January 12, 2018

Director
WVDEP – Division of Air Quality
601 57th Street SE
Charleston, WV 25304

UPS Tracking No. 1Z 865 F5F 01 9421 7413

RE: DTE Appalachia Gathering, LLC
Carrico Compressor Station
G35-D Construction Application

To Whom It May Concern:

On behalf of DTE Appalachia Gathering, LLC (DTE), we are submitting this G35-D Construction Application to construct and operate a new natural gas compressor station (Carrico Compressor Station).

Enclosed are one (1) original hard copy and two (2) CDs with PDFs of the application, along with a check for the application fee in the amount of $1,500. The affidavit of publication for the Class I Legal Advertisement will be forwarded upon receipt.

DTE appreciates your review of this submittal. If you have any questions or comments about the attached information, please contact me at (724) 935-2611 x104.

Respectfully,

Domenic A. Tedesco

Domenic Tedesco
Senior Consultant
Trinity Consultants

Attachments

PROJECT REPORT

DTE Appalachia Gathering, LLC
Carrico Compressor Station

G35-D Permit Application

TRINITY CONSULTANTS
4500 Brooktree Drive
Suite 103
Wexford, PA 15090
(724) 935-2611

January 2018

EHS Solutions Delivered Uncommonly Well

TABLE OF CONTENTS

DTE Appalachia Gathering, LLC (DTE), which is owned by DTE Energy Company, is submitting this G35-D Permit application to the West Virginia Department of Environmental Protection (WVDEP) for a new natural gas compressor station located in Monongalia County, West Virginia (Carrico Compressor Station or 'Carrico Station').

1.1. FACILITY AND PROJECT DESCRIPTION

The Carrico Station is a new natural gas compressor station covered under standard industrial code (SIC) 1311. The station compresses natural gas for transportation across the pipeline.

DTE is proposing to install the following equipment at the station:

- Two (2) Caterpillar G3606 compressor engines (CE-1 to CE-2), each rated at 1,875 bhp and controlled by oxidation catalysts;
- One (1) PSI Heavy Duty 11.1LTCAC prime power generator (GE-1) rated at 272 bhp;
- One (1) 16,800 gallon produced fluids tank; and
- Seven (7) miscellaneous tanks.

A process flow diagram is included as Attachment D.

1.2. SOURCE STATUS

WVDEP must make stationary source determinations on a case-by-case basis using the guidance under the Clean Air Act (CAA) and EPA's and WVDEP's implementing regulations. The definition of stationary source in 40 CFR 51.166(b) includes the following:

> *"(6) Building, structure, facility, or installation means all of the pollutant emitting activities which belong to the same industrial grouping, are located on or more contiguous or adjacent properties, and are under control of the same person (or persons under common control)."*

Other additional pollutant emitting facilities should be aggregated with the Carrico Station for air permitting purposes if, and only if, all three elements of the "stationary source" definition above are fulfilled.

There are no pollutant emitting activities that belong to DTE or any related legal entity within a quarter-mile radius of the facility. As such, the Carrico Station should be considered a separate stationary source for the purposes of this permitting action.

1.3. G35-D APPLICATION ORGANIZATION

This West Virginia G35-D permit application is organized as follows:

- Section 2: Sample Emission Source Calculations;
- Section 3: Regulatory Discussion;
- Section 4: G35-D Application Form;
- Attachment A: Single Source Determination Form
- Attachment B: Siting Criteria Waiver *(not applicable)*
- Attachment C: Current Business Certificate
- Attachment D: Process Flow Diagram
- Attachment E: Process Description
- Attachment F: Plot Plan
- Attachment G: Area Map
- Attachment H: G35-D Section Applicability Form
- Attachment I: Emission Units/ERD Table
- Attachment J: Fugitive Emission Summary Sheet(s)
- Attachment K: Storage Vessels Data Sheet(s)
- Attachment L: Natural Gas Fired Fuel Burning Unit Data Sheet(s)
- Attachment M: Internal Combustion Engine Data Sheet(s)
- Attachment N: Tanker Truck Loading Data Sheet
- Attachment O: Glycol Dehydration Unit Data Sheet(s)
- Attachment P: Pneumatic Controller Data Sheet(s)
- Attachment Q: Centrifugal Compressor Data Sheet(s)
- Attachment R: Reciprocating Compressor Data Sheet(s)
- Attachment S: Blowdown and Pigging Operation Data Sheet(s)
- Attachment T: Air Pollution Control Device Data Sheet(s)
- Attachment U: Emission Calculations
- Attachment V: Facility-wide Emission Summary Sheet(s)
- Attachment W: Class I Legal Advertisement

2. SAMPLE EMISSION SOURCE CALCULATIONS

The characteristics of air emissions from the facility, along with the methodology for calculating emissions, are briefly described in this section of the application. Detailed emission calculations are presented in Attachment U of this application.

Emissions at this facility will result from combustion of natural gas (in the engines,), operation of the storage tanks, as well as piping blowdowns and fugitive emissions from components leaks and the facility roadway. The methods by which emissions from each of these source types is calculated are summarized below.

- **Compressor Engines**: Potential emissions of nitrogen oxides (NO_X), CO, VOC, formaldehyde are calculated using factors provided by the engine and catalyst manufacturer. Potential emissions of sulfur dioxide (SO_2), particulate matter ($PM/PM_{10}/PM_{2.5}$), and all other hazardous air pollutants (HAPs) are calculated using U.S. EPA's AP-42 factors for four-stroke lean-burn engines.

- **Generator Engine:** Potential emissions of nitrogen oxides (NO_X), CO and VOC are calculated using factors provided in the EPA Certificate of Conformity. Potential emissions of sulfur dioxide (SO_2), particulate matter ($PM/PM_{10}/PM_{2.5}$), and all other hazardous air pollutants (HAPs) are calculated using U.S. EPA's AP-42 factors for four-stroke rich-burn engines.

