G35-D General Permit Application

Goff Natural Gas Compressor Station

Clarksburg, West Virginia

Prepared By:

Environmental Resources Management, Inc.
Hurricane, West Virginia

September 2017

ARSENAL MIDSTREAM

People Powered. Asset Strong.

September 12, 2017

Mr. William F. Durham, Director
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, West Virginia, 25304

RE: G35-D General Permit Registration Application
Arsenal Midstream
Goff Natural Gas Compression Station

Dear Director Durham:

Enclosed are one (1) original hard copy and two (2) complete PDFs included on CD-ROM of a G35-D General Permit Registration Application for the authority to construct the Goff natural gas compression station located in Harrison County, West Virginia.

A legal advertisement will be published in the next few days and proof of publication will be forwarded as soon as it is received. Please contact me for payment of the application fee by credit card.

If you have any questions concerning this permit application, please contact me at (724) 940-1112 or by email at myingling@arsenalresources.com.

Sincerely,

Meghan M.B. Yingling
Environmental Compliance Manager
Arsenal Midstream

Enclosures

Cc: Bill Veigel, Sr. Director of Production, Arsenal Midstream
Stacey Lucas, V.P. HSE, Arsenal Resources
Grant Morgan, ERM

6031 Wallace Road Ext. Suite 300
Wexford, PA 15090
P: 724-940-1100
F: 800-428-0981
www.arsenalresources.com

1.0 INTRODUCTION NARRATIVE

Arsenal Midstream, LLC submits this G35-D Class II General Permit application to the West Virginia Department of Environmental Protection's Division of Air Quality (WVDAQ) for the Goff Compressor Station (Goff) located in Harrison County, West Virginia. This application addresses the operational activities associated with the compression of natural gas and produced water at the Goff Station.

Arsenal wishes to submit this G35-D to permit the following equipment currently at the Goff Station:

- Five (5) 1380 hp G3516ULB Compressor Engines;
- One (1) 107 hp Kohler 80REZGD Emergency Generator;
- One (1) 210 bbl Produced Water Tank;
- One (1) 100 bbl Produced Water Tank;
- One (1) 0.25 MMBtu/hr Line Heater; and
- Nine (9) 520 gal Oil Storage tanks.

This update is being made to correct issues with emission factors and fuel usage rates currently permitted under Permit No. G35-D107E. The original name permitted for this station was Goff West Compressor Station, which was an aggregation of this station and another compressor station. These stations will no longer share a permit, based on EPA Source Determination Guidance, and the name for this station will change to Goff Compressor Station. The other station will have a separate G35-D permit application submitted to become Cather Compressor Station.

Statement of aggregation

The Goff Compressor Station is located in Harrison County, WV and operated by Arsenal. Stationary sources of air pollutants may require aggregation of total emission levels if these sources share the same industrial grouping, are operating under common control, and are classified as contiguous or adjacent properties. Arsenal operates Goff with the same industrial grouping as nearby facilities, and some of these facilities are under common control. However, the Goff Station is not subject to the aggregation of stationary emission sources because these sites do not meet the definition of contiguous or adjacent facilities.

The Goff Station operates under SIC code 1311 (Crude Petroleum and Natural Gas Extraction). There are surrounding sites operated by Arsenal that share the same two digit major SIC code of 13 for Crude Petroleum and Natural Gas Extraction. Therefore, the Goff Station does share the same SIC codes as the surrounding wells and compressor stations.

Arsenal is the sole operator of the Goff Station. Arsenal is also the sole operator of other production sites and compressor stations in the area. Therefore, Arsenal does qualify as having nearby operations under common control.

Based on the EPA's Source Determination Guidance for Certain Emission Units in the Oil and Natural Gas Sector, effective on August 2, 2016, the term "adjacent" is defined as follows:

> *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 near each other – specifically, if they are located on the same site or on sites that share equipment and are within ¼ mile of each other.*

The Goff compressor station shares equipment with the surrounding wells and compressor stations. Specifically, the Goff Compressor Station and Cather Compressor Station can be operated such that gas flows from one station to the other, with each station acting as a stage of compression. It is important to note that bypass valves are installed and operated at each facility to allow for each station to operate independently of one another, as required by field and market conditions. Based upon the above, the Goff compressor station does share equipment with nearby facilities.

The additional consideration that the EPA put forth in the Source Determination Guidance is that the facilities must be within ¼ mile to be considered as adjacent facilities. Goff Compressor station does not fall within the ¼ mile rule and therefore, does not meet the definition of contiguous or adjacent properties.

Below are the GPS coordinates for the Goff Compressor station and nearby, Arsenal owned assets to show the ¼ mile radius is valid.

Goff Compressor Station: 39.27737, -80.40417 (0.50 miles from Cather Compressor Station and 0.57 miles from Goff 3 & 4).
Cather Compressor Station: 39.27944, -80.41333
Goff 3 & 4 Wellpad: 39.269845, -80.40031

Based on the above reasoning, Arsenal is not subject to the aggregation of stationary emission sources since the stationary sources are not considered contiguous or adjacent facilities.

2.0 REGULATORY DISCUSSION

This section outlines the State air quality regulations that could be reasonably expected to apply to the Goff Station and makes an applicability determination for each regulation based on activities conducted at the station and the emissions of regulated air pollutants. This review is presented to supplement and/or add clarification to the information provided in the WVDEP G35-D permit application forms. The West Virginia State Regulations address federal regulations, including Prevention of Significant Deterioration permitting, Title V permitting, New Source Performance Standards, and National Emission Standards for Hazardous Air Pollutants.

The regulatory requirements in reference to Goff are described in detail in the below section.

West Virginia State Air Regulations

45 CSR 02 – To Prevent and Control Particulate Air Pollution From Combustion of Fuel in Indirect Heat Exchangers

The line heater is an indirect heat exchanger that combusts natural gas but is exempt from this regulation since the heat input capacity is less than 10 MMBtu/hr.

45 CSR 04 – To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

Operations conducted at the Goff Station are subject to this requirement. Based on the nature of the process at the compressor station, the presence of objectionable odors is unlikely.

45 CSR 06 – Control of Air Pollution from the Combustion of Refuse

The Goff Compressor Station does not have a combustion device and is therefore not subject to this rule.

45 CSR 10 – To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

The Line Heater combusts natural gas but are exempt from this regulation since the heat input capacity is less than 10 MMBtu/hr.

45 CSR 13 – Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants

This G35-D permit application is being submitted for the operational activities associated with Arsenal's compression of natural gas.

45 CSR 14 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration (PSD). The G35-D applicability criterion excludes facilities that meet the definition of a major source as defined in 45 CSR 19 for being eligible for the general permit.

Operation of equipment at the Goff Station will not exceed emission thresholds established by this permitting program. Arsenal will monitor future construction and modification activities at the station closely and will compare any future increase in emissions with the PSD thresholds to ensure these activities will not trigger this program.

45 CSR 16 - Standards of Performance for New Stationary Sources (NSPS)

45 CSR 16 applies to all registrants that are subject to any of the NSPS requirements described in more detail in the Federal Regulations section.

45 CSR 19 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contributed to Non-attainment

Federal construction permitting programs regulate new and modified sources of nonattainment pollutants under Non-Attainment New Source Review (NNSR). The G35-D applicability criterion excludes facilities that meet the definition of a major source as defined in 45 CSR 19 for being eligible for the general permit.

Harrison County, WV is in attainment for all pollutants with a National Ambient Air Quality Standard (NAAQS). Therefore, this regulation would not apply to the Goff Station.

45 CSR 25 – Control of Air Pollution from Hazardous Waste Treatment, Storage, and Disposal Facilities

No hazardous waste will be burned at this compressor station; therefore, it is not subject to this hazardous waste rule.

45 CSR 30 – Requirements for Operating Permits

45 CSR 30 applies to the requirements of the federal Title V operating permit program (40 CFR 70). The major source thresholds for the Title V operating permit program regulations are 10 tons per year (tpy) of a single hazardous air pollutant (HAP), 25 tpy of any combination of HAPs, or 100 tpy of all other regulated pollutants.

The potential emissions of all regulated pollutants at the proposed facility are below the corresponding major source threshold(s). Therefore, the Goff Station will not be a major source under the Title V program.

45 CSR 34 – National Emission Standards for Hazardous Air Pollutants (NESHAP)

45 CSR 34 applies to all registrants that are subject to any of the NESHAP requirements. The NESHAP Rules are discussed further in the Federal Regulation section of this document.

Federal Regulations

New Source Performance Standards

40 CFR 60, Subpart OOOO (Standards of Performance for Crude oil and Natural Gas Production, Transmission and Distribution)

Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO_2) emissions from affected facilities that commence construction, modification or reconstruction between August 23, 2011 and September 18, 2015. The applicable provisions and requirements of Subpart OOOO are included under the G35-D permit.

The Goff station is a reciprocating compressor engine affected facility under OOOO for compression engines CE-1R and CE-2R. As a reciprocating engine affected facility, Arsenal

must replace the compressor rod packing prior to three (3) years from the date of the most recent rod packing replacement.

There are several equipment types that have been installed at Goff that do not meet the affected facility definitions as specified by EPA. These include:

- Storage vessels: Emissions from Produced Water Tank TK-2 were determined to be below 6 tons per year (tpy) of VOC. Therefore, Produced Water Tank TK-2 is not an affected storage vessel.
- Pneumatic devices: All pneumatic devices installed at the Goff Station are either low-continuous bleed or intermittent bleed and do not qualify as affected sources.

Subpart OOOOa (Standards Of Performance For Crude Oil And Natural Gas Facilities For Which Construction, Modification, Or Reconstruction Commenced After September 18, 2015)

The Goff Station does have equipment that is an affected facility under OOOOa. The Goff Station will qualify as a collection of fugitive components affected facility. As a fugitive component affected facility, in order to comply, LDAR monitoring at the Goff Station must be conducted quarterly.

The Goff Station is a reciprocating compressor engine affected facility under OOOOa for compressor engines CE-7R, CE-8R, and CE-9R. As a reciprocating engine affected facility, Arsenal must replace the compressor rod packing on or before the compressor operates for 26,000 hours or prior to three (3) years from the date of the most recent rod packing replacement, whichever is earlier.

There are several equipment types that have been installed at the Goff Station that do not meet the affected facility definitions as specified by EPA. These include:

- Storage vessels: Emissions from Produced Water Tank TK-1 were determined to be below 6 tons per year (tpy) of VOC. Therefore, Produced Water Tank TK-1 is not an affected storage vessel.
- Pneumatic devices: All pneumatic devices installed at the Goff Station are either low-continuous bleed or intermittent bleed and do not qualify as affected sources.

40 CFR 60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)

The Goff Station has compressor engines that were constructed after 6/12/2006, making them subject to JJJJ. All five (5) of these engines are non-emergency, spark-ignition, lean-burn reciprocating internal combustion engine with a horsepower rating of 1380 bhp and are subject to the following emission standards:

- NOx – 1.0 g/bhp-hr;
- CO – 2.0 g/bhp-hr; and
- VOCs – 0.7 g/bhp-hr.

The Goff Station also has one (1) 107 hp emergency generator. This unit is JJJJ certified for the following standards and has an EPA Certificate of Conformity:

- NOx – 2.0 g/bhp-hr;
- CO – 4.0 g/bhp-hr; and
- VOC – 1.0 g/bhp-hr.

No additional NSPS are expected to be applicable to this facility.

National Emissions Standards for Hazardous Air Pollutants

40 CFR 63, Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines)

The CAT G3516B LE compressor engines comply with Subpart ZZZZ because they are subject to NSPS Subpart JJJJ regulations.

The Kohler 80REZGD Emergency Generator complies with Subpart ZZZZ because it is a NSPS Subpart JJJJ certified engine with an EPA Certificate of Conformity.

No additional NESHAP are expected to be applicable to this facility.

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): **Arsenal Midstream, LLC**

Federal Employer ID No. (FEIN): **47-1919654**

Applicant's Mailing Address: **65 Professional Place Suite 200**

City: **Bridgeport** | State: **WV** | ZIP Code: **26330**

Facility Name: **Goff Compressor Station**

Operating Site Physical Address: **50 E. Davisson Run Rd. Clarksburg, Harrison County, WV**
If none available, list road, city or town and zip of facility.

City: **Clarksburg** | Zip Code: **26302** | County: **Harrison**

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: **39.27737**
Longitude: **-80.40417**

SIC Code: **1311**

NAICS Code: **211111**

DAQ Facility ID No. (For existing facilities)
033-00187

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 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: Phone: Fax:
Email: Date:

If applicable:
Authorized Representative Signature:_____
Name and Title: **Meghan M.B. Yingling, Environmental Compliance Manager** Phone: **724-940-1112** Fax:
Email: **myingling@arsenalresources.com** Date: 9/12/17

If applicable:
Environmental Contact
Name and Title: **Meghan M.B. Yingling, Environmental Compliance Manager** Phone: **724-940-1112** Fax:
Email: **myingling@arsenalresources.com** Date:

OPERATING SITE INFORMATION
Briefly describe the proposed new operation and/or any change(s) to the facility: Addition of compressor engine CE-9R.
Directions to the facility: From I-79 South; (1.) At exit 119, take ramp right for US-50 West toward Clarksburg, Travel 7.0 miles (2.) Turn left onto WV-98/Old US 50 / Sun Valley Rd. travel 0.4 miles (3.) turn left to stay on WV-98 and travel 0.3 miles (4.) arrive at the Goff Compressor Station.

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): **Meghan Yingling myingling@arsenalresources.com** ☒$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.

