	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2,251	9,860
CE-04	1.66	7.25	0.94	4.09	1.11	4.83	0.01	0.05	<0.01	<0.01	<0.01	<0.01	2,895	12,679
CE-05	1.66	7.25	0.94	4.09	1.11	1.10	0.01	0.05	<0.01	<0.01	<0.01	<0.01	2,895	12,679
CE-06	1.66	7.25	0.94	4.09	1.11	1.10	0.01	0.05	<0.01	<0.01	<0.01	<0.01	2,895	12,679
CE-07	1.66	7.25	0.94	4.09	1.11	1.10	0.01	0.05	<0.01	<0.01	<0.01	<0.01	2,895	12,679
CE-08	1.66	7.25	0.94	4.09	1.11	1.10	0.01	0.05	<0.01	<0.01	<0.01	<0.01	2,895	12,679
CE-09	1.66	7.25	0.94	4.09	1.11	1.10	0.01	0.05	<0.01	<0.01	<0.01	<0.01	2,895	12,679
CE-10	1.66	7.25	0.94	4.09	1.11	1.10	0.01	0.05	<0.01	<0.01	<0.01	<0.01	2,895	12,679
CE-11	1.66	7.25	0.94	4.09	1.11	1.10	0.01	0.05	<0.01	<0.01	<0.01	<0.01	2,895	12,679
GE-01	0.03	0.14	0.18	0.76	0.38	1.67	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	455	2,015
GE-02	0.03	0.14	0.18	0.76	0.38	1.67	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	455	2,015
DEHY-1	--	--	--	--	1.62	7.09	--	--	--	--	--	--	338	1,479
DEHY-2	--	--	--	--	1.62	7.09	--	--	--	--	--	--	338	1,479
DEHY-3	--	--	--	--	1.62	7.09	--	--	--	--	--	--	338	1,479
REB-1	0.20	0.86	0.17	0.73	0.01	0.05	<0.01	<0.01	0.02	0.07	0.02	0.07	237	1,037
REB-2	0.20	0.86	0.17	0.73	0.01	0.05	<0.01	<0.01	0.02	0.07	0.02	0.07	237	1,037
REB-3	0.20	0.86	0.17	0.73	0.01	0.05	<0.01	<0.01	0.02	0.07	0.02	0.07	237	1,037
TO-1	--	--	--	--	<0.01	0.02	--	--	--	--	--	--	9	38
TOTAL	19.75	86.49	10.52	46.10	17.99	78.79	0.12	0.53	0.06	0.26	0.06	0.26	32,554	142,582

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

Facility-Wide Controlled Emissions Summary Sheet

ATTACHMENT V – FACILITY-WIDE HAP CONTROLLED EMISSIONS SUMMARY SHEET

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

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-01	0.16	0.67	0.001	0.003	0.001	0.003	0.000	0.000	0.000	0.001	0.002	0.007	0.073	0.319
CE-02	0.16	0.67	0.001	0.003	0.001	0.003	0.000	0.000	0.000	0.001	0.002	0.007	0.073	0.319
CE-03	0.16	0.67	0.001	0.003	0.001	0.003	0.000	0.000	0.000	0.001	0.002	0.007	0.073	0.319
CE-04	0.14	0.58	0.001	0.004	0.001	0.004	0.000	0.000	0.000	0.002	0.002	0.010	0.080	0.350
CE-05	0.14	0.58	0.001	0.004	0.001	0.004	0.000	0.000	0.000	0.002	0.002	0.010	0.080	0.350
CE-06	0.14	0.58	0.001	0.004	0.001	0.004	0.000	0.000	0.000	0.002	0.002	0.010	0.080	0.350
CE-07	0.14	0.58	0.001	0.004	0.001	0.004	0.000	0.000	0.000	0.002	0.002	0.010	0.080	0.350
CE-08	0.14	0.58	0.001	0.004	0.001	0.004	0.000	0.000	0.000	0.002	0.002	0.010	0.080	0.350
CE-09	0.14	0.58	0.001	0.004	0.001	0.004	0.000	0.000	0.000	0.002	0.002	0.010	0.080	0.350
CE-10	0.14	0.58	0.001	0.004	0.001	0.004	0.000	0.000	0.000	0.002	0.002	0.010	0.080	0.350
CE-11	0.14	0.58	0.001	0.004	0.001	0.004	0.000	0.000	0.000	0.002	0.002	0.010	0.080	0.350
GE-01	0.170	0.745	0.001	0.006	0.001	0.006	0.000	0.001	0.001	0.003	0.004	0.016	0.230	1.008
GE-02	0.170	0.745	0.001	0.006	0.001	0.006	0.000	0.001	0.001	0.003	0.004	0.016	0.230	1.008
DEHY-1	--	--	0.080	0.349	0.132	0.578	0.175	0.766	0.247	1.078	0.019	0.081	0.651	2.850
DEHY-2	--	--	0.080	0.349	0.132	0.578	0.175	0.766	0.247	1.078	0.019	0.081	0.651	2.850
DEHY-3	--	--	0.080	0.349	0.132	0.578	0.175	0.766	0.247	1.078	0.019	0.081	0.651	2.850
TO-1	--	--	--	--	--	--	--	--	--	--	0.001	0.006	0.001	0.006
TOTAL	1.86	8.13	0.25	1.10	0.41	1.78	0.53	2.30	0.74	3.26	0.09	0.38	5.50	24.11