- **Storage Tanks and Liquid Loading:** Working, breathing and flashing emissions of VOC and HAPs from the waste fluid tank are calculated using E&P TANK v2.0 software. Working and breathing emissions from all other tanks, along with the waste fluid loading emissions, were calculated using EPA Tanks 4.0.9d and AP-42 methodology.

- **Fugitive Emissions:** Emissions from fugitive equipment leaks are calculated using published EPA emission factors and 40 CFR Part 98, Subpart W emission factors. Emissions from blowdown events are calculated using engineering estimates of the amount of gas vented. Site specific gas analyses were used to speciate VOC, HAP, and GHG emissions.

- **Haul Roads:** Fugitive dust emitted from facility roadways has been estimated using projected vehicle miles traveled along with U.S. EPA's AP-42 factors for unpaved haul roads.[1]

Potential emissions of greenhouse gas pollutants (GHGs) are calculated using manufacturer's data as available (CO_2 and CH_4 in this case) and U.S. EPA's emission factors from 40 CFR Part 98, Subpart C for all others.

[1] U.S. EPA, AP 42, Fifth Edition, Volume I, Section 13.2.2, Unpaved Roads, November 2006.

This section documents the applicability determinations made for Federal and State air quality regulations. In this section, applicability or non-applicability of the following regulatory programs is addressed:

- Prevention of Significant Deterioration (PSD) permitting;
- Non-attainment New Source Review (NNSR) permitting;
- Title V of the 1990 Clean Air Act Amendments;
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants (NESHAP); and
- West Virginia State Implementation Plan (SIP) regulations.

This review is presented to supplement and/or add clarification to the information provided in the WVDEP G35-D operating permit application forms.

In addition to providing a summary of applicable requirements, this section of the application also provides non-applicability determinations for certain regulations, allowing the WVDEP to confirm that identified regulations are not applicable to the facility. Note that explanations of non-applicability are limited to those regulations for which there may be some question of applicability specific to the operations at the station. Regulations that are categorically non-applicable are not discussed (e.g., NSPS Subpart J, Standards of Performance for Petroleum Refineries).

3.1. PSD AND NNSR SOURCE CLASSIFICATION

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration and new and modified sources of non-attainment pollutants under Non-Attainment New Source Review. PSD regulations apply when a new source is constructed in which emissions exceed major source thresholds, an existing minor source undergoes a modification in which emission increases exceed PSD major source thresholds, or an existing major source undergoes a modification in which emission increases exceed PSD significant emission rates. The facility will be a minor source with respect to the NSR program since potential emissions are below all the PSD thresholds. As such, PSD permitting is not triggered by this construction activity. NNSR regulations only apply in areas designated as non-attainment. The facility is located in Monongalia County, which is designated as attainment/unclassifiable for all criteria pollutants.[2] Therefore, NNSR regulations do not apply to the facility.

3.2. TITLE V OPERATING PERMIT PROGRAM

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in West Virginia Code of State Regulations (CSR) 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP, and 100 tpy of all other regulated pollutants. The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility. Therefore, the facility is not a major source for Title V purposes.

[2] U.S. EPA Green Book, http://www.epa.gov/airquality/greenbook/anayo_wv.html, as of February 13, 2017.

3.3. NEW SOURCE PERFORMANCE STANDARDS

New Source Performance Standards, located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the facility. Besides 40 CFR 60 Subpart A (NSPS Subpart A), which is similar to 40 CFR 63 Subpart A (NESHAP Subpart A), the following NSPS could potentially apply to the facility:

> 40 CFR Part 60 Subparts D, Da, Db, and Dc – Steam Generating Units
> 40 CFR Part 60 Subparts K, Ka, and Kb – Storage Vessels for Petroleum Liquids/Volatile Organic Liquids
> 40 CFR Part 60 Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines
> 40 CFR Part 60 Subpart OOOO – Crude Oil and Natural Gas Production, Transmission, and Distribution
> 40 CFR Part 60 Subpart OOOOa – Crude Oil and Natural Gas Facilities

3.3.1. NSPS Subparts D, Da, Db, and Dc - Steam Generating Units

These subparts apply to steam generating units of various sizes, all greater than 10 MMBtu/hr. The proposed facility does not include any steam generating units with a heat input greater than 10 MMBtu/hr, therefore the requirements of these subparts do not apply.

3.3.2. NSPS Subparts K, Ka, and Kb - Storage Vessels for Petroleum Liquids/Volatile Organic Liquids

These subparts apply to storage tanks of certain sizes constructed, reconstructed, or modified during various time periods. Subpart K applies to storage tanks constructed, reconstructed, or modified prior to 1978, and Subpart Ka applies to those constructed, reconstructed, or modified prior to 1984. Both Subparts K and Ka apply to storage tanks with a capacity greater than 40,000 gallons. Subpart Kb applies to volatile organic liquid (VOL) storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m^3 (~19,813 gallons). All of the tanks at the facility have a capacity of 19,813 gallons or less. As such, Subparts K, Ka, and Kb do not apply to the storage tanks at the facility.

3.3.3. NSPS Subpart JJJJ - Stationary Spark Ignition Internal Combustion Engines

Subpart JJJJ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines, applies to manufacturers, owners and operators of stationary spark ignition (SI) engines. The requirements for SI engines with a maximum power rating greater than or equal to 500 hp (except lean burn engines 500 hp ≤ hp < 1,350) apply to owner/operators of such engines ordered on or after July 1, 2007. The proposed compressor engines will be a 4-stroke, lean burn spark ignition RICE rated at 1,875 hp (CE-1 and CE-2). As such, the engines will be subject to the emissions standards per Table 1 to NSPS Subpart JJJJ (for non-emergency use engines), as well as performance testing every 8,760 hours of operation or three (3) years, and associated notification and reporting requirements.

The generator engine (GE-1) is also subject to Subpart JJJJ. However, as this unit is an EPA Certified Unit (see attached Certificate of Conformity), the applicant is not required to conduct performance testing. Instead, it is required to operate and maintain the certified stationary SI internal combustion engine and control device according to the manufacturer's emission-related written instructions.