Attachment A

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

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

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

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

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

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

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

Attachment B
(Not Applicable)

Attachment C

WEST VIRGINIA
STATE TAX DEPARTMENT

BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
ARSENAL MIDSTREAM LLC
65 PROFESSIONAL PL 200
BRIDGEPORT, WV 26330-1889

BUSINESS REGISTRATION ACCOUNT NUMBER: **2306-9776**

This certificate is issued on: **05/17/2017**

This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code

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

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

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

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

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

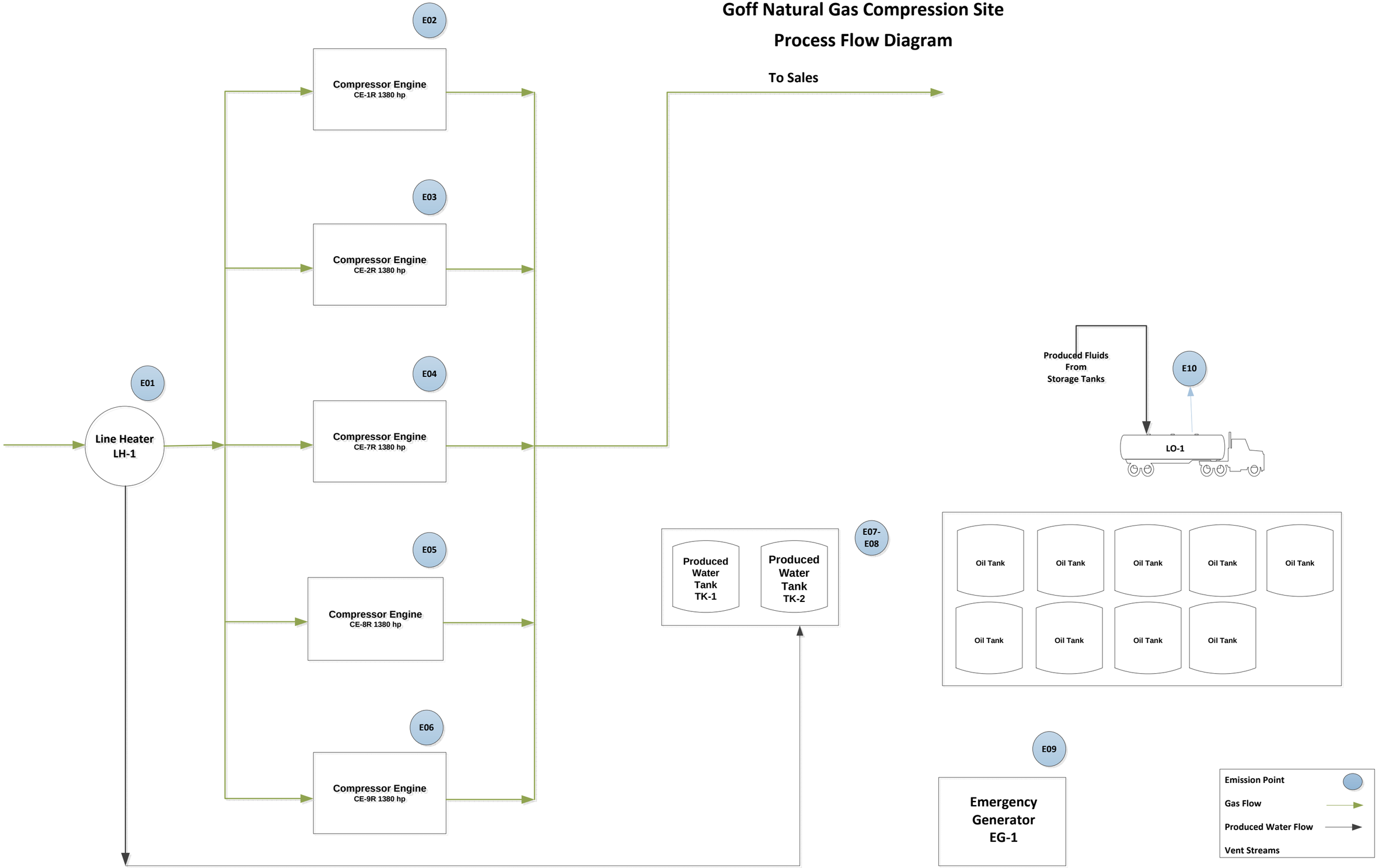
atL006 v.4
L0904785088

Attachment D

Attachment D

Goff Natural Gas Compression Site

Process Flow Diagram



Attachment E

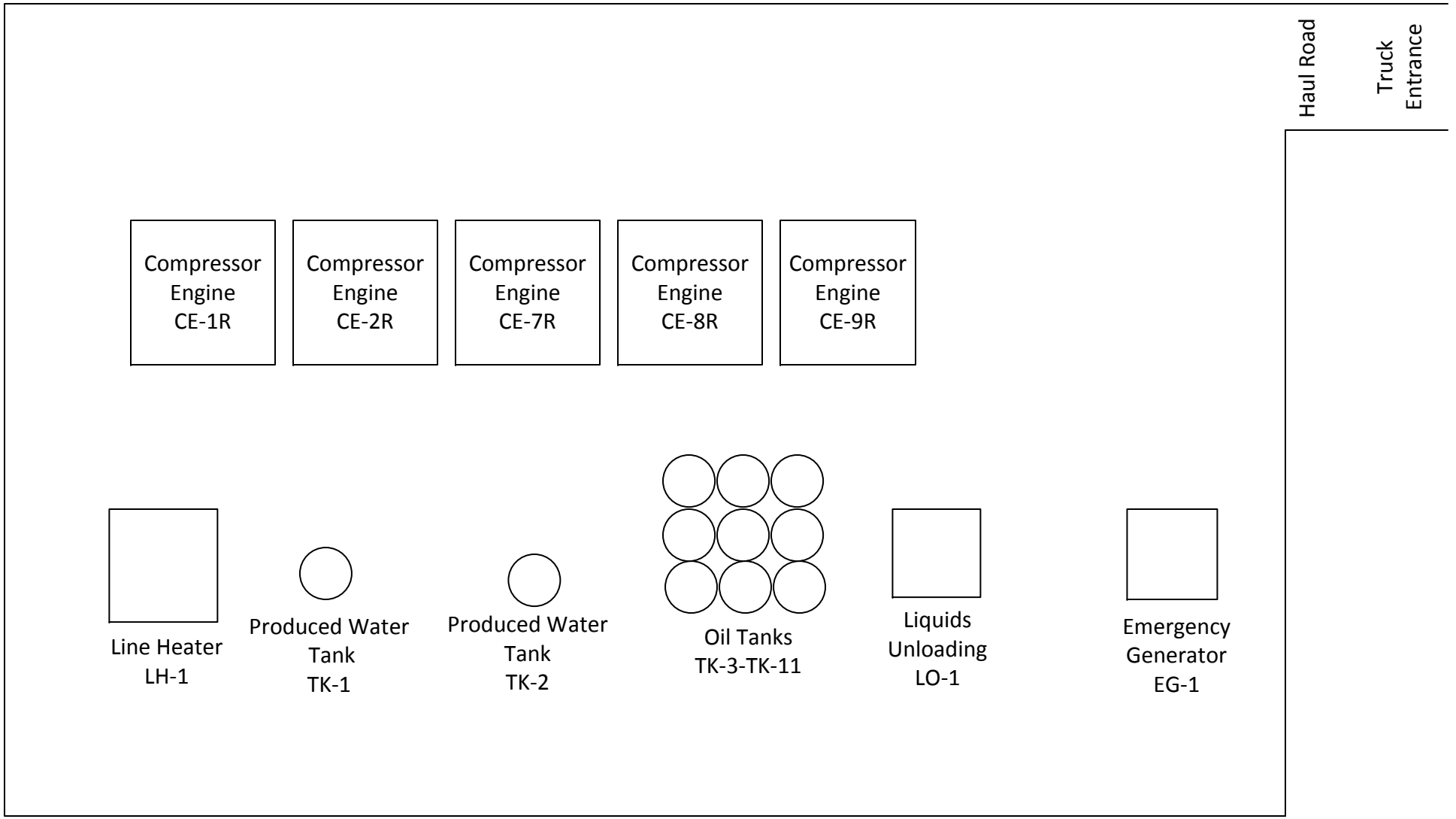
Attachment E – Process Description

Pipeline quality natural gas enters the site and is routed through a line heater. Fluids from the line heater are routed to the produced water tanks (TK-1 and TK-2). From there the gas flows through five (5) G3516 ULB Compressor Engines (CE-1R, CE-2R, CE-7R, CE-8R, and CE-9R). From the compressors, the gas enters the sales line.

Fluids are removed from the site via tanker truck on an as needed basis.

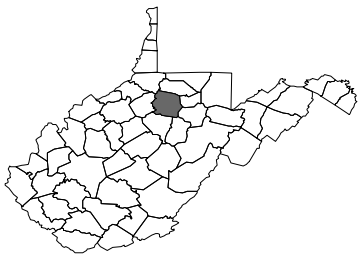
Attachment F

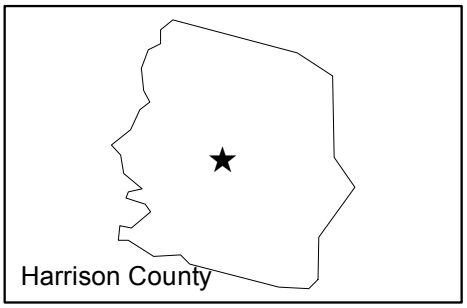
ATTACHMENT F – PLOT PLAN



Goff Natural Gas Compression Site
LAT: 39.27737 LON: -80.40417

Attachment G





0 1,000 2,000 4,000 Feet

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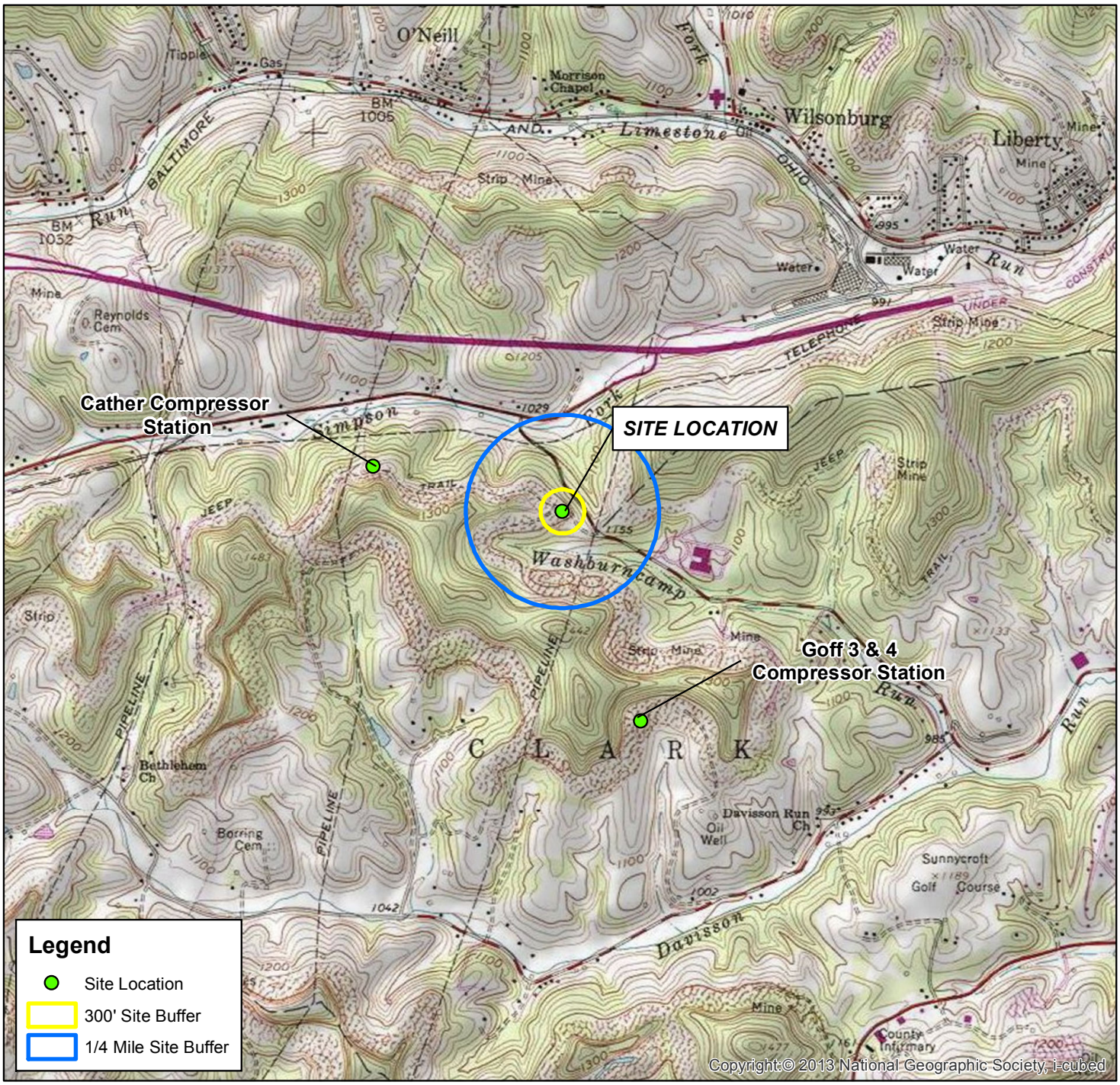
LAT. 39.27737 LON. -80.40417
HARRISON COUNTY
WEST VIRGINIA



USGS 1:24K 7.5' Quadrangle:
Wolf Summit, WV

SITE LOCATION MAP

ERM	**Arsenal Resources** Arsenal Goff Compressor Station Clarksburg Harrison County, West Virginia	GIS Review: GM CHK'D: GM 0419542
Drawn By: SRV-9/8/17	**Environmental Resources Management**	ATTACHMENT G

J:\Projects\SiteLocationMaps\Arsenal Resources_MXD\AttachmentG-SiteLocationMap_Goff_20170908.mxd - 9/8/2017\SRV

Attachment H

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	
☒ Section 5.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☐ Section 6.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)
☐ Section 7.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa and/or NESHAP Subpart HH
☒ 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]
☒ Section 11.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO/OOOOa)[2]
☒ Section 12.0	Reciprocating Internal Combustion Engines, Generator Engines. Microturbine Generators
☒ Section 13.0	Tanker Truck Loading[3]
☐ Section 14.0	Glycol Dehydration Units[4]
☒ Section 15.0	Blowdown and Pigging Operations
☒ 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

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]
LH-1	E01	Line Heater	2017	2017	0.25 MMBTU/hr	New	NA	
CE-1R	E02	Caterpillar G3516B LE Compressor Engine	2011	After 2010	1380 hp / 1,400 rpm	Existing	Oxidation Catalyst	1D
CE-2R	E03	Caterpillar G3516B LE Compressor Engine	2011	After 2010	1380 hp / 1,400 rpm	Existing	Oxidation Catalyst	2D
CE-7R	E04	Caterpillar G3516B LE Compressor Engine	2017	11/16/2012	1380 hp / 1,400 rpm	Existing	Oxidation Catalyst	3D
CE-8R	E05	Caterpillar G3516B LE Compressor Engine	2017	3/17/2013	1380 hp / 1,400 rpm	Existing	Oxidation Catalyst	4D
CE-9R	E06	Caterpillar G3516B LE Compressor Engine	2017	2013	1380 hp / 1,400 rpm	Existing	Oxidation Catalyst	7D
TK-1	E07	Produced Water Tank	2016	2016	210 bbl	Existing	NA	NA
TK-2	E08	Produced Water Tank	2010	2010	100 bbl	Existing	NA	NA
EG-1	E09	Kohler 80REZGD Emergency Generator	2017	2017	107.3 bhp	New	NA	NA
LO-1	E10	Produced Water Tank Truck Loading TK-1 and TK-2	2016	2016	1,200 gal/day	Existing	NA	NA

[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

ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

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

Source/Equipment:

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

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			☐ Gas ☐ Liquid ☐ Both			
Valves	☐ Yes ☒ No	87	EPA	☒ Gas ☐ Liquid ☐ Both	<0.01	<0.01	0.41, 10.24
Safety Relief Valves	☐ Yes ☒ No	1	EPA	☒ Gas ☐ Liquid ☐ Both	<0.01	<0.01	<0.01, 0.17
Open Ended Lines	☐ Yes ☒ No	2	EPA	☒ Gas ☐ Liquid ☐ Both	<0.01	<0.01	0.02, 0.53
Sampling Connections	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Connections (Not sampling)	☐ Yes ☒ No	401	EPA	☒ Gas ☐ Liquid ☐ Both	<0.01	<0.01	0.21, 5.24
Compressors	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
Flanges	☐ Yes ☐ No			☐ Gas ☐ Liquid ☐ Both			
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

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: **Goff Compressor Station**	2. Tank Name: **Produced Water Tank**
3. Emission Unit ID number **TK-1**	4. Emission Point ID number **E07**
5. Date Installed , Modified or Relocated *(for existing tanks)* **2016** 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)*	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 8-42 below are not required.***	

TANK INFORMATION

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. **210 bbl**	
9A. Tank Internal Diameter (ft.) **12**	9B. Tank Internal Height (ft.) **12**
10A. Maximum Liquid Height (ft.) **12**	10B. Average Liquid Height (ft.) **6**
11A. Maximum Vapor Space Height (ft.) **1.5**	11B. Average Vapor Space Height (ft.) **5**
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume". **210 bbl**	
13A. Maximum annual throughput (gal/yr) **458,640**	13B. Maximum daily throughput (gal/day) **1256.55**
14. Number of tank turnovers per year **52**	15. Maximum tank fill rate (gal/min) **0.87**
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**	
Produced Water	**See Attachment V**								

[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: **Tan**	21B. Roof Color: **Tan**	21C. Year Last Painted: **2015**	
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): **4**	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.			