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 W

Class I Legal Advertisement

ATTACHMENT W – CLASS I LEGAL ADVERTISEMENT

Publication of a proper Class I legal advertisement is a requirement of the G35-D registration process. In the event the applicant's legal advertisement fails to follow the requirements of 45CSR13, Section 8 or the requirements of Chapter 59, Article 3, of the West Virginia Code, the application will be considered incomplete and no further review of the application will occur until this is corrected.

The applicant, utilizing the format for the Class I legal advertisement example provided on the following page, shall have the legal advertisement appear a minimum of one (1) day in the newspaper most commonly read in the area where the facility exists or will be constructed. The notice must be published no earlier than five (5) working days of receipt by this office of your application. The original affidavit of publication must be received by this office no later than the last day of the public comment period.

The advertisement shall contain, at a minimum, the name of the applicant, the type and location of the source, the type and amount of air pollutants that will be discharged (include fugitive emissions separately), the nature of the permit being sought, the proposed start-up date for the source, and a contact telephone number for more information.

The location of the source should be as specific as possible starting with: 1.) the street address of the source; 2.) the nearest street or road; 3.) the nearest town or unincorporated area, 4.) the county, and 5.) latitude and longitude coordinates in decimal format.

Types and amounts of pollutants discharged must include all regulated pollutants (Nitrogen Oxides, Carbon Monoxide, Particulate Matter-2.5, Particulate Matter-10, Volatile Organic Compounds, Sulfur Dioxide, Formaldehyde, Benzene, Toluene, Ethylbenzene, Xylenes, Hexane, Total Hazardous Air Pollutants) and their potential to emit or the permit level being sought in units of tons per year.

In the event the 30th day is a Saturday, Sunday, or legal holiday, the comment period will be extended until 5:00 p.m. on the following regularly scheduled business day.

A list of qualified newspapers that are eligible to publish legal ads may be found:

http://www.sos.wv.gov/elections/resource/Documents/Qualified%20Newspapers.pdf

Affidavit Notice Will Be Submitted Upon Receipt

RECOMMENDED PUBLIC NOTICE TEMPLATE

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Goff Connector LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G35-D General Permit Registration for a natural gas compressor and/or dehydration facility located on along Pigtail Run-Green Valley Road near Bridgeport, WV, in Harrison County, West Virginia. The latitude and longitude coordinates are: (39.23405N, 80.17733W).

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

86.49 tons of Oxides of Nitrogen per year
78.79 tons of Volatile Organic Compounds per year
46.10 tons of Carbon Monoxide per year
0.26 tons of Particulate Matter per year
0.53 tons of Sulfur Dioxide per year
8.13 tons of Formaldehyde per year
0.41 tons of Benzene per year
0.53 tons of Toluene per year
0.74 tons of Ethylbenzene per year
0.09 tons of Xylenes per year
0.38 tons of Hexane per year
24.11 tons of Total Hazardous Air Pollutants
142,582 tons of Greenhouse Gases per year

Startup of operation is planned to begin on or about the 1st day of October, 2018. 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)** day of **(Month)**, **(Year)**.

By: Mr. Mike Hopkins
Chief Operating Officer
Goff Connector LLC