3.3.4. NSPS Subpart OOOO — Crude Oil and Natural Gas Production, Transmission, and Distribution

Subpart OOOO – *Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution*, applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011 and

before September 18, 2015. The facility sources will not fall into this date range. Therefore, the facility has no applicable requirements under this regulation.

3.3.5. NSPS Subpart OOOOa — Crude Oil and Natural Gas Facilities

Subpart OOOOa, Standards of Standards of Performance for Crude Oil and Natural Gas Facilities, will apply to affected facilities that commenced construction, reconstruction, or modification after September 18, 2015. The regulation was published final in the Federal Register on June 3, 2016. The rule includes provisions for the following facilities:

- Hydraulically fractured wells;
- Centrifugal compressors located between the wellhead and the point of custody transfer to the natural gas distribution segment;
- Reciprocating compressors located between the wellhead and the point of custody transfer to the natural gas distribution segment;
- Continuous bleed natural gas-driven pneumatic controllers with a bleed rate of > 6 scfh located in the production, gathering, processing, or transmission and storage segments (excluding natural gas processing plants);
- Continuous bleed natural gas-driven pneumatic controllers located at natural gas processing plants;
- Pneumatic pumps located in the production, gathering, processing, or transmission and storage segments;
- Storage vessels located in the production, gathering, processing, or transmission and storage segments;
- The collection of fugitive emissions components at a well site;
- The collection of fugitive emissions components at a compressor station; and
- Sweetening units located onshore that process natural gas produced from either onshore or offshore wells.

The reciprocating compressors will be required to change rod packing every 26,000 hours of operation or every 36 months, or collect the methane and VOC emissions using a rod packing collection system which operates under negative pressure. The compressors will also be subject to the recordkeeping and annual reporting requirements of the rule.

The produced fluids storage tank will be a 'storage vessel' as defined by the regulation, however, potential emissions of VOC will be less than six tons per year. Therefore, it will not be a storage vessel affected facility under the rule.

DTE will be required to monitor all fugitive emission components (ex. connectors, flanges, etc.) with an optical gas imaging (OGI) device, and repair all sources of fugitive emissions in accordance with the rule. DTE must also develop a monitoring plan, conduct surveys on a quarterly basis, and will be subject to the applicable recordkeeping and reporting requirements of the rule.

All pneumatic controllers proposed to be located at the facility are intermittent or low-bleed. Therefore, they will not be subject to any pneumatic controller requirements under Subpart OOOOa. As currently proposed, there are no other affected source categories under the rule that will apply to the proposed equipment.

3.3.6. Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas processing plants (Subparts OOOO and OOOOa) and associated equipment (Subpart K-Kb), the applicability of a particular NSPS to the facility can be readily ascertained based on the industrial source category covered. All other NSPS are categorically not applicable to the proposed facility.

3.4. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Part 63 NESHAP allowable emission limits are established on the basis of a maximum achievable control technology (MACT) determination for a particular major source. A HAP major source is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP. The facility is an

area (minor) source of HAP since its potential emissions of HAP are less than the 10/25 major source thresholds. Besides 40 CFR 63 Subpart A (NESHAP Subpart A), which is similar to 40 CFR 60 Subpart A (NSPS Subpart A), the following NESHAP could potentially apply to the facility:

- 40 CFR Part 63 Subpart HH – Oil and Natural Gas Production Facilities
- 40 CFR 63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines
- 40 CFR Part 63 Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers

3.4.1. NESHAP Subpart HH – Oil and Natural Gas Production Facilities

This MACT standard contains requirements for both major and area sources of HAP. The facility does not have dehydration units, as such, this subpart does not apply.

3.4.2. NESHAP Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines

Stationary reciprocating internal combustion engines (RICE) at both area and major sources of HAP emissions are potentially subject to Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE). Per §63.6590(a)(2)(iii), a stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary reciprocating internal combustion engine (RICE) on or after 6/12/2006. The compressor engines and generator will commence construction after this date, and will therefore be considered new RICE under Subpart ZZZZ. Per §63.6590(c), "[…] An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 Subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part." Specifically, §63.6590(c)(1) includes "a new or reconstructed stationary RICE located at an area source"; the compressor engines fall into this category. Therefore, the compressor and generator engines have no applicable Subpart ZZZZ requirements, other than to comply with any applicable 40 CFR 60 Subpart JJJJ requirements.

3.4.3. NESHAP JJJJJJ – Industrial, Commercial, and Institutional Boilers

This MACT standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types at area sources. There are no boilers at the facility, therefore this subpart does not apply.

3.5. WEST VIRGINIA SIP REGULATIONS

The facility is potentially subject to regulations contained in the West Virginia Code of State Regulations, Chapter 45 (Code of State Regulations). The Code of State Regulations fall under two main categories: those regulations that are generally applicable (e.g., permitting requirements), and those that have specific applicability (e.g., PM standards for manufacturing equipment).

3.5.1. 45 CSR 2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

45 CSR 2 applies to fuel burning units, defined as equipment burning fuel "for the primary purpose of producing heat or power by indirect heat transfer". There are no fuel burning units at the facility that meet this definition. As such, this regulation is not applicable.

3.5.2. 45 CSR 4: To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

According to 45 CSR 4-3:

No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.

The facility is generally subject to this requirement. However, due to the nature of the process at the station, production of objectionable odor during normal operation is unlikely.

3.5.3. 45 CSR 6: To Prevent and Control the Air Pollution from the Combustion of Refuse

45 CSR 6 applies to activities involving incineration of refuse, defined as "the destruction of combustible refuse by burning in a furnace designed for that purpose. For the purposes of this rule, the destruction of any combustible liquid or gaseous material by burning in a flare or flare stack, thermal oxidizer or thermal catalytic oxidizer stack shall be considered incineration." There are no control devices at the facility that utilize 'incineration'.