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: **Goff Compressor Station**	2. Tank Name: **Produced Water Tank**
3. Emission Unit ID number **TK-2**	4. Emission Point ID number **E08**
5. Date Installed , Modified or Relocated *(for existing tanks)* **2010** 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)*	
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. **100 bbl**	
9A. Tank Internal Diameter (ft.) **8**	9B. Tank Internal Height (ft.) **10**
10A. Maximum Liquid Height (ft.) **10**	10B. Average Liquid Height (ft.) **5**
11A. Maximum Vapor Space Height (ft.) **11**	11B. Average Vapor Space Height (ft.) **5**
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume". **100 bbl**	
13A. Maximum annual throughput (gal/yr) **218,400**	13B. Maximum daily throughput (gal/day) **598.36**
14. Number of tank turnovers per year **52**	15. Maximum tank fill rate (gal/min) **0.42**
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	
Produced Water	**See Attachment V**								

[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: **Tan**	21B. Roof Color: **Tan**	21C. Year Last Painted: **2015**	
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): **4**	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]
Oil Storage TK3-TK11	**Existing**	**Oil**	**520 gal each**

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.

Attachment L
(Not Applicable)

Attachment M

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-1R		CE-2R		CE-7R	
Engine Manufacturer/Model		CAT G3516		CAT G3516		CAT G3516	
Manufacturers Rated bhp/rpm		1380/1400		1380/1400		1380/1400	
Source Status[2]		ES		ES		ES	
Date Installed/ Modified/Removed/Relocated[3]		2011		2011		2017	
Engine Manufactured /Reconstruction Date[4]		After 2010		After 2010		11/16/2012	
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable)[5]		☒40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources		☒40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources		☒40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	
Engine Type[6]		4SLB		4SLB		4SLB	
APCD Type[7]		OxCat		OxCat		OxCat	
Fuel Type[8]		RG		RG		RG	
H_2S (gr/100 scf)		0.025		0.025		0.025	
Operating bhp/rpm		1380/1400		1380/1400		1380/1400	
BSFC (BTU/bhp-hr)		8,399		8,399		8,399	
Hourly Fuel Throughput		9,971 ft^3/hr gal/hr		9,971 ft^3/hr gal/hr		9,971 ft^3/hr gal/hr	
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)		87.34 $MMft^3$/yr gal/yr		87.34 $MMft^3$/yr gal/yr		87.34 $MMft^3$/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]**
Vendor Guarantee	NO_x	1.52	6.66	1.52	6.66	1.52	6.66
Vendor Guarantee	CO	0.56	2.43	0.56	2.43	0.56	2.43
Vendor Guarantee	VOC	0.32	1.39	0.32	1.39	0.32	1.39
AP-42	SO_2	<0.01	0.03	<0.01	0.03	<0.01	0.03
AP-42	PM_{10}	0.10	0.45	0.10	0.45	0.10	0.45
Vendor Guarantee	Formaldehyde	0.13	0.57	0.13	0.57	0.13	0.57
AP-42	Total HAPs	0.15	0.67	0.15	0.67	0.15	0.67
AP-42	GHG (CO_2e)	1,441.54	6,313.93	1,441.54	6,313.93	1,441.54	6,313.93

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-8R	CE-9R	EG-1
Engine Manufacturer/Model	CAT G3516B	CAT G3516B	Kohler 80REZGD
Manufacturers Rated bhp/rpm	1380/1400	1380/1400	107/1800
Source Status[2]	ES	ES	NS
Date Installed/ Modified/Removed/Relocated[3]	2017	2017	2017
Engine Manufactured /Reconstruction Date[4]	3/17/2013	2013	06/09/2017
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]	RG	RG	RG
H_2S (gr/100 scf)	0.025	0.025	0.025
Operating bhp/rpm	1380/1400	1380/1400	107/1800
BSFC (BTU/bhp-hr)	8,399	8,399	8,399
Hourly Fuel Throughput	9,971 ft^3/hr gal/hr	9,971 ft^3/hr gal/hr	1,187 ft^3/hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	87.34 $MMft^3$/yr gal/yr	87.34 $MMft^3$/yr gal/yr	0.59 $MMft^3$/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]**
Vendor Guarantee	NO_x	1.52	6.66	1.52	6.66	0.47	0.12
Vendor Guarantee	CO	0.56	2.43	0.56	2.43	0.07	0.02
Vendor Guarantee	VOC	0.32	1.39	0.32	1.39	0.05	0.01
AP-42	SO_2	<0.01	0.03	<0.01	0.03	<0.01	<0.01
AP-42	PM_{10}	0.10	0.45	0.10	0.45	<0.01	<0.01
Vendor Guarantee	Formaldehyde	0.13	0.57	0.13	0.57	0.05	0.01
AP-42	Total HAPs	0.15	0.67	0.15	0.67	0.05	0.01
AP-42	GHG (CO_2e)	1,441.54	6,313.93	1,441.54	6,313.93	99.24	434.68

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

2 Enter the Source Status using the following codes:

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

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

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

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

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

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

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

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

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

8 Enter the Fuel Type using the following codes:

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

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

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

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

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

Engine Air Pollution Control Device
(Emission Unit ID# CE-1R, 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: **DCL**	Model #: **DC65A-12**
Design Operating Temperature: °F	Design gas volume: scfm
Service life of catalyst:	Provide manufacturer data? ☐Yes ☐ No
Volume of gas handled: acfm at °F	Operating temperature range for NSCR/Ox Cat: From °F to °F
Reducing agent used, if any:	Ammonia slip (ppm):

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

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions:

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# CE-2R, 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: **DCL**	Model #: **DC65A-12**
Design Operating Temperature: °F	Design gas volume: scfm
Service life of catalyst:	Provide manufacturer data? ☐Yes ☐ No
Volume of gas handled: acfm at °F	Operating temperature range for NSCR/Ox Cat: From °F to °F
Reducing agent used, if any:	Ammonia slip (ppm):

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

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions:

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# CE-7R, 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: **DCL**	Model #: **DC65A-12**
Design Operating Temperature: °F	Design gas volume: scfm
Service life of catalyst:	Provide manufacturer data? ☐Yes ☐ No
Volume of gas handled: acfm at °F	Operating temperature range for NSCR/Ox Cat: From °F to °F
Reducing agent used, if any:	Ammonia slip (ppm):

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

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions:

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# CE-8R, 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: **DCL**	Model #: **DC65A-12**
Design Operating Temperature: °F	Design gas volume: scfm
Service life of catalyst:	Provide manufacturer data? ☐Yes ☐ No
Volume of gas handled: acfm at °F	Operating temperature range for NSCR/Ox Cat: From °F to °F
Reducing agent used, if any:	Ammonia slip (ppm):

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

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions:

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# CE-9R, 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: **DCL**	Model #: **DC63Q-8**
Design Operating Temperature: °F	Design gas volume: scfm
Service life of catalyst:	Provide manufacturer data? ☐Yes ☐ No
Volume of gas handled: acfm at °F	Operating temperature range for NSCR/Ox Cat: From °F to °F
Reducing agent used, if any:	Ammonia slip (ppm):

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

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions:

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,

Attachment N

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#: **LO-1**	Emission Point ID#: **E10**	Year Installed/Modified: **N/A**
Emission Unit Description: **Produced Water Tank Truck Loading TK-1 and TK-2**		
Loading Area Data		
Number of Pumps: **NA**	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. **NA**		
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)	1.86		
Max. Annual Throughput (1000 gal/yr)	677.04		
Loading Method[1]	SP		
Max. Fill Rate (gal/min)	1.29		
Average Fill Time (min/loading)	NA		
Max. Bulk Liquid Temperature (^{o}F)	70		

True Vapor Pressure[2]		NA		
Cargo Vessel Condition[3]		U		
Control Equipment or Method[4]		None		
Max. Collection Efficiency (%)		NA		
Max. Control Efficiency (%)		NA		
Max.VOC Emission Rate	Loading (lb/hr)	<0.01		
	Annual (ton/yr)	<0.01		
Max.HAP Emission Rate	Loading (lb/hr)	<0.01		
	Annual (ton/yr)	<0.01		
Estimation Method[5]		O - ProMax		

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
(Not Applicable)

Attachment P

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.

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

☐ Yes ☒ No

Please list approximate number.

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

☐ Yes ☒ No

Please list approximate number.

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

☐ Yes ☒ No

Please list approximate number.

Attachment Q

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

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
CE-1R	CAT G3516B LE Compressor Engine
CE-2R	CAT G3516B LE Compressor Engine

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-7R	CAT G3516B LE Compressor Engine
CE-8R	CAT G3516B LE Compressor Engine
CE-9R	CAT G3516B LE Compressor Engine

Attachment S

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	100	377,600	16.65	353	0.01	2.66
Compressor Startup						
Plant Shutdown						
Low Pressure Pig Venting						
High Pressure Pig Venting	20	168.82	16.65	0.1615	0.01	<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	100	377,600	16.65	353	<0.01	<0.01
Compressor Startup						
Plant Shutdown						
Low Pressure Pig Venting						
High Pressure Pig Venting	20	168.82	16.65	0.1615	<0.01	<0.01

Attachment T
(Not Applicable)

Attachment U

Attachment U - Emission Calculations
Line Heaters LH-1

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Boiler Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions. (lb/hr)	Max. Annual Emissions. (tpy)
VOC's	5.5	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	<0.01	<0.01
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	<0.01	<0.01
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	<0.01	<0.01
CO	84	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	0.02	0.09
NOx	100	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	0.02	0.11
$PM_{Filterable}$	1.9	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	<0.01	<0.01
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	<0.01	<0.01
PM_{Total}	7.6	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	<0.01	<0.01
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	0.25	1,040	8,760	<0.01	<0.01
CO_2	53.06	kg CO_2 / MMBtu	40 CFR Subpart C	0.25	1,040	8,760	29.24	128.09
CH_4	0.001	kg CO_2 / MMBtu	40 CFR Subpart C	0.25	1,040	8,760	<0.01	<0.01
N_2O	0.0001	kg CO_2 / MMBtu	40 CFR Subpart C	0.25	1,040	8,760	<0.01	<0.01
Total HAPs							<0.01	<0.01
Total CO_2e							29.27	128.22

Notes:

-Emission rates displayed above represent the max. hourly and max. annual emissions for one line heater. Cumulative emission rates for all 4 line heaters are diplayed in the Total Site Emissions Table.

-Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.

-AP-42, Chapter 1.4 references are from the July 1998 revision.

-Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf) ÷** Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating (**MMBtu/hr)**

Max Hourly Emission Rate **(lb/hr)** = Emission Factor (**kg/MMBtu) x** Boiler rating **(MMBtu/hr) x** 2.20462 **(lb/kg)**

CE-1R, CE-2R, CE-7R, CE-8R, and CE-9R

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Engine Rating (bhp)	Engine Rating (kW)	Fuel Consumption (Btu/bhp-hr)	Heat Value of Natural Gas (Btu/scf)	Catalyst Effect	Annual Operating Hours	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
VOC's	0.52	g/bhp-hr	Vendor Guarantee	1,380.00	1,029.07	8,399.00	1,038.16	0.80	8,760.00	0.32	1.39
Formaldehyde	0.44	g/bhp-hr	Vendor Guarantee	1,380.00	1,029.07	8,399.00	1,038.16	0.90	8,760.00	0.13	0.59
Benzene	0.00	lb/MMBtu	AP-42 Chapter 3.2	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	<0.01	0.02
Toluene	0.00	lb/MMBtu	AP-42 Chapter 3.2	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	<0.01	0.02
Ethylbenzene	0.00	lb/MMBtu	AP-42 Chapter 3.2	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	<0.01	<0.01
Xylene	0.00	lb/MMBtu	AP-42 Chapter 3.2	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	<0.01	<0.01
CO	2.61	g/bhp-hr	Vendor Guarantee	1,380.00	1,029.07	8,399.00	1,038.16	0.93	8,760.00	0.56	2.43
NO_x	0.50	g/bhp-hr	Vendor Guarantee	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	1.52	6.66
$PM_{Filterable}$	0.00	lb/MMBtu	AP-42 Chapter 3.2	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	<0.01	<0.01
$PM_{Condensable}$	0.01	lb/MMBtu	AP-42 Chapter 3.2	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	0.11	0.50
PM_{Total}	0.01	lb/MMBtu	AP-42 Chapter 3.2	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	0.12	0.51
SO_2	0.00	lb/MMBtu	AP-42 Chapter 3.2	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	<0.01	0.03
CO_2	549.00	g/bhp-hr	Vendor Guarantee	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	1,670.27	7,315.77
CH_4	0.00	kg CH_4 / MMBtu	40 CFR Subpart C	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	0.03	0.11
N_2O	0.00	kg N_2O / MMBtu	40 CFR Subpart C	1,380.00	1,029.07	8,399.00	1,038.16	0.00	8,760.00	<0.01	0.01
Total HAPs										0.15	0.64
Total CO_2e										1,671.67	7,321.91

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one NG compressor.
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2, Table 3.2-2 - Uncontrolled Emission Factors for 4-Stroke Lean Burn Engines
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40 CFR 98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298
- Vendor Guarantee Emissions are listed in Attachment S

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Fuel Consumption Rating **(Btu/bhp-hr)** x Engine Rating **(bhp)** x (1 **MMBtu**/10^6 **Btu**)

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(g/bhp-hr)** x Engine Rating **(bhp)** x (1 **lb**/453.6 **g**)

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(kg/MMBtu)** x Engine Rating **(bhp)** x (2.205 **lb**/**kg**) x Fuel Consumption Rating **(Btu/bhp-hr)** x (1 **MMBtu/**10^6 **Btu**)

Attachment U - Emission Calculations
Produced Fluids Tanks TK-1 and TK-2

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Annual Emissions using ProMax (tons/yr)
VOCs	0.02	0.09
Total HAPs	<0.01	<0.01
Hexane	<0.01	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
Xylene	<0.01	<0.01
CO_2	0.03	0.13
CH_4	0.54	2.35
Total CO_2e	13.42	58.77

Notes:

-Emission rates for Produced Fluid Tanks TK-1 and TK-2 were calculated using ProMax software. ProMax output sheets for the Goff Compressor Station are attached.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298

-For emission calculation purposes, the total throughput for tanks TK-1 and TK-2 is modeled as being received through a single tank. Therefore, emission rates represent a total from all produced fluids tanks located on the compressor station. Actual throughput for each tank will vary based on operations.

Emergency Generator (EG-1)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Engine Rating (bhp)	Engine Rating (kW)	Fuel Consumption (Btu/bhp-hr)	Heat Value of Natural Gas (Btu/scf)	Catalyst Effect	Annual Operating Hours	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
VOC's	1.00	g/bhp-hr	Vendor Guarantee	107.30	80.01	8,399.00	1,038.16	0.80	500.00	0.05	0.01
Formaldehyde	0.05	lb/MMBtu	AP-42 Chapter 3.2	107.30	80.01	8,399.00	1,038.16	0.90	500.00	0.05	0.01
Benzene	0.00	lb/MMBtu	AP-42 Chapter 3.2	107.30	80.01	8,399.00	1,038.16	0.00	500.00	<0.01	<0.01
Toluene	0.00	lb/MMBtu	AP-42 Chapter 3.2	107.30	80.01	8,399.00	1,038.16	0.00	500.00	<0.01	<0.01
Ethylbenzene	0.00	lb/MMBtu	AP-42 Chapter 3.2	107.30	80.01	8,399.00	1,038.16	0.00	500.00	<0.01	<0.01
Xylene	0.00	lb/MMBtu	AP-42 Chapter 3.2	107.30	80.01	8,399.00	1,038.16	0.00	500.00	<0.01	<0.01
CO	4.00	g/bhp-hr	Vendor Guarantee	107.30	80.01	8,399.00	1,038.16	0.93	500.00	0.07	0.02
NO_x	2.00	g/bhp-hr	Vendor Guarantee	107.30	80.01	8,399.00	1,038.16	0.00	500.00	0.47	0.12
$PM_{Filterable}$	0.00	lb/MMBtu	AP-42 Chapter 3.2	107.30	80.01	8,399.00	1,038.16	0.00	500.00	<0.01	<0.01
$PM_{Condensable}$	0.01	lb/MMBtu	AP-42 Chapter 3.2	107.30	80.01	8,399.00	1,038.16	0.00	500.00	<0.01	<0.01
PM_{Total}	0.01	lb/MMBtu	AP-42 Chapter 3.2	107.30	80.01	8,399.00	1,038.16	0.00	500.00	<0.01	<0.01
SO_2	0.00	lb/MMBtu	AP-42 Chapter 3.2	107.30	80.01	8,399.00	1,038.16	0.00	500.00	<0.01	<0.01
CO_2	110.00	lb/MMBtu	AP-42 Chapter 3.2	107.30	80.01	8,399.00	1,038.16	0.00	500.00	99.13	24.78
CH_4	0.00	kg CH_4 / MMBtu	40 CFR Subpart C	107.30	80.01	8,399.00	1,038.16	0.00	500.00	<0.01	<0.01
N_2O	0.00	kg N_2O / MMBtu	40 CFR Subpart C	107.30	80.01	8,399.00	1,038.16	0.00	500.00	<0.01	<0.01
Total HAPs										0.05	0.01
Total CO_2e										99.24	24.81

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one NG compressor.
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2, Table 3.2-2 - Uncontrolled Emission Factors for 4-Stroke Lean Burn Engines
- Max. Annual Emissions based upon Max. Hourly Emissions @ 500 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40 CFR 98 Table A-1 (Updated January 2014). GWP CO_2=1, GWP CH_4=25, GWP N_2O=298
- Vendor Guarantee Emissions are listed in Attachment S

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Fuel Consumption Rating **(Btu/bhp-hr)** x Engine Rating **(bhp)** x (1 **MMBtu**/10^6 **Btu**)

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(g/bhp-hr)** x Engine Rating **(bhp)** x (1 **lb**/453.6 **g**)

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(kg/MMBtu)** x Engine Rating **(bhp)** x (2.205 **lb**/**kg**) x Fuel Consumption Rating **(Btu/bhp-hr)** x (1 **MMBtu**/10^6 **Btu**)

Attachment U - Emission Calculations
Liquids Unloading (LO-1)

Pollutant	Max. Hourly Emissions using ProMax (lb/hr)	Max. Annual Emissions using ProMax (tons/yr)
VOCs	<0.01	<0.01
Total HAPs	<0.01	<0.01
Hexane	<0.01	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
Xylene	<0.01	<0.01
CO_2	<0.01	<0.01
CH_4	<0.01	<0.01
Total CO_2e	0.02	0.08

Notes:

-Emission rates for Liquids Unloading was calculated using ProMax software. ProMax output sheets for the Goff CS are attached.

-CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014).

Attachment U - Emission Calculations
Fugitive Emissions from Unpaved Haul Roads

Constant	Industrial Roads		
	PM	PM-10	PM-2.5
k (lb/VMT)	4.9	1.5	0.15
a	0.7	0.9	0.9
b	0.45	0.45	0.45

where

k		Patricle size multiplier[1]
s	4.8	Silt content of road surface material (%)
p	150	Number of days per year with precipitation

Item Number	Description	Number of Wheels	W Mean Vehicle Weight (tons)	Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)	PM-2.5 Emissions (tons/yr)
1	Liquids Hauling	14	30	10	0.16	1	161	NA	NA	0.69	0.06	0.17	0.01	0.02	0.00
2	Employee Vehicles	4	3	10	0.16	1	200	NA	NA	0.24	0.02	0.06	0.01	0.01	<0.001
									Totals:	**0.93**	**0.08**	**0.24**	**0.02**	**0.02**	**0.00**

Notes:

[1] - Particle Size Multiplier used from AP-42 13.2.2 - Final Version 11/2006

[2] - Silt Content of Road Surface uses Sand and Gravel Processing Plant Road from AP-42 13.2.2 - Final Version 11/2006

[3] - Number of days per year with precipitation >0.01 in3 found using AP-42 13.2.2 Figure 13.2.2-1 - Final Version 11/2006

Example Calculations:

Emissions (lb/Vehicle Mile Traveled) - $E = k \times (s/12)^a \times (W/3)^b$ Equation 1a from AP-42 13.2.2 - Final Version 11/2006

Size Specific Emissions (lb/VMT) - $E_{ext} = E[(365-p)/365]$ Equation 2 from AP-42 13.2.2 - Final Version 11/2006

Attachment U - Emissions Calculations
Pigging Operations

Type (Launch or Receiving)	Latitude Decimal Degrees	Longitude Decimal Degrees	Chamber Length (Ft.)	Chamber Diam. (Ft .)	Volume of Chamber (ft3)	PSIG of Chamber	Volume of Pressurized Gas (ft3)
Receiving	39.25854	-80.38052	11	1	8.64	625	375.96

Temp. of Chamber (R®)	Molecular Weight of gas mixture (lb/lb-mole)	Compressibility Factor	Pressurized Density (lb/ft3)	Atmospheric Density (lb/ft3)	Delta Density (lb/ft3)	Amount Gas Vented (lbs) Per Event
519.67	16.65	0.9979	1.91	0.04	1.87	16.15

# of Events	# of Purges Per Event	Total Amount of Gas Vented (lbs)
20	1	323.06

Methane/Ethane Weight Fraction	Total VOC Weight Fraction	Total CO2 Weight Fraction	Tons of Total Amount of Gas Vented	Tons of CH4/C2H6	Tons of VOC	Tons of CO2
0.9857	0.0074	0.0047	0.16	0.16	0.00	0.00

Example Calc

Volume of Pressurized Gas (ft3)= (Volume of Chamber (ft3) x (PSIG of Chamber 14.7)) / 14.7

Pressurized Density (lb/ft3) = (Moecular Weight (lb/lb-mole) x (PSIG of Chamber + 14.7)) / Compressibility Factor x 10.73 x Temp of Chamber (R))

Atmospheric Density (lb/ft3) = (14.7 x Molecular Weight (lb/lb-mole)) / (10.73 x Temp of Chamber (R) x Compressibility Factor)

Amount of gas vented (lbs) = Delta Density (lb/ft3) x Volume of chamber (ft3)

Total Gas vented (lbs) = Number of events x Number of purges per event x Amount of gas vented (lbs)

Tons of Total Gas Vented = Amount of gas vented (lbs) / 2000

Tons of VOC = Tons of total gas vented x Total VOC weight frac

Tons of CO2 = Tons of total gas vented x CO2 weight frac

Attachment U - Emissions Calculations
Blowdowns

Blowdown Volume (scf)	Number of Events	Average length of event (hrs)	Average blowdown rate (scf/hr)	Amount of gas vented (scf)	Pressure of chamber (PSIG)
3,776	100	0.167	22,610.78	377,600.00	625
Temp of Gas (R)	**Molecular weight of mixture (lb/lb-mol)**	**Compressibility Factor**	**Pressurized Density (lb/ft3)**	**Atmospheric Density (lb/ft3)**	**Delta Density (lb/ft3)**
519.67	16.65	0.9979	1.913658529	0.043974958	1.869683571
Amount of Gas vented (lbs)	**VOC weight fraction**	**CO2 Weight fraction**	**Me/Et frac**	**Gas vented (tons)**	**Tons of CH4/C2H6**
705,992.52	0.007534966	0.004679745	0.985578356	353.00	347.91
Tons of VOC	**Tons of CO2**				
2.66	1.63				

Example Calc

Amount of gas vented (scf) = Blowdown volume (scf) x Number of events

Pressurized Density (lb/ft3) = (Moecular Weight (lb/lb-mole) x (PSIG of Chamber + 14.7)) / Compressibility Factor x 10.73 x Temp of Chamber (R))

Atmospheric Density (lb/ft3) = (14.7 x Molecular Weight (lb/lb-mole)) / (10.73 x Temp of Chamber (R) x Compressibility Factor)

Amount of gas vented (lbs) = Delta Density (lb/ft3) x Volume of chamber (ft3)

Total Gas vented (lbs) = Amount of gas vented (scf) x Delta Density (lb/ft3)

Tons of Total Gas Vented = Amount of gas vented (lbs) / 2000

Tons of VOC = Tons of total gas vented x Total VOC weight frac

Tons of CO2 = Tons of total gas vented x CO2 weight frac

Fugitive Leaks

Default Average Component Counts for Major Onshore Natural Gas Production Equipment[1]				
Facility Equipment Type	**Valves**	**Connectors**	**Open-ended Lines**	**Pressure Relief Valves**
Wellheads	8	38	0.5	0
Separators	1	6	0	0
Meters/Piping	12	45	0	0
Compressors	12	57	0	0
In-line Heaters	14	65	2	1
Dehydrators	24	90	2	2

[1]- Table W-1B to 40CFR98 Subpart W

Well Specific Equipment Counts	
Facility Equipment Type	**Count on Site**
Wellheads	0
Separators	1
Meters/Piping	1
Compressors	5
In-line Heaters	1
Dehydrators	0

Gas Composition						
Emissions from Flaring Operations	**Propane**	**Butane**	**Pentanes**	**Hexanes+**	**CO_2**	**CH_4**
Mole %	0.22	0.03	0.01	0.00	0.18	95.88
MW	44	58	72	86.00	44.00	16.00

Fugitive Emissions															
Facility Equipment Type	**Total Count**	**Emission Rate (scf/hr/component)[2]**	**Hours of Operation**	**VOCs (lbs/hr)**	**VOCs (tons/yr)**	**Hexane (lbs/hr)**	**Hexane (tons/yr)**	**HAPs (lbs/hr)**	**HAPs (tons/yr)**	**CO_2 (lbs/hr)**	**CO_2 (tons/yr)**	**CH_4 (lbs/hr)**	**CH_4 (tons/yr)**	**Total CO_2e (lbs/hr)**	**Total CO_2e (tons/yr)**
Valves	87	0.027	8760	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.09	0.41	2.34	10.24
Connectors	401	0.003	8760	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.21	1.20	5.24
Open-ended Lines	2	0.061	8760	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.12	0.53
Pressure Relief Valves	1	0.040	8760	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	0.17
Total Emissions:				**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.15**	**0.65**	**3.70**	**16.19**

[2]- Table W-1A to 40CFR98 Subpart W

Notes:
Gas composition for Goff was used

Example Equations:
Fugitive Emissions (lb/hr) = Count x Emission Rate x Hours of Operation ÷ 385.5 scf/lbmol x mol VOC's

Attachment U - Emission Calculations
Goff CS Site Emission Levels

	VOCs		HAPs		CO		NO_x		PM - Total		PM - 10/2.5		PM - CON		SO_2		CO_2		CH_4		N_2O		CO_2e	
Emission Sources	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
Line Heater LH-1	<0.01	0.01	<0.01	<0.01	0.02	0.09	0.02	0.11	0.01	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	29.24	128.09	<0.01	<0.01	<0.01	<0.01	29.27	128.22
Compressor Engine CE-1R	0.32	1.39	0.15	0.64	0.56	2.43	1.52	6.66	0.12	0.51	<0.01	<0.01	0.11	0.50	0.01	0.03	1670.27	7315.77	0.03	0.11	<0.01	0.01	1671.67	7321.91
Compressor Engine CE-2R	0.32	1.39	0.15	0.64	0.56	2.43	1.52	6.66	0.12	0.51	<0.01	<0.01	0.11	0.50	0.01	0.03	1670.27	7315.77	0.03	0.11	<0.01	0.01	1671.67	7321.91
Compressor Engine CE-7R	0.32	1.39	0.15	0.64	0.56	2.43	1.52	6.66	0.12	0.51	<0.01	<0.01	0.11	0.50	0.01	0.03	1670.27	7315.77	0.03	0.11	<0.01	0.01	1671.67	7321.91
Compressor Engine CE-8R	0.32	1.39	0.15	0.64	0.56	2.43	1.52	6.66	0.12	0.51	<0.01	<0.01	0.11	0.50	0.01	0.03	1670.27	7315.77	0.03	0.11	<0.01	0.01	1671.67	7321.91
Compressor Engine CE-9R	0.32	1.39	0.15	0.64	0.56	2.43	1.52	6.66	0.12	0.51	<0.01	<0.01	0.11	0.50	0.01	0.03	1670.27	7315.77	0.03	0.11	<0.01	0.01	1671.67	7321.91
Produced Fluid Tank TK-1 and TK-2	0.02	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.13	0.54	2.35	<0.01	<0.01	13.42	58.77
Emergency Generator EG-1	0.05	0.01	0.05	0.01	0.07	0.02	0.47	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	99.13	24.78	<0.01	<0.01	<0.01	<0.01	99.24	24.81
Tank Loading LO-1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.08
Pigging Operations	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Blowdown	0.61	2.66	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.37	1.63	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fugitive Emissions	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.15	0.65	<0.01	<0.01	3.70	16.19
Haul Roads	--	--	--	--	--	--	--	--	0.93	0.08	0.26	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Totals	**2.26**	**9.70**	**0.78**	**3.22**	**2.87**	**12.28**	**8.10**	**33.54**	**1.52**	**2.62**	**0.26**	**0.04**	**0.58**	**2.52**	**0.03**	**0.15**	**8,479.75**	**36,731.87**	**0.81**	**3.56**	**0.01**	**0.06**	**8,503.97**	**36,837.52**

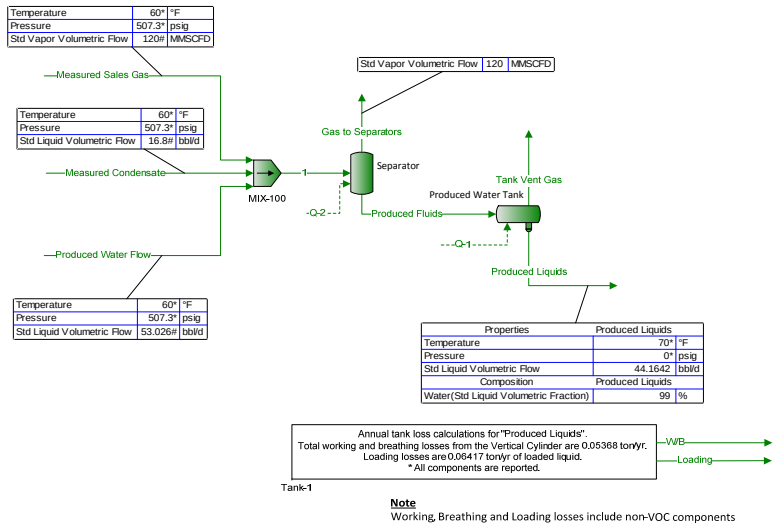
Total Goff CS Site Emission Levels - HAP Speciation