3.5.4. 45 CSR 10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

This rule potentially applies to fuel burning units, including glycol dehydration unit reboilers. Per 45 CSR 10-10.1, units rated less than 10 MMBtu/hr are exempt from the SO_2 emission limitations and testing, monitoring, recordkeeping, and reporting requirements of this rule. There are no fuel burning units at the facility that meet this definition. As such, this regulation is not applicable.

3.5.5. 45 CSR 16: Standards of Performance for New Stationary Sources

45 CSR 16-1 incorporates the federal Clean Air Act (CAA) standards of performance for new stationary sources set forth in 40 CSR Part 60 by reference. As such, by complying with all applicable requirements of 40 CFR Part 60 at the facility, the applicant will be complying with 45 CSR 16.

3.5.6. 45 CSR 17: To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage and Other Sources of Fugitive Particulate Matter

According to 45 CSR 17-3.1:

No person shall cause, suffer, allow or permit fugitive particulate matter to be discharged beyond the boundary lines of the property lines of the property on which the discharge originates or at any public or residential location, which causes or contributes to statutory air pollution.

Due to the nature of the activities at the facility, it is unlikely that fugitive particulate matter emissions will be emitted under normal operating conditions. However, the applicant will take measures to ensure any fugitive particulate matter emissions will not cross the property boundary should any such emissions occur.

3.5.7. 45 CSR 21-28: Petroleum Liquid Storage in Fixed Roof Tanks

45 CSR 21-28 applies to any fixed roof petroleum liquid storage tank with a capacity greater than 40,000 gallons located in Putnam County, Kanawha County, Cabell County, Wayne County, and Wood County. The capacity of each storage tank at the facility is less than 40,000 gallons and the facility is not located in the listed counties. Therefore, 45 CSR 21-28 does not apply to the storage tanks at this station.

3.5.8. 45 CSR 34: Emissions Standards for Hazardous Air Pollutants

45 CSR 34-1 incorporates the federal Clean Air Act (CAA) national emissions standards for hazardous air pollutants (NESHAPs) as set forth in 40 CPR Parts 61 and 63 by reference. As such, by complying with all applicable requirements of 40 CFR Parts 61 and 63 at the facility, the applicant will be complying with 45 CSR 34.

3.5.9. Non-Applicability of Other SIP Rules

A thorough examination of the West Virginia SIP rules with respect to applicability at the facility reveals many SIP regulations that do not apply or impose additional requirements on operations. Such SIP rules include those specific to a particular type of industrial operation that is categorically not applicable to the facility.

4. G35-D APPLICATION FORMS

The WVDEP permit application forms contained in this application include all applicable G35-D application forms including the required attachments.

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): DTE Appalachia Gathering, LLC

Federal Employer ID No. (FEIN): 45-0718671

Applicant's Mailing Address: 1000 Noble Energy Drive, 5th Floor

City: Canonsburg | State: PA | ZIP Code: 15317

Facility Name: Carrico Compressor Station

Operating Site Physical Address: See lat/long
If none available, list road, city or town and zip of facility.

City: Maidsville | Zip Code: 26541 | County: Monongalia

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.69716
Longitude: -80.16659

SIC Code: 1311

NAICS Code: 211111

DAQ Facility ID No. (For existing facilities)

CERTIFICATION OF INFORMATION

This G35-D General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of the Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. **Any administratively incomplete or improperly signed or unsigned G35-D Registration Application will be returned to the applicant. Furthermore, if the G35-D forms are not utilized, the application will be returned to the applicant. No substitution of forms is allowed.**

I hereby certify that 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: KD Magyar
Name and Title: Kenneth D. Magyar, VP, Project Development & Business Development
Phone: (724) 416-7263 Fax: n/a
Email: Kenneth.Magyar@dteenergy.com Date: JAN. 9, 2018

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

If applicable:
Environmental Contact Adam T. Snee
Name and Title: Adam Snee, Gas Pipeline Engineer Phone: (724) 416-7822 Fax:
Email: adam.snee@dteenergy.com Date: JAN. 9, 2018

OPERATING SITE INFORMATION
Briefly describe the proposed new operation and/or any change(s) to the facility: Addition of compression and ancillary equipment to the facility.
Directions to the facility: From 601 57th St SE, Charleston, WV 25304: head northeast on 57th St SE toward Washington Ave SE (travel 0.1 mi). Turn left onto MacCorkle Ave SE (travel 1.8 mi). Turn right onto 36th St SE (travel 0.2 mi). Continue onto 36th St Southeast Bridge (travel 0.2 mi). Use the right lane to take the ramp onto I-64 W/I-77 N (travel 0.1 mi). Merge onto I-64 W/I-77 N (travel 2.5 mi). Use the right 2 lanes to take the Interstate 77 N/Interstate 79 N exit toward Parkersburg (travel 0.5 mi). Continue onto I-77 N (travel 1.4 mi). Keep right at the fork to continue on I-79 N, follow signs for Clarksburg (travel 160 mi). Take exit 1 toward Mt Morris (travel 0.2 mi). Turn left onto Bald Hill Road (travel 0.6 mi). Slight turn onto Wades Run Road (travel 308 ft). Turn left onto Buckeye Road (travel 3.7 mi). Turn right onto WV-7 E (travel 2.7 mi). Turn left onto Jakes Run Road (travel 1.0 mi). Turn right onto the access road.

ATTACHMENTS AND SUPPORTING DOCUMENTS	
I have enclosed the following required documents:	
Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22). ☒ Check attached to front of application. ☐ I wish to pay by electronic transfer. Contact for payment (incl. name and email address): ☐ I wish to pay by credit card. Contact for payment (incl. name and email address): ☒$500 (Construction, Modification, and Relocation) ☐$300 (Class II Administrative Update) ☒$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO and/or OOOOa [1] ☐$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH [2] [1] Only one NSPS fee will apply. [2] Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ. *NSPS and NESHAP fees apply to new construction or if the source is being modified.*	
☒ Responsible Official or Authorized Representative Signature (if applicable)	
☒ Single Source Determination Form **(must be completed in its entirety)** – Attachment A	
☐ Siting Criteria Waiver (if applicable) – Attachment B	☒ Current Business Certificate – Attachment C
☒ Process Flow Diagram – Attachment D	☒ Process Description – Attachment E
☒ Plot Plan – Attachment F	☒ Area Map – Attachment G
☒ G35-D Section Applicability Form – Attachment H	☒ Emission Units/ERD Table – Attachment I
☒ Fugitive Emissions Summary Sheet – Attachment J	
☒ Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment K	
☒ Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applic.) – Attachment L	
☒ Internal Combustion Engine Data Sheet(s) (include manuf. 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	
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☒ 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.