	Total HAPs		Formaldehyde		Hexane		Benzene		Toluene		Ethylbenzene		Xylene	
Emission Sources	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
Line Heater LH-1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Compressor Engine CE-1R	0.17	0.64	0.13	0.59	<0.01	<0.01	<0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Compressor Engine CE-2R	0.17	0.64	0.13	0.59	<0.01	<0.01	<0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Compressor Engine CE-7R	0.17	0.64	0.13	0.59	<0.01	<0.01	<0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Compressor Engine CE-8R	0.17	0.64	0.13	0.59	<0.01	<0.01	<0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Compressor Engine CE-9R	0.17	0.64	0.13	0.59	<0.01	<0.01	<0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
Produced Fluid Tank TK-1 and TK-2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Emergency Generator S09	0.05	0.01	0.05	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Liquids Unloading LO-1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pigging Operations	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Blowdown	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fugitive Emissions	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Haul Roads	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Totals	**0.88**	**3.22**	**0.72**	**2.94**	**<0.01**	**<0.01**	**0.03**	**0.11**	**0.02**	**0.10**	**<0.01**	**0.01**	**0.01**	**0.05**

Flowsheet1
Plant Schematic

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Arsenal – Goff Compressor Station
Produced Water Tank



Note
Working, Breathing and Loading losses include non-VOC components

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Connections

	Gas to Separators	Loading	Measured Condensate	Measured Sales Gas	Produced Fluids
From Block	Separator	--	--	--	Separator
To Block	--	--	MIX-100	MIX-100	Produced Water Tank

Stream Composition

Mole Fraction	Gas to Separators %	Loading %	Measured Condensate %	Measured Sales Gas %	Produced Fluids %
Nitrogen	0.253723	0.00278102	0 *	0.2539 *	0.00013162
Methane	95.8284	5.81454	10.674 *	95.894 *	0.09654
Carbon Dioxide	0.157591	2.38512	0.065 *	0.1577 *	0.0027669
Ethane	3.44538	0.686636	5.377 *	3.4471 *	0.00700407
Propane	0.218627	0.0355857	3.736 *	0.2183 *	0.000856741
Isobutane	0.0118665	0.00282363	1.359 *	0.0117 *	9.64698E-05
n-Butane	0.0176419	0.00537069	2.754 *	0.0173 *	0.000203686
Isopentane	0.000322829	0.000125031	2.508 *	0 *	7.71831E-06
n-Pentane	0.000289613	0.000127646	2.25 *	0 *	9.37731E-06
i-Hexane	0.000610307	0.000326485	4.742 *	0 *	4.49637E-05
n-Hexane	0.000349784	0.000203165	2.718 *	0 *	3.6666E-05
2,2,4-Trimethylpentane	2.31535E-06	1.28185E-06	0.018 *	0 *	6.52143E-07
Benzene	1.40233E-05	1.11579E-05	0.109 *	0 *	3.0054E-06
Heptane	0.00170029	0.00099922	13.22 *	0 *	0.000555721
Toluene	0.000141014	8.36034E-05	1.097 *	0 *	7.44506E-05
Octane	0.00200653	0.00100637	15.626 *	0 *	0.00184879
Ethylbenzene	2.56484E-05	1.37441E-05	0.2 *	0 *	3.60905E-05
o-Xylene	4.71431E-05	2.12796E-05	0.368 *	0 *	8.49734E-05
Nonane	0.00148246	0.000636322	11.599 *	0 *	0.00395861
Decane	0	0	0 *	0 *	0
Water	0.0571757	91.0629	0 *	0 *	99.8043
Oxygen	0	0	0 *	0 *	0
Decanes Plus	0.00255852	0.000692518	21.58 *	0 *	0.0814884
Hexanes+	0	0	0 *	0 *	0

Molar Flow	Gas to Separators lbmol/h	Loading lbmol/h	Measured Condensate lbmol/h	Measured Sales Gas lbmol/h	Produced Fluids lbmol/h
Nitrogen	33.4299	2.18805E-08	0 *	33.43 *	4.66992E-05
Methane	12626.1	4.57476E-05	0.181041 *	12626 *	0.0342526
Carbon Dioxide	20.7638	1.87656E-05	0.00110246 *	20.7637 *	0.000981703
Ethane	453.955	5.40231E-06	0.0911987 *	453.866 *	0.00248506
Propane	28.8057	2.79981E-07	0.0633659 *	28.7427 *	0.000303974
Isobutane	1.56351	2.22157E-08	0.0230499 *	1.54049 *	3.42277E-05
n-Butane	2.32446	4.22555E-08	0.0467103 *	2.27782 *	7.22682E-05
Isopentane	0.0425352	9.83714E-10	0.0425379 *	0 *	2.73847E-06
n-Pentane	0.0381587	1.00429E-09	0.038162 *	0 *	3.32709E-06
i-Hexane	0.0804126	2.56872E-09	0.0804286 *	0 *	1.59532E-05
n-Hexane	0.0460867	1.59846E-09	0.0460997 *	0 *	1.30092E-05
2,2,4-Trimethylpentane	0.000305065	1.00854E-11	0.000305296 *	0 *	2.31382E-07
Benzene	0.00184767	8.77882E-11	0.00184874 *	0 *	1.06632E-06
Heptane	0.224026	7.86165E-09	0.224223 *	0 *	0.000197171
Toluene	0.0185797	6.57774E-10	0.0186061 *	0 *	2.64152E-05
Octane	0.264375	7.9179E-09	0.265031 *	0 *	0.000655954
Ethylbenzene	0.00337937	1.08135E-10	0.00339218 *	0 *	1.2805E-05
o-Xylene	0.00621146	1.67424E-10	0.00624161 *	0 *	3.01487E-05
Nonane	0.195325	5.00645E-09	0.196729 *	0 *	0.00140452
Decane	0	0	0 *	0 *	0
Water	7.53333	0.000716464	0 *	0 *	35.4108
Oxygen	0	0	0 *	0 *	0
Decanes Plus	0.337104	5.44858E-09	0.366016 *	0 *	0.0289123

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Molar Flow	Gas to Separators lbmol/h	Loading lbmol/h	Measured Condensate lbmol/h	Measured Sales Gas lbmol/h	Produced Fluids lbmol/h
Hexanes+	0	0	0 *	0 *	0

Mass Fraction	Gas to Separators %	Loading %	Measured Condensate %	Measured Sales Gas %	Produced Fluids %
Nitrogen	0.425988	0.00418393	0 *	0.426571 *	0.000203259
Methane	92.1377	5.00957	1.71125 *	92.2624 *	0.0853768
Carbon Dioxide	0.415672	5.6373	0.0285875 *	0.416237 *	0.00671277
Ethane	6.20909	1.10882	1.61576 *	6.21636 *	0.01161
Propane	0.577791	0.0842724	1.64634 *	0.577313 *	0.0020826
Isobutane	0.0413369	0.00881382	0.789365 *	0.0407841 *	0.000309097
n-Butane	0.0614554	0.0167643	1.59964 *	0.0603046 *	0.000652626
Isopentane	0.00139596	0.000484461	1.80831 *	0 *	3.06982E-05
n-Pentane	0.00125233	0.000494594	1.62229 *	0 *	3.72966E-05
i-Hexane	0.00315213	0.00151099	4.08377 *	0 *	0.000213603
n-Hexane	0.00180657	0.000940256	2.34072 *	0 *	0.000174184
2,2,4-Trimethylpentane	1.58512E-05	7.86371E-06	0.0205477 *	0 *	4.10657E-06
Benzene	6.56505E-05	4.68074E-05	0.0850863 *	0 *	1.29414E-05
Heptane	0.0102111	0.00537714	13.238 *	0 *	0.00306969
Toluene	0.00077871	0.000413694	1.0101 *	0 *	0.000378156
Octane	0.013737	0.00617371	17.8377 *	0 *	0.0116419
Ethylbenzene	0.000163198	7.83629E-05	0.212191 *	0 *	0.00021122
o-Xylene	0.000299966	0.000121328	0.390432 *	0 *	0.000497308
Nonane	0.0113954	0.00438294	14.8666 *	0 *	0.0279884
Decane	0	0	0 *	0 *	0
Water	0.061734	88.1042	0 *	0 *	99.1178
Oxygen	0	0	0 *	0 *	0
Decanes Plus	0.0249527	0.00605204	35.0933 *	0 *	0.730995
Hexanes+	0	0	0 *	0 *	0

Mass Flow	Gas to Separators lb/h	Loading lb/h	Measured Condensate lb/h	Measured Sales Gas lb/h	Produced Fluids lb/h
Nitrogen	936.487	6.12947E-07	0 *	936.488 *	0.0013082
Methane	202554	0.000733904	2.90434 *	202552 *	0.549496
Carbon Dioxide	913.807	0.000825866	0.0485186 *	913.801 *	0.0432043
Ethane	13650	0.000162442	2.74226 *	13647.3 *	0.0747234
Propane	1270.21	1.23459E-05	2.79416 *	1267.43 *	0.0134039
Isobutane	90.8745	1.29123E-06	1.33971 *	89.5368 *	0.00198939
n-Butane	135.103	2.45598E-06	2.71491 *	132.392 *	0.00420038
Isopentane	3.06886	7.09738E-08	3.06906 *	0 *	0.000197578
n-Pentane	2.7531	7.24583E-08	2.75334 *	0 *	0.000240046
i-Hexane	6.92959	2.2136E-07	6.93096 *	0 *	0.00137477
n-Hexane	3.97154	1.37748E-07	3.97266 *	0 *	0.00112107
2,2,4-Trimethylpentane	0.0348471	1.15204E-09	0.0348735 *	0 *	2.64304E-05
Benzene	0.144325	6.8573E-09	0.144408 *	0 *	8.32925E-05
Heptane	22.4478	7.87753E-07	22.4676 *	0 *	0.0197569
Toluene	1.7119	6.06063E-08	1.71434 *	0 *	0.00243386
Octane	30.1992	9.0445E-07	30.2741 *	0 *	0.0749287
Ethylbenzene	0.358771	1.14802E-08	0.360131 *	0 *	0.00135944
o-Xylene	0.65944	1.77745E-08	0.66264 *	0 *	0.00320074
Nonane	25.0514	6.42102E-07	25.2315 *	0 *	0.180137
Decane	0	0	0 *	0 *	0
Water	135.715	0.0129073	0 *	0 *	637.935
Oxygen	0	0	0 *	0 *	0
Decanes Plus	54.8556	8.86626E-07	59.5603 *	0 *	4.70478
Hexanes+	0	0	0 *	0 *	0

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Gas to Separators	Loading	Measured Condensate	Measured Sales Gas	Produced Fluids
Temperature	°F	60 *	72.1381	60 *	60 *	60
Pressure	psia	522	0.429201	522 *	522 *	522
Mole Fraction Vapor	%	100	100	0	100	0
Mole Fraction Light Liquid	%	0	0	100	0	0.107439
Mole Fraction Heavy Liquid	%	0	0	0	0	99.8926
Molecular Weight	lb/lbmol	16.6851	18.6203	100.065	16.6739	18.14
Mass Density	lb/ft^3	1.70968	0.00140088	44.4326	1.7083	62.1857
Molar Flow	lbmol/h	13175.8	0.000786779	1.69609	13166.6	35.4802
Mass Flow	lb/h	219838	0.01465	169.72	219539	643.613
Vapor Volumetric Flow	ft^3/h	128584	10.4577	3.81972	128513	10.3499
Liquid Volumetric Flow	gpm	16031.3	1.30382	0.476224	16022.4	1.29037
Std Vapor Volumetric Flow	MMSCFD	120	7.16568E-06	0.0154473	119.916 *	0.32314
Std Liquid Volumetric Flow	sgpm	1437.99	3.37009E-05	0.490016 *	1437.24	1.29227
Compressibility		0.913465	0.999602	0.210796	0.913591	0.0273041
Specific Gravity		0.57609	0.642907	0.712414	0.575705	0.99706
API Gravity				67.1204		10.4172
Enthalpy	Btu/h	-4.33541E+08	-79.3763	-153898	-4.32625E+08	-4.36656E+06
Mass Enthalpy	Btu/lb	-1972.09	-5418.16	-906.779	-1970.61	-6784.45
Mass Cp	Btu/(lb*°F)	0.583476	0.438394	0.495788	0.583584	0.978747
Ideal Gas CpCv Ratio		1.30073	1.32163	1.05593	1.30088	1.32399
Dynamic Viscosity	cP	0.0114909	0.0103659	0.469083	0.0114895	1.13101
Kinematic Viscosity	cSt	0.419583	461.938	0.659063	0.419871	1.13542
Thermal Conductivity	Btu/(h*ft*°F)	0.0203121	0.0123958	0.07	0.0203152	0.338273
Surface Tension	lbf/ft			0.00120131		0.00506523 ?
Net Ideal Gas Heating Value	Btu/ft^3	933.776	65.3094	5056.69	933.796	8.01571
Net Liquid Heating Value	Btu/lb	21226.3	391.232	19022.3	21241.7	-883.95
Gross Ideal Gas Heating Value	Btu/ft^3	1035.96	118.118	5439.14	1035.97	58.8176
Gross Liquid Heating Value	Btu/lb	23550.3	1467.48	20472.7	23567.1	178.809

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Connections

	Produced Liquids	Produced Water Flow	Tank Vent Gas	W/B	1
From Block	Produced Water Tank	--	Produced Water Tank	--	MIX-100
To Block	--	MIX-100	--	--	Separator

Stream Composition

Mole Fraction	Produced Liquids %	Produced Water Flow %	Tank Vent Gas %	W/B %	1 %
Nitrogen	1.655E-06	0 *	0.12222	0.00278102	0.253042
Methane	0.00255814	0 *	88.3828	5.81454	95.5713
Carbon Dioxide	0.00092115	0 *	1.73666	2.38512	0.157175
Ethane	0.000400441	0 *	6.21043	0.686636	3.43614
Propane	9.51043E-05	0 *	0.716335	0.0355857	0.218042
Isobutane	2.11736E-05	0 *	0.0708294	0.00282363	0.0118349
n-Butane	5.9132E-05	0 *	0.135997	0.00537069	0.0175951
Isopentane	3.80148E-06	0 *	0.00368717	0.000125031	0.000321983
n-Pentane	5.29126E-06	0 *	0.0038478	0.000127646	0.00028886
i-Hexane	3.41986E-05	0 *	0.0101577	0.000326485	0.000608789
n-Hexane	3.02071E-05	0 *	0.00610416	0.000203165	0.000348943
2,2,4-Trimethylpentane	6.105E-07	0 *	3.9771E-05	1.28185E-06	2.31088E-06
Benzene	2.71252E-06	0 *	0.000278139	1.11579E-05	1.39937E-05
Heptane	0.000524716	0 *	0.0296809	0.00099922	0.00169721
Toluene	7.16047E-05	0 *	0.00274786	8.36034E-05	0.000140835
Octane	0.00181621	0 *	0.0324495	0.00100637	0.0020061
Ethylbenzene	3.56509E-05	0 *	0.000448972	1.37441E-05	2.56765E-05
o-Xylene	8.41938E-05	0 *	0.00081726	2.12796E-05	4.72447E-05
Nonane	0.00394024	0 *	0.0212068	0.000636322	0.00148911
Decane	0	0 *	0	0	0
Water	99.9078	100 *	2.48393	91.0629	0.325057
Oxygen	0	0 *	0	0	0
Decanes Plus	0.0815439	0 *	0.0293728	0.000692518	0.00277049
Hexanes+	0	0 *	0	0	0