Single Source Determination Form

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

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

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

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

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

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

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

ATTACHMENT A: SINGLE SOURCE DETERMINATION MAP

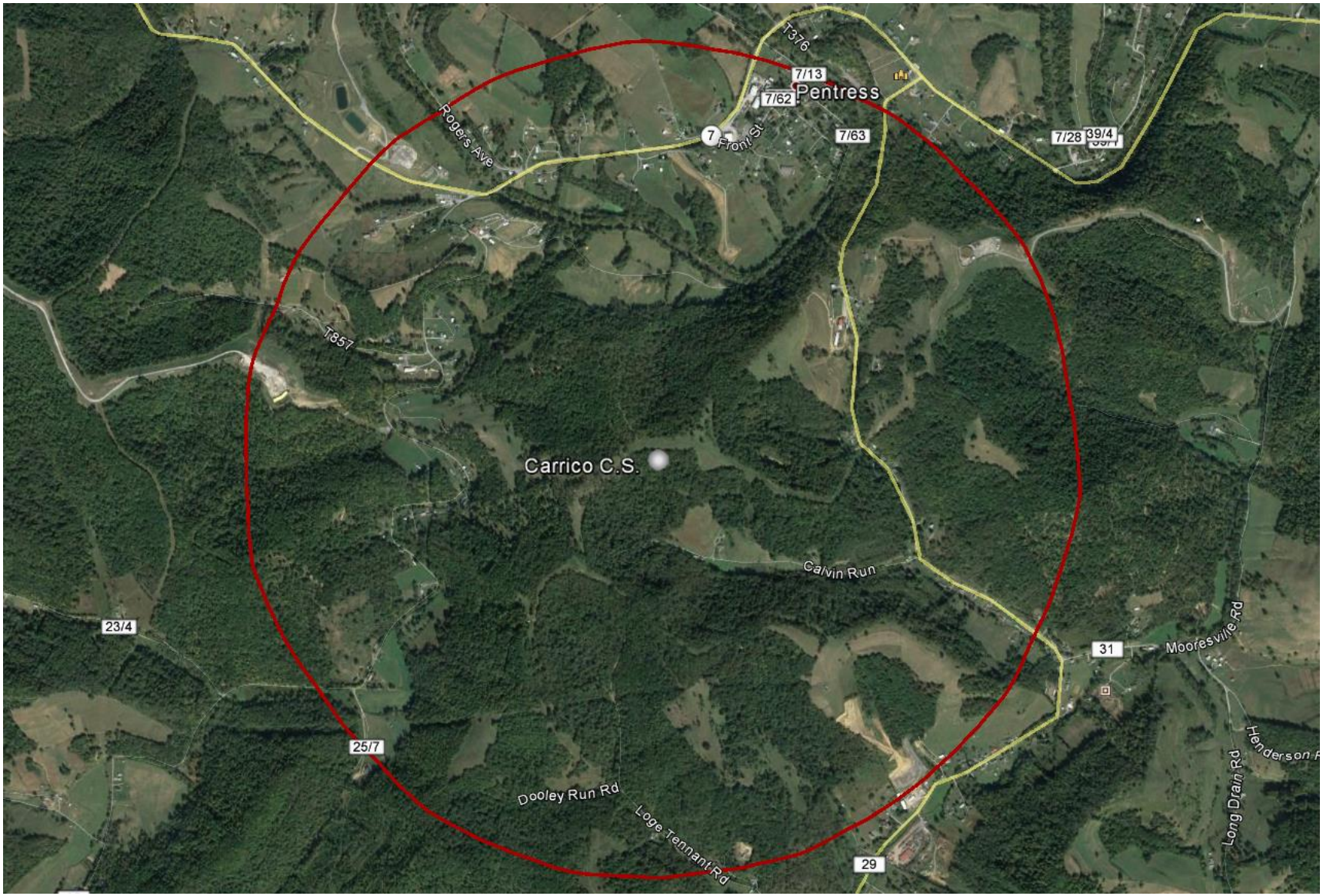

Figure 1 - Map of Location with 1 Mile Radius Circle

Coordinates:
Latitude: 39° 41' 49.9" N, Longitude: -80° 09' 59.7" W

Siting Criteria Waiver *(not applicable)*

ATTACHMENT B – SITING CRITERIA WAIVER – NOT APPLICABLE
If applicable, please complete this form and it must be notarized.

G35-D General Permit
Siting Criteria Waiver

WV Division of Air Quality 300' Waiver

I _____ hereby
Print Name

acknowledge and agree that _____ will
General Permit Applicant's Name

construct an emission unit(s) at a natural gas compressor and/or dehydration facility that will be located within 300' of my dwelling and/or business.

.

I hereby offer this waiver of siting criteria to the West Virginia Department of Environmental Protection Division of Air Quality as permission to construct, install and operate in such location.

Signed:

_____

Signature Date

_____

Signature Date

Taken, subscribed and sworn before me this _____ day of

_____, 20_____.

My commission expires: _____

SEAL_____
Notary Public

Current Business Certificate

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION
CERTIFICATE

ISSUED TO:
DTE APPALACHIA GATHERING, LLC
ONE ENERGY PLAZA, 2055 WCB
DETROIT, MI 48226-0000

BUSINESS REGISTRATION ACCOUNT NUMBER: **2252-1954**

This certificate is issued on: **05/5/2017**

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.