Molar Flow	Produced Liquids lbmol/h	Produced Water Flow lbmol/h	Tank Vent Gas lbmol/h	W/B lbmol/h	1 lbmol/h
Nitrogen	5.86573E-07	0 *	4.61126E-05	1.83028E-08	33.43
Methane	0.000906669	0 *	0.033346	3.82673E-05	12626.2
Carbon Dioxide	0.000326479	0 *	0.000655225	1.56972E-05	20.7648
Ethane	0.000141926	0 *	0.00234313	4.51897E-06	453.957
Propane	3.37074E-05	0 *	0.000270266	2.34201E-07	28.8061
Isobutane	7.50444E-06	0 *	2.67233E-05	1.85832E-08	1.56354
n-Butane	2.09579E-05	0 *	5.13103E-05	3.53462E-08	2.32453
Isopentane	1.34734E-06	0 *	1.39113E-06	8.22865E-10	0.0425379
n-Pentane	1.87536E-06	0 *	1.45174E-06	8.40077E-10	0.038162
i-Hexane	1.21208E-05	0 *	3.83239E-06	2.1487E-09	0.0804286
n-Hexane	1.07062E-05	0 *	2.30304E-06	1.33709E-09	0.0460997
2,2,4-Trimethylpentane	2.16377E-07	0 *	1.50052E-08	8.43629E-12	0.000305296
Benzene	9.61384E-07	0 *	1.04939E-07	7.34338E-11	0.00184874
Heptane	0.000185973	0 *	1.11983E-05	6.57618E-09	0.224223
Toluene	2.53785E-05	0 *	1.03674E-06	5.5022E-10	0.0186061
Octane	0.000643712	0 *	1.22429E-05	6.62323E-09	0.265031
Ethylbenzene	1.26356E-05	0 *	1.69393E-07	9.04539E-11	0.00339218
o-Xylene	2.98404E-05	0 *	3.08344E-07	1.40048E-10	0.00624161
Nonane	0.00139652	0 *	8.0011E-06	4.18783E-09	0.196729
Decane	0	0 *	0	0	0
Water	35.4098	42.9441 *	0.000937164	0.000599314	42.9441
Oxygen	0	0 *	0	0	0
Decanes Plus	0.0289012	0 *	1.10821E-05	4.55768E-09	0.366016

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Molar Flow	Produced Liquids lbmol/h	Produced Water Flow lbmol/h	Tank Vent Gas lbmol/h	W/B lbmol/h	1 lbmol/h
Hexanes+	0	0 *	0	0	0

Mass Fraction	Produced Liquids %	Produced Water Flow %	Tank Vent Gas %	W/B %	1 %
Nitrogen	2.55575E-06	0 *	0.191342	0.00418393	0.424746
Methane	0.0022623	0 *	79.239	5.00957	91.869
Carbon Dioxide	0.00223477	0 *	4.27131	5.6373	0.414478
Ethane	0.000663763	0 *	10.4362	1.10882	6.191
Propane	0.00023118	0 *	1.76527	0.0842724	0.576111
Isobutane	6.78409E-05	0 *	0.230068	0.00881382	0.0412172
n-Butane	0.000189461	0 *	0.441745	0.0167643	0.061278
Isopentane	1.51195E-05	0 *	0.014867	0.000484461	0.00139198
n-Pentane	2.10447E-05	0 *	0.0155146	0.000494594	0.00124878
i-Hexane	0.00016246	0 *	0.048919	0.00151099	0.00314355
n-Hexane	0.000143499	0 *	0.0293974	0.000940256	0.00180181
2,2,4-Trimethylpentane	3.84429E-06	0 *	0.000253888	7.86371E-06	1.58169E-05
Benzene	1.168E-05	0 *	0.00121417	4.68074E-05	6.54966E-05
Heptane	0.00289839	0 *	0.166209	0.00537714	0.0101902
Toluene	0.000363695	0 *	0.0141493	0.000413694	0.00077754
Octane	0.0114366	0 *	0.207149	0.00617371	0.0137309
Ethylbenzene	0.000208645	0 *	0.0026638	7.83629E-05	0.000163338
o-Xylene	0.000492739	0 *	0.00484889	0.000121328	0.000300542
Nonane	0.0278582	0 *	0.152002	0.00438294	0.0114438
Decane	0	0 *	0	0	0
Water	99.2193	100 *	2.50081	88.1042	0.35089
Oxygen	0	0 *	0	0	0
Decanes Plus	0.731482	0 *	0.267118	0.00605204	0.0270137
Hexanes+	0	0 *	0	0	0

Mass Flow	Produced Liquids lb/h	Produced Water Flow lb/h	Tank Vent Gas lb/h	W/B lb/h	1 lb/h
Nitrogen	1.64319E-05	0 *	0.00129177	5.12723E-07	936.488
Methane	0.0145452	0 *	0.534951	0.000613902	202555
Carbon Dioxide	0.0143682	0 *	0.0288361	0.000690828	913.85
Ethane	0.00426758	0 *	0.0704558	0.000135881	13650.1
Propane	0.00148635	0 *	0.0119176	1.03272E-05	1270.22
Isobutane	0.000436175	0 *	0.00155321	1.0801E-06	90.8765
n-Butane	0.00121812	0 *	0.00298227	2.0544E-06	135.107
Isopentane	9.7209E-05	0 *	0.000100368	5.93687E-08	3.06906
n-Pentane	0.000135305	0 *	0.000104741	6.06105E-08	2.75334
i-Hexane	0.00104452	0 *	0.000330258	1.85165E-07	6.93096
n-Hexane	0.000922606	0 *	0.000198465	1.15224E-07	3.97266
2,2,4-Trimethylpentane	2.47164E-05	0 *	1.71402E-06	9.63665E-10	0.0348735
Benzene	7.50955E-05	0 *	8.19699E-06	5.73605E-09	0.144408
Heptane	0.0186348	0 *	0.00112209	6.58946E-07	22.4676
Toluene	0.00233834	0 *	9.55238E-05	5.06964E-08	1.71434
Octane	0.0735302	0 *	0.00139849	7.56562E-07	30.2741
Ethylbenzene	0.00134146	0 *	1.79836E-05	9.60304E-09	0.360131
o-Xylene	0.00316801	0 *	3.27354E-05	1.48682E-08	0.662641
Nonane	0.179111	0 *	0.00102618	5.37111E-07	25.2316
Decane	0	0 *	0	0	0
Water	637.918	773.65 *	0.0168833	0.0107968	773.65
Oxygen	0	0 *	0	0	0
Decanes Plus	4.70297	0 *	0.00180334	7.41653E-07	59.5603
Hexanes+	0	0 *	0	0	0

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Arsenal - Goff Compressor Station
Location:	
Flowsheet:	Flowsheet1
Job:	Produced Water Tank

Stream Properties

Property	Units	Produced Liquids	Produced Water Flow	Tank Vent Gas	W/B	1
Temperature	°F	70 *	60 *	70	72.1381	58.7987
Pressure	psia	14.6959 *	522 *	14.6959	0.429201	522
Mole Fraction Vapor	%	0	0	100	100	99.7289
Mole Fraction Light Liquid	%	0.0888185	100	0	0	0.000444548
Mole Fraction Heavy Liquid	%	99.9112	0	0	0	0.270624
Molecular Weight	lb/lbmol	18.1403	18.0153	17.8937	18.6203	16.689
Mass Density	lb/ft^3	62.1446	62.3966	0.0463885	0.00140088	1.71997
Molar Flow	lbmol/h	35.4425	42.9441	0.037729	0.000658132	13211.2
Mass Flow	lb/h	642.938	773.65	0.675111	0.0122546	220482
Vapor Volumetric Flow	ft^3/h	10.3458	12.3989	14.5534	8.74777	128189
Liquid Volumetric Flow	gpm	1.28987	1.54584	1.81445	1.09063	15982
Std Vapor Volumetric Flow	MMSCFD	0.322797	0.391118	0.000343621	5.99401E-06	120.323
Std Liquid Volumetric Flow	sgpm	1.28812	1.54658 *	0.00414909	2.81904E-05	1439.28
Compressibility		0.000754693	0.0270246	0.997283	0.999602	0.910317
Specific Gravity		0.996402	1.00044	0.61782	0.642907	
API Gravity		10.3066	9.93743			
Enthalpy	Btu/h	-4.35965E+06	-5.28906E+06	-1386.05	-66.3974	-4.38068E+08
Mass Enthalpy	Btu/lb	-6780.82	-6836.5	-2053.07	-5418.16	-1986.86
Mass Cp	Btu/(lb*°F)	0.97814	0.98225	0.497067	0.438394	0.584731
Ideal Gas CpCv Ratio		1.3235	1.32632	1.28863	1.32163	1.30107
Dynamic Viscosity	cP	0.998378	1.14219	0.0110164	0.0103659	
Kinematic Viscosity	cSt	1.00293	1.14276	14.8255	461.938	
Thermal Conductivity	Btu/(h*ft*°F)	0.344286	0.342316	0.0182012	0.0123958	
Surface Tension	lbf/ft	0.00500046 ?	0.00510743			
Net Ideal Gas Heating Value	Btu/ft^3	7.02846	0	935.437	65.3094	931.289
Net Liquid Heating Value	Btu/lb	-905.657	-1059.76	19787.8	391.232	21161.7
Gross Ideal Gas Heating Value	Btu/ft^3	57.7757	50.3101	1037.54	118.118	1033.33
Gross Liquid Heating Value	Btu/lb	155.945	0	21953.3	1467.48	23482.1

Remarks

Energy Stream Report

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Energy Streams

Energy Stream	Energy Rate	Power	From Block	To Block
Q-1	5526.78 Btu/h	2.17211 hp	--	Produced Water Tank
Q-2	160984 Btu/h	63.2692 hp	--	Separator

Remarks

Blocks
Blowdown Tank
Separator Report

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank	
Location:		Modified: 12:02 PM, 7/26/2017	
Flowsheet:	Flowsheet1	Status: Solved 5:59 PM, 8/21/2017	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Fluids	Inlet	Separator	Tank Vent Gas	Vapor Outlet	
Produced Liquids	Heavy Liquid Outlet		Q-1	Energy	

Block Parameters

Pressure Drop	507.304	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0.106338	%	Heat Duty	5526.78	Btu/h
Mole Fraction Light Liquid	0.088724	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	99.8049	%	Heat Release Curve Increments	10	

Remarks

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank	
Location:		Modified: 11:59 AM, 6/20/2017	
Flowsheet:	Flowsheet1	Status: Solved 6:00 PM, 8/21/2017	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Produced Water Flow	Inlet		Measured Condensate	Inlet	
Measured Sales Gas	Inlet		1	Outlet	Separator

Block Parameters

Pressure Drop	0 psi	Fraction to PStream 1	100 %

Remarks

Blocks
Sand Trap
Separator Report

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		Modified: 12:21 PM, 6/20/2017
Flowsheet:	Flowsheet1	Status: Solved 5:59 PM, 8/21/2017

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
1	Inlet	MIX-100	Gas to Separators	Vapor Outlet	
Produced Fluids	Light Liquid Outlet	Produced Water Tank	Q-2	Energy	

Block Parameters

* Pressure Drop	0	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	99.7314	%	Heat Duty	160984	Btu/h
Mole Fraction Light Liquid	0.000288539	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	0.268272	%	Heat Release Curve Increments	10	

Remarks

Flowsheet Environment
Environment1

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		
Flowsheet:	Flowsheet1	

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Nitrogen	False	False	Benzene	False	False
Methane	False	False	Heptane	False	False
Carbon Dioxide	False	False	Toluene	False	False
Ethane	False	False	Octane	False	False
Propane	False	False	Ethylbenzene	False	False
Isobutane	False	False	o-Xylene	False	False
n-Butane	False	False	Nonane	False	False
Isopentane	False	False	Decane	False	False
n-Pentane	False	False	Water	False	True
i-Hexane	False	False	Oxygen	False	False
n-Hexane	False	False	Decanes Plus	False	False
2,2,4-Trimethylpentane	False	False	Hexanes+	False	False

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

Environments Report

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		

Project-Wide Constants

Atmospheric Pressure	14.6959 psia	Ideal Gas Reference Pressure	14.6959 psia
Ideal Gas Reference Temperature	60 °F	Ideal Gas Reference Volume	379.484 ft^3/lbmol
Liquid Reference Temperature	60 °F		

Environment [Environment1]

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F		

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Nitrogen	False	False	Benzene	False	False
Methane	False	False	Heptane	False	False
Carbon Dioxide	False	False	Toluene	False	False
Ethane	False	False	Octane	False	False
Propane	False	False	Ethylbenzene	False	False
Isobutane	False	False	o-Xylene	False	False
n-Butane	False	False	Nonane	False	False
Isopentane	False	False	Decane	False	False
n-Pentane	False	False	Water	False	True
i-Hexane	False	False	Oxygen	False	False
n-Hexane	False	False	Decanes Plus	False	False
2,2,4-Trimethylpentane	False	False	Hexanes+	False	False

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

Single Oil Report
Decanes Plus

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		

Properties

	Volume Average Boiling Point	399.878 °F		Low Temperature Viscosity	1.05288 cP
*	Molecular Weight	162.726 lb/lbmol		Temperature of High T Viscosity	210 °F
*	Specific Gravity	0.788		High Temperature Viscosity	0.503332 cP
	API Gravity	48.0685		Watson K	12.066
	Critical Temperature	720.653 °F		ASTM D86 10-90% Slope	0 °F/%
	Critical Pressure	307.278 psia		ASTM D93 Flash Point	157.716 °F
	Critical Volume	10.2876 ft^3/lbmol	?	Pour Point	-12.6777 °F
	Acentric Factor	0.527304		Paraffinic Fraction	51.9393 %
	Carbon to Hydrogen Ratio	6.00643		Naphthenic Fraction	27.7089 %
	Refractive Index	1.43922		Aromatic Fraction	20.3518 %
	Temperature of Low T Viscosity	100 °F		Ideal Gas Heat Capacity	57.9027 Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Decanes Plus!Properties!Pour Point

Warning: Pour Point calculation: The value of 0.788 for Specific Gravity should be between 0.8 and 1.