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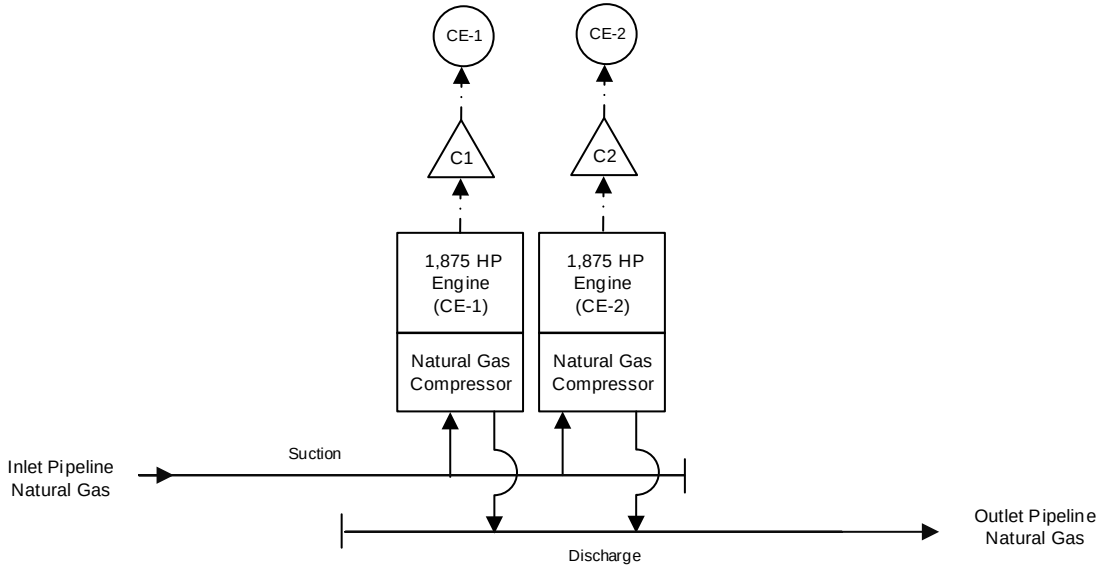
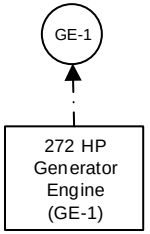
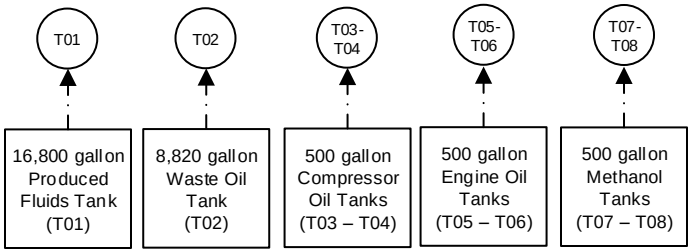
Process Flow Diagram

*** Note that this is a simplified diagram for the purposes of explaining basic facility flow and emission points. The actual design is more complex and may vary.**







Flow Legend

- Gas Flow
- Stack Emissions
- Emission Point
- Control Device

DTE Appalachia Gathering, LLC

Process Flow Diagram
Carrico Compressor Station

Trinity Consultants

January 2018

ATTACHMENT E

Process Description

ATTACHMENT E: PROCESS DESCRIPTION

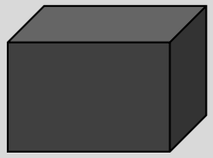
The Carrico Compressor Station compresses natural gas and sends it along the pipeline system. Reciprocating compressors utilize the power created by reciprocating internal combustion engines (RICE) to compress (raise the pressure of) the incoming gas stream. Subsequently, the gas stream travels into the downstream pipeline. The compressor engines' exhaust streams are controlled by oxidation catalysts.

A process flow diagram is included as Attachment D.

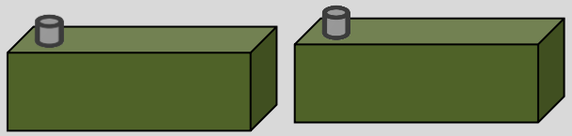
Plot Plan

NOTE: This diagram is not to scale. Locations and distances between surface equipment are not known at this time.

Entrance to facility



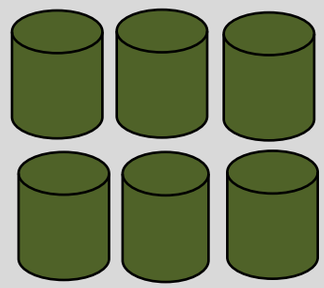
Generator Engine
GE-1
272 HP



Compressor Engines
CE-1 to CE-2
1,875 HP

Produced Fluids Tank
T01
(16,800 gal)

Waste Oil Tank
T02
(8,820 gal)



Miscellaneous Tanks
T03 to T08
(500 gal)

Attachment F
Plot Plan

Area Map

ATTACHMENT G: AREA MAP

Figure 1 - Map of Location with 300 foot Boundary Circle

UTM Northing (KM): 4,394.478 UTM Easting (KM): 571.453 Elevation: ~1,380 ft

ATTACHMENT H

G35-D Section Applicability Form

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.*

Emission Units/ERD Table

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

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

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed	Manufac. Date[3]	Design Capacity	Type[4] and Date of Change	Control Device(s)[5]	ERD(s)[6]
CE-1	CE-1	Caterpillar G3606 Compressor Engine	TBD	---	1,875 HP	New	C1	---
CE-2	CE-2	Caterpillar G3606 Compressor Engine	TBD	---	1,875 HP	New	C2	---
GE-1	GE-1	PSI Heavy Duty 11.1LTCAC	TBD	---	272 HP	New	None	---
T01	T01	Produced Fluids Tank	TBD	---	16,800 Gallons	New	None	---
T02	T02	Waste Oil Tank	TBD	---	8,820 Gallons	New	None	---
T03	T03	Compressor Oil Tank	TBD	---	500 Gallons	New	None	---
T04	T04	Compressor Oil Tank	TBD	---	500 Gallons	New	None	---
T05	T05	Engine Oil Tank	TBD	---	500 Gallons	New	None	---
T06	T06	Engine Oil Tank	TBD	---	500 Gallons	New	None	---
T07	T07	Methanol Tank	TBD	---	500 Gallons	New	None	---
T08	T08	Methanol Tank	TBD	---	500 Gallons	New	None	---
L01	L01	Liquid Loading	---	---	201,600 Gallons	New	None	---
---	---	Fugitives	---	---	---	New	None	---
---	---	Haul Roads	---	---	---	New	None	---

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

Fugitive Emission Summary Sheet(s)

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: Fugitive Emissions

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	3	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☐ Gas ☒ Liquid ☐ Both	0.58	<0.01	0.13
Valves	☐ Yes ☒ No	57	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☒ Gas ☐ Liquid ☐ Both	0.01	<0.01	6.90
Safety Relief Valves	☐ Yes ☒ No	4	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☒ Gas ☐ Liquid ☐ Both	0.01	<0.01	0.72
Open Ended Lines	☐ Yes ☐ No	---	N/A	☐ Gas ☐ Liquid ☐ Both	---	---	---
Sampling Connections	☐ Yes ☐ No	---	N/A	☐ Gas ☐ Liquid ☐ Both	---	---	---
Connections (Not sampling)	☐ Yes ☒ No	257	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☐ Gas ☐ Liquid ☒ Both	0.02	<0.01	3.45
Compressors	☐ Yes ☒ No	2	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☒ Gas ☐ Liquid ☐ Both	0.02	<0.01	37.39
Flanges	☐ Yes ☐ No	---	(included in connections)	☐ Gas ☐ Liquid ☐ Both	---	---	---
Other[1]	☒ Yes ☐ No	12	40 CFR 98 Subpart W	☒ Gas ☐ Liquid ☐ Both	0.13	<0.01	107.60

[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.)

Storage Vessel Data Sheet(s)

ATTACHMENT K – STORAGE VESSEL DATA SHEET

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

The following information is REQUIRED:

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

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

Additional information may be requested if necessary.

GENERAL INFORMATION

1. Bulk Storage Area Name Carrico Compressor Station	2. Tank Name Produced Fluids Tank
3. Emission Unit ID number T01	4. Emission Point ID number T01
5. Date Installed , Modified or Relocated *(for existing tanks)* Was the tank manufactured after August 23, 2011? ☒ Yes ☐ No	6. Type of change: ☒ New construction ☐ New stored material ☐ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)* N/A	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 8-42 below are not required.***	

TANK INFORMATION

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 16,800 gal	
9A. Tank Internal Diameter (ft.) 12	9B. Tank Internal Height (ft.) 20
10A. Maximum Liquid Height (ft.) 20	10B. Average Liquid Height (ft.) 10
11A. Maximum Vapor Space Height (ft.) 20	11B. Average Vapor Space Height (ft.) 10
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume". 16,800 gal	
13A. Maximum annual throughput (gal/yr) **See attached emissions calculations for all throughput values**	13B. Maximum daily throughput (gal/day) **See attached emissions calculations for all throughput values**
14. Number of tank turnovers per year **See attached emissions calculations for all throughput values**	15. Maximum tank fill rate (gal/min) **See attached emissions calculations for all throughput values**
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 Fluids	0.06	0.27	<0.01	<0.01	<0.01	<0.01	0.06	0.27	E&P TANK v2.0

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

TANK CONSTRUCTION AND OPERATION INFORMATION			
21. Tank Shell Construction: ☒ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)			
21A. Shell Color:	21B. Roof Color:	21C. Year Last Painted:	
22. Shell Condition (if metal and unlined): ☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable			
22A. Is the tank heated? ☐ Yes ☒ No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?	
23. Operating Pressure Range (psig): zero (no pressure, atmospheric) **Must be listed for tanks using VRUs with closed vent system.**			
24. Is the tank a **Vertical Fixed Roof Tank**? ☒ Yes ☐ No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):	
25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☒			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type *(check one):* ☐ Metallic (mechanical) shoe seal ☐ Liquid mounted resilient seal ☐ Vapor mounted resilient seal ☐ Other (describe):			
25C. Is the Floating Roof equipped with a secondary seal? ☐ Yes ☐ No			
25D. If yes, how is the secondary seal mounted? *(check one)* ☐ Shoe ☐ Rim ☐ Other (describe):			
25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No			
25F. Describe deck fittings:			
26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply			
26A. Deck Type: ☐ Bolted ☐ Welded	26B. For bolted decks, provide deck construction:		
26C. Deck seam. Continuous sheet construction: ☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
27. Closed Vent System with VRU? ☐ Yes ☒ No			
28. Closed Vent System with Enclosed Combustor? ☐ Yes ☒ No			
SITE INFORMATION - Not Applicable: Tank calculations performed using E&P TANK software			
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 - Not Applicable: Tank calculations performed using E&P TANK software			
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]
T02	New	Waste Oil	8,820 gallons
T03	New	Compressor Oil	500 gallons
T04	New	Compressor Oil	500 gallons
T05	New	Engine Oil	500 gallons
T06	New	Engine Oil	500 gallons
T07	New	Methanol	500 gallons
T08	New	Methanol	500 gallons

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

Natural Gas Fired Fuel Burning Unit Data Sheet(s)

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

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

Emission Unit ID#[1]	Emission Point ID#[2]	Emission Unit Description (manufacturer, model #)	Year Installed/ Modified	Type[3] and Date of Change	Maximum Design Heat Input (MMBTU/hr)[4]	Fuel Heating Value (BTU/scf)[5]

1 Enter the appropriate Emission Unit (or Source) identification number for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For sources, use 1S, 2S, 3S…or other appropriate designation. Enter glycol dehydration unit Reboiler Vent data on the Glycol Dehydration Unit Data Sheet.