Remarks

Single Oil Report
Hexanes+

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		

Properties

	Volume Average Boiling Point	-173.182 °F		Low Temperature Viscosity	3.0532E+30 cP
*	Molecular Weight	16.662 lb/lbmol		Temperature of High T Viscosity	210 °F
*	Specific Gravity	0.5763		High Temperature Viscosity	1370.85 cP
	API Gravity	114.032		Watson K	11.439
	Critical Temperature	-2.89417 °F		ASTM D86 10-90% Slope	0 °F/%
	Critical Pressure	1116.36 psia	?	ASTM D93 Flash Point	-237.696 °F
	Critical Volume	1.64547 ft^3/lbmol	?	Pour Point	2.40106E+29 °F
	Acentric Factor	0.333018	?	Paraffinic Fraction	100 %
?	Carbon to Hydrogen Ratio	8.6229	?	Naphthenic Fraction	0 %
?	Refractive Index	1.31682	?	Aromatic Fraction	0 %
	Temperature of Low T Viscosity	100 °F	?	Ideal Gas Heat Capacity	5.55252 Btu/(lbmol*°F)

Warnings

ProMax:ProMax!Project!Oils!Hexanes+!Properties!Carbon to Hydrogen Ratio
Warning: Carbon to Hydrogen Ratio calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 80 °F and 650 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Refractive Index
Warning: Refractive Index calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 80 °F and 1500 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!ASTM D93 Flash Point
Warning: ASTM D93 Flash Point calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 150 °F and 850 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Pour Point
Warning: Pour Point calculation: The value of -173.182 °F for Volume Average Boiling Point should be between 340.33 °F and 1040.33 °F.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Paraffinic Fraction
Warning: Paraffinic Fraction calculation: The value of 16.662 lb/lbmol for Molecular Weight should be between 70 lb/lbmol and 600 lb/lbmol.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Naphthenic Fraction
Warning: Naphthenic Fraction calculation: The value of 16.662 lb/lbmol for Molecular Weight should be between 70 lb/lbmol and 600 lb/lbmol.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Aromatic Fraction
Warning: Aromatic Fraction calculation: The value of 16.662 lb/lbmol for Molecular Weight should be between 70 lb/lbmol and 600 lb/lbmol.
ProMax:ProMax!Project!Oils!Hexanes+!Properties!Ideal Gas Heat Capacity
Warning: Ideal Gas Heat Capacity calculation: The value of 0.5763 for Specific Gravity should be between 0.662763 and 1.07605.
ProMax:ProMax!Project!Oils!Hexanes+
Warning: The value of 0.5763 for Specific Gravity should be between 0.662763 and 1.07605.

Remarks

Calculator Report

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		

Condensate Produced

Source Code

Residual Error (for CV1) = Water_frac - 99

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Measured Condensate!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	16.8005
Unit	

Measured Variable [Water_frac]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Liquids!Phases!Total!Composition!Std Liquid Volumetric Fraction!Water
Value	99.0002
Unit	

Solver Properties

Status: Solved

Error	0.000199189		Algorithm	Default
Calculated Value	0.490016	sgpm	Iterations	2
Lower Bound		sgpm	Max Iterations	20
Upper Bound		sgpm	Weighting	1
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		* Skip Dependency Check	True

Remarks

Produced Water

Source Code

Residual Error (for CV1) = Water_flow - 677040/42/365

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Water Flow!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	53.0257
Unit	

Measured Variable [Water_flow]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Produced Liquids!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	44.1642
Unit	

Solver Properties

Status: Solved

Error	-0.000152079		Algorithm	Default
Calculated Value	1.54658	sgpm	Iterations	2
Lower Bound		sgpm	Max Iterations	20
Upper Bound		sgpm	Weighting	1
Step Size		sgpm	Solver Active	Active
Is Minimizer	False		* Skip Dependency Check	True

Remarks

Calculator Report

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		

SG Flow

Source Code

Residual Error (for CV1) = SGflow-120

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Measured Sales Gas!Phases!Total!Properties!Std Vapor Volumetric Flow
Value	119916
Unit	

Measured Variable [SGflow]

Source Moniker	ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!Gas to Separators!Phases!Total!Properties!Std Vapor Volumetric Flow
Value	120
Unit	

Solver Properties

Status: Solved

Error	-0.000256845		Iterations	1
Calculated Value	119.916	MMSCFD	Max Iterations	20
Lower Bound		MMSCFD	Weighting	1
Upper Bound		MMSCFD	Priority	0
Step Size		MMSCFD	Solver Active	Active
Is Minimizer	False		Group	
Algorithm	Default		Skip Dependency Check	False

Remarks

User Value Sets Report

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		

Tank-1

User Value [BlockReady]

* Parameter	1		Upper Bound		
Lower Bound			* Enforce Bounds	False	

User Value [ShellLength]

* Parameter	20	ft	Upper Bound		ft
Lower Bound		ft	* Enforce Bounds	False	

User Value [ShellDiam]

* Parameter	12	ft	Upper Bound		ft
Lower Bound		ft	* Enforce Bounds	False	

User Value [BreatherVP]

* Parameter	0.03	psig	Upper Bound		psig
Lower Bound		psig	* Enforce Bounds	False	

User Value [BreatherVacP]

* Parameter	-0.03	psig	Upper Bound		psig
Lower Bound		psig	* Enforce Bounds	False	

User Value [DomeRadius]

* Parameter	0	ft	Upper Bound		ft
Lower Bound		ft	* Enforce Bounds	False	

User Value [OpPress]

* Parameter	0	psig	Upper Bound		psig
Lower Bound		psig	* Enforce Bounds	False	

User Value [AvgPercentLiq]

* Parameter	50	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds	False	

User Value [MaxPercentLiq]

* Parameter	90	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds	False	

User Value [AnnNetTP]

* Parameter	44.1674	bbl/day	Upper Bound		bbl/day
Lower Bound		bbl/day	* Enforce Bounds	False	

User Value [OREff]

* Parameter	0	%	Upper Bound		%
Lower Bound		%	* Enforce Bounds	False	

User Value [MaxAvgT]

* Parameter	59.8833	°F	Upper Bound		°F
Lower Bound		°F	* Enforce Bounds	False	

User Value [MinAvgT]

* Parameter	40.7333	°F	Upper Bound		°F
Lower Bound		°F	* Enforce Bounds	False	

User Value [BulkLiqT]

* Parameter	54.6483	°F	Upper Bound		°F
Lower Bound		°F	* Enforce Bounds	False	

User Value Sets Report

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		

User Value [AvgP]

* Parameter	14.1085	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [Therml]

* Parameter	1202.96	Btu/ft^2/day	Upper Bound	Btu/ft^2/day
Lower Bound		Btu/ft^2/day	* Enforce Bounds	False

User Value [AvgWindSpeed]

* Parameter	9.075	mi/h	Upper Bound	mi/h
Lower Bound		mi/h	* Enforce Bounds	False

User Value [MaxHourlyLoadingRate]

* Parameter	16.62	gpm	Upper Bound	gpm
Lower Bound		gpm	* Enforce Bounds	False

User Value [EntrainedOilFrac]

* Parameter	1	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [TurnoverRate]

* Parameter	44.4572		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [LLossSatFactor]

* Parameter	1.45		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [AtmPressure]

* Parameter	14.1085	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [TVP]

* Parameter	0.293463	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [MaxVP]

* Parameter	0.418012	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [MinVP]

* Parameter	0.20454	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

* Parameter	61.1967	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [MaxLiqSurfaceT]

* Parameter	72.1381	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [TotalLosses]

* Parameter	0.0536751	ton/yr	Upper Bound	ton/yr

User Value Sets Report

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		

User Value [TotalLosses]

Lower Bound	ton/yr	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	0.0370633 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	0.0166118 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [WithdrawalLoss]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [LoadingLosses]

* Parameter	0.0641671 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [MaxHourlyLoadingLoss]

* Parameter	0.189008 lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	* Enforce Bounds	False

User Value [PStar]

Parameter		Upper Bound	
Lower Bound		* Enforce Bounds	False

User Value [AllCTotalLosses]

* Parameter	0.0536751 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [AllCLoadingLosses]

* Parameter	0.0641671 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [AllCMaxHLoadingLoss]

* Parameter	0.189008 lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	* Enforce Bounds	False

User Value [AllCFlashingLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [DeckFittingLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [DeckSeamLosses]

* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value Sets Report

Client Name:	Arsenal - Goff Compressor Station	Job: Produced Water Tank
Location:		

User Value [FlashingLosses]

* Parameter	0	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [TotalResidual]

* Parameter	2816.01	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [GasMoleWeight]

* Parameter	0.0186203	kg/mol	Upper Bound	kg/mol
Lower Bound		kg/mol	* Enforce Bounds	False

User Value [VapReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [LiqReportableFrac]

* Parameter	100	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

User Value [FlashReportableFrac]

* Parameter	0	%	Upper Bound	%
Lower Bound		%	* Enforce Bounds	False

Remarks

This User Value Set was programmatically generated. GUID={8F6700DA-E196-4418-8000-F476C212C378}

G3516B

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	8	APPLICATION:	GAS COMPRESSION
AFTERCOOLER TYPE:	SCAC	RATING LEVEL:	CONTINUOUS
AFTERCOOLER - STAGE 2 INLET (°F):	130	FUEL:	NAT GAS
AFTERCOOLER - STAGE 1 INLET (°F):	201	FUEL SYSTEM:	CAT WIDE RANGE
JACKET WATER OUTLET (°F):	210		WITH AIR FUEL RATIO CONTROL
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	7.0-40.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	80
CONTROL SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	905
EXHAUST MANIFOLD:	DRY	ALTITUDE CAPABILITY AT 100°F INLET AIR TEMP. (ft):	4000
COMBUSTION:	LOW EMISSION		
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5		

RATING		NOTES	LOAD	100%	75%	50%
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	1380	1035	690
ENGINE EFFICIENCY	(ISO 3046/1)	(3)	%	34.8	32.5	30.3
ENGINE EFFICIENCY	(NOMINAL)	(3)	%	34.2	31.9	29.7
ENGINE DATA						
FUEL CONSUMPTION	(ISO 3046/1)	(4)	Btu/bhp-hr	7301	7820	8399
FUEL CONSUMPTION	(NOMINAL)	(4)	Btu/bhp-hr	7443	7972	8562
AIR FLOW (77°F, 14.7 psia)	(WET)	(5) (6)	ft3/min	3126	2452	1715
AIR FLOW	(WET)	(5) (6)	lb/hr	13862	10874	7602
FUEL FLOW (60ºF, 14.7 psia)			scfm	189	152	109
COMPRESSOR OUT PRESSURE			in Hg(abs)	103.8	91.8	69.4
COMPRESSOR OUT TEMPERATURE			°F	381	354	274
AFTERCOOLER AIR OUT TEMPERATURE			°F	133	133	131
INLET MAN. PRESSURE		(7)	in Hg(abs)	94.6	76.8	54.0
INLET MAN. TEMPERATURE	(MEASURED IN PLENUM)	(8)	°F	146	146	143
TIMING		(9)	°BTDC	30	29	24
EXHAUST TEMPERATURE - ENGINE OUTLET		(10)	°F	992	986	1006
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(11) (6)	ft3/min	9126	7138	5065
EXHAUST GAS MASS FLOW	(WET)	(11) (6)	lb/hr	14380	11290	7900
EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)		(12)(13)	g/bhp-hr	0.50	0.50	0.50
CO		(12)(14)	g/bhp-hr	2.43	2.61	2.56
THC (mol. wt. of 15.84)		(12)(14)	g/bhp-hr	4.77	5.11	5.19
NMHC (mol. wt. of 15.84)		(12)(14)	g/bhp-hr	0.72	0.77	0.78
NMNEHC (VOCs) (mol. wt. of 15.84)		(12)(14)(15)	g/bhp-hr	0.48	0.51	0.52
HCHO (Formaldehyde)		(12)(14)	g/bhp-hr	0.44	0.43	0.42
CO2		(12)(14)	g/bhp-hr	474	506	549
EXHAUST OXYGEN		(12)(16)	% DRY	9.0	8.7	8.3
LAMBDA		(12)(16)		1.68	1.64	1.60
ENERGY BALANCE DATA						
LHV INPUT		(17)	Btu/min	171179	137505	98460
HEAT REJECTION TO JACKET WATER (JW)		(18)(26)	Btu/min	23412	21533	19930
HEAT REJECTION TO ATMOSPHERE		(19)	Btu/min	6110	5092	4074
HEAT REJECTION TO LUBE OIL (OC)		(20)(26)	Btu/min	4475	3978	3363
HEAT REJECTION TO EXHAUST (LHV TO 77°F)		(21)(22)	Btu/min	62427	48810	34853
HEAT REJECTION TO EXHAUST (LHV TO 350°F)		(21)	Btu/min	41619	32383	23415
HEAT REJECTION TO A/C - STAGE 1 (1AC)		(23)(26)	Btu/min	10046	8308	2813
HEAT REJECTION TO A/C - STAGE 2 (2AC)		(24)(27)	Btu/min	5358	5063	3334
PUMP POWER		(25)	Btu/min	833	833	833

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1. (Standard reference conditions of 77°F, 29.60 in Hg barometric pressure.) No overload permitted at rating shown. Consult the altitude deration factor chart for applications that exceed the rated altitude or temperature.

Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions, adjusted to the specified NOx level at 100% load. Tolerances specified are dependent upon fuel quality. Fuel methane number cannot vary more than ± 3.

For notes information consult page three.

DCL International Inc.

Mailing address: P.O. Box 90, Concord, Ontario, Canada, L4K 1B2
Toll free: 1-800-872-1968 *Phone:* 905-660-6450 *Fax:* 905-660-6435 *E-mail:* info@dcl-inc.com

To	Mark Davis	Phone	
	J-W Power	Fax	
Date	January 4, 2010	Email	mdavis@jwenergy.com

RE: EMISSIONS GUARANTEE

Mark,

We hereby guarantee that our QUICK-LID™ Model DC65A-12 catalytic converter described below:

Catalyst model	DC65
Catalyst coating	Oxidation (A coating)
Outside Diameter of catalyst substrate	30.75"
No. of catalyst substrates	1
Cell Density	300 cpsi

and sized for the following engine:

Engine model	CAT G3516 ULB
Power	1380 hp @ 1400 rpm
Fuel	Pipeline Quality Natural Gas

will perform as follows:

Emissions	**After Catalyst (% destruction)**
Carbon Monoxide (CO)	93%
Formaldehyde (CH_2O)	90%
Volatile Organic Compounds	80%

for a period of 1 year or 8000 hours, whichever comes first, subject to all terms and conditions contained in the attached warranty document being respected and met.

Best regards,
DCL International, Inc.

Tawnya VanGroningen

Tawnya VanGroningen
Account Manager
North American Industrial Catalyst Division

Quote#16-1558

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2017 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Power Solutions International, Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: HPSIB5.70EMT-022

Effective Date: 01/25/2017

Expiration Date: 12/31/2017

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 01/25/2017

Revision Date: N/A

Manufacturer: Power Solutions International, Inc.
Engine Family: HPSIB5.70EMT
Mobile/Stationary Certification Type: Stationary
Fuel : LPG/Propane
Natural Gas (CNG/LNG)
Emission Standards :
Part 60 Subpart JJJJ Table 1
VOC (g/Hp-hr) : 1.0
CO (g/Hp-hr) : 4.0
NOx (g/Hp-hr) : 2.0
Stationary Part 1048
CO (g/kW-hr) : 4.4
HC + NOx (g/kW-hr) : 2.7
NMHC + NOx (g/kW-hr) : 2.7
Emergency Use Only : Y

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Model: 80ERESD

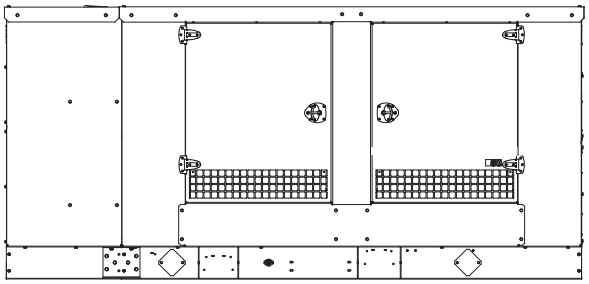
KOHLER. Power Systems

208–480 V **Gas**

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

Ratings Range

		60 Hz
Standby:	**kW**	63–80
	kVA	63–100



Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- UL 2200 listing is available. (60 Hz only)
- CSA approval is available.
- The generator set accepts rated load in one step.
- The 60 Hz generator set engine is certified by the Environmental Protection Agency (EPA) to conform to the New Source Performance Standard (NSPS) for stationary spark-ignited emissions.
- A one-year limited warranty covers all systems and components. Two- and five-year extended limited warranties are also available.
- Alternator features:
  - The unique Fast-Response™ X excitation system delivers excellent voltage response and short-circuit capability using a rare-earth permanent magnet (PM)-excited alternator.
  - The brushless, rotating-field alternator has broadrange reconnectability.
- Other features:
  - Kohler® Decision-Maker® 3000 controller. See controller features on page 3.
  - The electronic, isochronous governor incorporates an integrated drive-by-wire throttle body actuator delivering precise frequency regulation.
- Quick-ship (QS) models with selected features and a five-year basic limited warranty are available. See your Kohler distributor for details.

Generator Set Ratings

				Natural Gas 130°C Rise Standby Rating	
Alternator	**Voltage**	**Ph**	**Hz**	**kW/kVA**	**Amps**
	120/208	3	60	77/96	267
	127/220	3	60	80/100	262
	120/240	3	60	77/96	231
4P10X	120/240	1	60	63/63	262
	139/240 *	3	60	80/100	240
	220/380 *	3	60	70/87	132
	277/480	3	60	80/100	120
	120/208	3	60	80/100	277
	127/220	3	60	80/100	262
	120/240	3	60	80/100	240
4R9X	120/240	1	60	77/77	320
	139/240 *	3	60	80/100	240
	220/380 *	3	60	80/100	151
	277/480	3	60	80/100	120
4T9X	120/240	1	60	80/80	333

* Voltage configuration not available from the factory. Field-adjustable by an authorized service technician.

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. *Standby Ratings:* Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For limited running time and base load ratings, consult the factory. Obtain the technical information bulletin (TIB-101) on ratings guidelines for the complete ratings definitions. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. GENERAL GUIDELINES FOR DERATING: *Altitude:* Derate 1.3% per 100 m (328 ft.) elevation above 200 m (656 ft.). *Temperature:* Derate 6.0% per 10°C (18°F) temperature above 25°C (77°F). For units having enclosures with enclosed silencers, add 10°C (18°F) to the ambient temperature.

Alternator Specifications

Specifications		Alternator
Manufacturer		Kohler
Type		4-Pole, Rotating-Field
Exciter type		Brushless, Rare-Earth Permanent- Magnet
Leads: quantity, type		
4PX, 4RX		12, Reconnectable
4TX		4, 120/240
Voltage regulator		Solid State, Volts/Hz
Insulation:		NEMA MG1
Material		Class H
Temperature rise		130°C, Standby
Bearing: quantity, type		1, Sealed
Coupling		Flexible Disc
Amortisseur windings		Full
Voltage regulation, no-load to full-load		±0.5%
Unbalanced load capability		100% of Rated Standby Current
One-step load acceptance		100% of Rating
Peak motor starting kVA:		(35% dip for voltages below)
480 V	4P10X (12 lead)	275 (60 Hz)
480 V	4R9X (12 lead)	385 (60 Hz)
240 V	4T9X (4 lead)	237 (60 Hz)

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Windings are vacuum-impregnated with epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.
- Total harmonic distortion (THD) from no load to full load with a linear load is less than 3.2%.

Application Data

Engine

Engine Specifications	
Manufacturer	General Motors
Engine: model, type	Industrial Powertrain Vortec 5.7 L, 4-Cycle Turbocharged
Cylinder arrangement	V-8
Displacement, L (cu. in.)	5.7 (350)
Bore and stroke, mm (in.)	101.6 x 88.4 (4.00 x 3.48)
Compression ratio	9.1:1
Piston speed, m/min. (ft./min.)	318 (1044)
Main bearings: quantity, type	5, M400 Copper lead
Rated rpm	1800
Max. power at rated rpm, kW (HP)	99 (133)
Cylinder head material	Cast Iron
Piston type and material	Strutless Flat Top, Hypereutectic Cast Alum.
Crankshaft material	Cast Nodular Undercut Rolled Fillet
Valve (exhaust) material	Int.-A193 Exh. Inconel
Governor type	Electronic
Frequency regulation, no-load to full-load	Isochronous
Frequency regulation, steady state	±0.5%
Frequency	Fixed
Air cleaner type, all models	Dry

Exhaust

Exhaust System	
Exhaust manifold type	Dry
Exhaust flow at rated kW, m^3/min. (cfm)	18.9 (670)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	649 (1200)
Maximum allowable back pressure, kPa (in. Hg)	10.2 (3.0)
Exhaust outlet size at engine hookup, mm (in.)	See ADV drawing

Engine Electrical

Engine Electrical System	
Ignition system	Individual Coil Near Plug Ignition
Battery charging alternator:	
Ground (negative/positive)	Negative
Volts (DC)	12
Ampere rating	70
Starter motor rated voltage (DC)	12
Battery, recommended cold cranking amps (CCA):	
Qty., rating for -18°C (0°F)	One, 630
Battery voltage (DC)	12

Fuel

Fuel System	
Fuel type	Natural Gas
Fuel supply line inlet	1 1/4 NPT
Gas fuel supply pressure, measured at the generator set fuel inlet downstream of any fuel system equipment accessories, kPa (in. H_2O)	1.74–2.74 (7-11)

Fuel Composition Limits *	Nat. Gas
Methane, % by volume	90 min.
Ethane, % by volume	4.0 max.
Propane, % by volume	1.0 max.
Propene, % by volume	0.1 max.
C_4 and higher, % by volume	0.3 max.
Sulfur, ppm mass	25 max.
Lower heating value, MJ/m^3 (Btu/ft^3), min.	33.2 (890)

* Fuels with other compositions may be acceptable. If your fuel is outside the listed specifications, contact your local distributor for further analysis and advice.

Application Data

Lubrication

Lubricating System	
Type	Full Pressure
Oil pan capacity, L (qt.)	4.7 (5.0)
Oil pan capacity with filter, L (qt.)	6.2 (6.5)
Oil filter: quantity, type	1, Cartridge

Cooling

Radiator System	
Ambient temperature, °C (°F)	40 (104)
Engine jacket water capacity, L (gal.)	6.8 (1.8)
Radiator system capacity, including engine, L (gal.)	22.5 (6.0)
Engine jacket water flow, Lpm (gpm)	144 (38)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	62 (3540)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	599 (23.6)
Fan, kWm (HP)	6.7 (9.0)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H_2O)	0.125 (0.5)

Operation Requirements

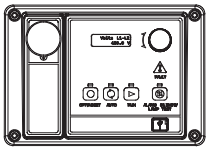
Air Requirements	
Radiator-cooled cooling air, m^3/min. (scfm)†	156 (5500)
Combustion air, m^3/min. (cfm)	6.8 (237)
Heat rejected to ambient air:	
Engine, kW (Btu/min.)	47 (2700)
Alternator, kW (Btu/min.)	14.5 (825)

† Air density = 1.20 kg/m^3 (0.075 lbm/ft^3)

Fuel Consumption‡	Standby Rating
Natural Gas, m^3/hr. (cfh) at % load	
100%	33.6 (1185)
75%	27.8 (981)
50%	22.0 (777)
25%	16.2 (573)
0%	10.4 (369)

‡ Nominal fuel rating: Natural gas, 37 MJ/m^3 (1000 Btu/ft^3)

Controller



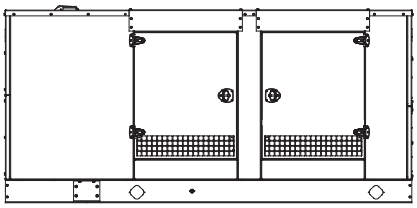
Decision-Maker® 3000 Controller

Provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility.

- Digital display and menu control provide easy local data access
- Measurements are selectable in metric or English units
- Remote communication through a PC via network or serial configuration
- Integrated hybrid voltage regulator with ±0.5% regulation
- Built-in alternator thermal overload protection

Refer to G6-100 for additional controller features and accessories.

Sound Enclosure



- Sound level (8 point logarithmic average) at 7 m (23 ft.) with full load: 71 dB(A).
- Sound level compared to competitor ratings with no load: 70 dB(A).*
- Sound attenuating enclosure uses acoustic insulation that meets UL 94 HF1 flammability classification and repels moisture absorption.
- Vertical air inlet and outlet discharge with 90 degree bends to redirect air and reduce noise.
- Internal-mounted critical silencer and flexible exhaust connector.
- Skid-mounted, steel (standard) or aluminum (optional) construction with hinged doors.
- Fade-, scratch-, and corrosion-resistant Kohler® Cashmere Power Armor™ textured e-coat paint.
- Lockable, flush-mounted door latches.
- Certified to withstand 241 kph (150 mph) wind load rating (aluminum enclosures only).

* Lowest of 8 points measured around the generator. Sound levels at other points around generator may be higher depending on installation parameters.

KOHLER CO., Kohler, Wisconsin 53044 USA
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the
US and Canada, phone 1-800-544-2444
KOHLERPower.com

Kohler Power Systems
Asia Pacific Headquarters
7 Jurong Pier Road
Singapore 619159
Phone (65) 6264-6422, Fax (65) 6264-6455

Additional Standard Features

- Alternator Protection
- Battery Rack and Cables
- Electronic, Isochronous Governor
- Gas Fuel System (includes fuel mixer, electronic secondary gas regulator, gas solenoid valve, and flexible fuel line between the engine and the skid-mounted fuel system components)
- Integral Vibration Isolation
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Literature
- Steel Sound Enclosure
- Three-Way Exhaust Catalyst

Available Options

Approvals and Listings

❑ CSA Approval
❑ UL 2200 Listing (60 Hz only)

Enclosure

❑ Aluminum Sound Enclosure

Fuel System

❑ Flexible Fuel Line
(required when the generator set skid is spring mounted)
❑ Gas Filter
❑ Additional Gas Solenoid Valve

Controller

❑ Common Fault Relay
❑ Communication Products and PC Software
❑ Input/Output Module
❑ Remote Annunciator Panel
❑ Remote Emergency Stop
❑ Run Relay

Cooling System

❑ Block Heater, 1500 W, 110–120 V
❑ Block Heater, 1500 W, 190–240 V
[recommended for ambient temperatures below 10°C (50°F)]

Electrical System

❑ Alternator Strip Heater
❑ Battery
❑ Battery Charger, Equalize/Float Type
❑ Battery Heater
❑ Line Circuit Breaker (NEMA1 enclosure)
❑ Line Circuit Breaker with Shunt Trip (NEMA1 enclosure)

Miscellaneous

❑ Air Cleaner Restrictor Indicator
❑ Engine Fluids Added
❑ Rated Power Factor Testing
❑ Rodent Guards

Literature

❑ General Maintenance
❑ Overhaul
❑ Production

Extended Limited Warranties

❑ 2-Year Basic
❑ 5-Year Basic
❑ 5-Year Comprehensive

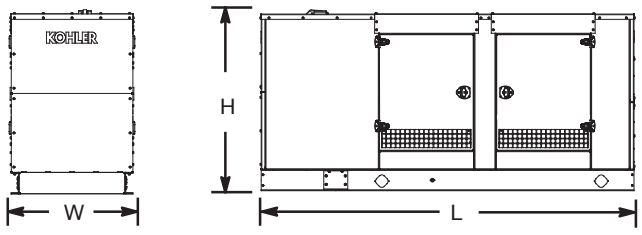
Other Options

❑ _____
❑ _____
❑ _____
❑ _____
❑ _____
❑ _____
❑ _____
❑ _____

Dimensions and Weights

Overall Size, L x W x H, mm (in.) :	3526 x 1153 x 1664 (138.8 x 45.4 x 65.5)
Weight, wet, kg (lb.):	
With steel sound enclosure	1412 (3117)
With aluminum sound enclosure	1350 (2976)

Weight includes generator set with engine fluids, sound enclosure, and silencer.



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

DISTRIBUTED BY:

Gas Analytical Services

CHARLESTON, WV

304-677-9926

Good

LELAP Certification #

04049

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	95.8791	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**

Attachment V

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
Line Heater LH-1	0.02	0.11	0.02	0.09	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	29.27	128.22
Compressor Engine CE-1R	1.52	6.66	0.56	2.43	0.32	1.39	0.01	0.03	<0.01	<0.01	<0.01	<0.01	1,671.67	7,321.91
Compressor Engine CE-2R	1.52	6.66	0.56	2.43	0.32	1.39	0.01	0.03	<0.01	<0.01	<0.01	<0.01	1,671.67	7,321.91
Compressor Engine CE-7R	1.52	6.66	0.56	2.43	0.32	1.39	0.01	0.03	<0.01	<0.01	<0.01	<0.01	1,671.67	7,321.91
Compressor Engine CE-8R	1.52	6.66	0.56	2.43	0.32	1.39	0.01	0.03	<0.01	<0.01	<0.01	<0.01	1,671.67	7,321.91
Compressor Engine CE-9R	1.52	6.66	0.56	2.43	0.32	1.39	0.01	0.03	<0.01	<0.01	<0.01	<0.01	1,671.67	7,321.91
Produced Fluid Tank TK-1 and TK-2	<0.01	<0.01	<0.01	<0.01	0.02	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	13.42	58.77
Emergency Generator EG-1	0.02	0.47	0.07	0.02	0.05	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	99.24	24.81
Tank Loading LO-1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.08
TOTAL	8.10	33.54	2.87	12.28	1.65	7.04	0.03	0.15	<0.01	<0.01	<0.01	<0.01	8,500.30	36,821.42

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 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
Line Heater LH-1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Compressor Engine CE-1R	0.13	0.59	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.17	0.64
Compressor Engine CE-2R	0.13	0.59	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.17	0.64
Compressor Engine CE-7R	0.13	0.59	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.17	0.64
Compressor Engine CE-8R	0.13	0.59	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.17	0.64
Compressor Engine CE-9R	0.13	0.59	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.17	0.64
Produced Fluid Tank TK-1 and TK-2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Emergency Generator EG-1	0.05	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.01
Tank Loading LO-1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TOTAL	0.72	2.94	0.03	0.11	0.02	0.10	<0.01	0.01	0.01	0.05	<0.01	<0.01	0.88	3.22

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

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Arsenal Resources, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G35-D General Permit for a natural gas compressor stations located in Taylor County, West Virginia. The latitude and longitude coordinates are: 39.27737 and -80.40417.

The applicant estimates the maximum potential to discharge the following regulated air pollutants on a facility-wide basis will be:

Particulate Matter (PM) = 3.13 tpy
Sulfur Dioxide (SO_2) = 0.15 tpy
Volatile Organic Compounds (VOC) = 9.70 tpy
Carbon Monoxide (CO) = 12.28 tpy
Nitrogen Oxides (NO_x) = 33.54 tpy
Total Hazardous Air Pollutants (HAPs) = 3.22 tpy
Formaldehyde (HCHO) = 2.94 tpy
Hexane (C_8H_{14}) = <0.01 tpy
Carbon Dioxide Equivalents (CO_2e) = 36,837.33 tpy

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 12th day of September 2017.

By: Arsenal Resources
Meghan M.B. Yingling
Environmental Compliance Manager
6031 Wallace Road Ext. Suite 300
Wexford, PA 15090