2 Enter the appropriate Emission Point identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For emission points, use 1E, 2E, 3E…or other appropriate designation.

3 New, modification, removal

4 Enter design heat input capacity in MMBtu/hr.

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

Internal Combustion Engine Data Sheet(s)

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-1 and CE-2	GE-1		
Engine Manufacturer/Model	Caterpillar G3606	PSI Heavy Duty 11.1LTCAC		
Manufacturers Rated bhp/rpm	1,875	272		
Source Status[2]	New	New		
Date Installed/ Modified/Removed/Relocated[3]	TBD	TBD		
Engine Manufactured /Reconstruction Date[4]	TBD	TBD		
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	☐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	4SRB		
APCD Type[7]	OxCat	LEC		
Fuel Type[8]	PQ	PQ		
H_2S (gr/100 scf)	Neg.	Neg.		
Operating bhp/rpm	1,875	272		
BSFC (BTU/bhp-hr)	7,556	N/A		
Hourly Fuel Throughput	13,754 ft^3/hr	1,980 ft^3/hr	ft^3/hr	ft^3/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	120.5 $MMft^3$/yr	17.3 $MMft^3$/yr	$MMft^3$/yr	$MMft^3$/yr
Fuel Usage or Hours of Operation Metered	Yes ☒ No ☐	Yes ☒ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

Calculation Methodology[9]	**Pollutant[10]**	**Hourly PTE (lb/hr) [11]**	**Hourly PTE (lb/hr) [11]**	**Hourly PTE (lb/hr) [11]**	**Hourly PTE (lb/hr) [11]**	**Hourly PTE (lb/hr) [11]**	**Annual PTE (tpy) [11]**	**Hourly PTE (lb/hr)[11]**	**Annual PTE (tpy) [11]**
See Emissions Calculations	NO_X	2.07	9.05	0.60	2.63				
See Emissions Calculations	CO	0.45	1.99	1.20	5.25				
See Emissions Calculations	VOC	0.54	2.35	0.46	2.02				
See Emissions Calculations	SO_2	0.01	0.04	1.20 E-03	0.01				
See Emissions Calculations	PM_{10}	0.14	0.62	0.04	0.17				
See Emissions Calculations	Formaldehyde	0.17	0.72	0.04	0.18				
See Emissions Calculations	Total HAPs	0.44	1.93	0.07	0.29				
See Emissions Calculations	GHG (CO_2e)	2,222	9,731	239	1,046				

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

2 Enter the Source Status using the following codes:

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

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

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

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

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

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

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

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

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

8 Enter the Fuel Type using the following codes:

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

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

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

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

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

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

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

☐ NSCR	☐ SCR	☒ Oxidation Catalyst

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

Manufacturer: EMIT Technologies (or equivalent)	Model #: ELS-4200-1820F-4CE0-362 (or equivalent)
Design Operating Temperature: 835 °F	Design gas volume: 11,801 acfm
Service life of catalyst: TBD	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: 11,801 acfm at 835 °F	Operating temperature range for NSCR/Ox Cat: From TBD °F to TBD °F
Reducing agent used, if any: N/A	Ammonia slip (ppm): N/A

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

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

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)?
TBD

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,

G3606

CATERPILLAR®

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Exterran
DTE ENERGY

GAS COMPRESSION APPLICATION

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	7.6	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	GAV
AFTERCOOLER - STAGE 2 INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 1 INLET (°F):	174	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	190	FUEL:	Gas Analysis
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	58.0-70.3
COOLING SYSTEM:	JW+1AC, OC+2AC	FUEL METHANE NUMBER:	90.8
CONTROL SYSTEM:	ADEM4	FUEL LHV (Btu/scf):	929
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	1500
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	100
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	1875 bhp@1000rpm
SET POINT TIMING:	18		

			MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING	**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER (WITHOUT FAN)	(2)	bhp	1875	1875	1406	938
INLET AIR TEMPERATURE		°F	100	100	100	100
ENGINE DATA						
FUEL CONSUMPTION (LHV)	(3)	Btu/bhp-hr	6811	6811	7088	7668
FUEL CONSUMPTION (HHV)	(3)	Btu/bhp-hr	7556	7556	7864	8506
AIR FLOW (@inlet air temp, 14.7 psia) (WET)	(4)(5)	ft3/min	4782	4782	3622	2491
AIR FLOW (WET)	(4)(5)	lb/hr	20333	20333	15402	10592
FUEL FLOW (60ºF, 14.7 psia)		scfm	229	229	179	129
INLET MANIFOLD PRESSURE	(6)	in Hg(abs)	100.0	100.0	76.7	54.9
EXHAUST TEMPERATURE - ENGINE OUTLET	(7)	°F	835	835	907	990
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia) (WET)	(8)(5)	ft3/min	11801	11801	9451	6909
EXHAUST GAS MASS FLOW (WET)	(8)(5)	lb/hr	20932	20932	15870	10930
EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)	(9)(10)	g/bhp-hr	0.50	0.50	0.50	0.50
CO	(9)(10)	g/bhp-hr	2.20	2.20	2.20	2.19
THC (mol. wt. of 15.84)	(9)(10)	g/bhp-hr	4.59	4.59	4.80	5.07
NMHC (mol. wt. of 15.84)	(9)(10)	g/bhp-hr	0.42	0.42	0.44	0.47
NMNEHC (VOCs) (mol. wt. of 15.84)	(9)(10)(11)	g/bhp-hr	0.29	0.29	0.30	0.32
HCHO (Formaldehyde)	(9)(10)	g/bhp-hr	0.20	0.20	0.21	0.24
CO2	(9)(10)	g/bhp-hr	433	433	447	484
EXHAUST OXYGEN	(9)(12)	% DRY	10.9	10.9	10.7	10.3
HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(13)	Btu/min	21993	21993	17927	14592
HEAT REJ. TO ATMOSPHERE	(13)	Btu/min	5737	5737	5618	5409
HEAT REJ. TO LUBE OIL (OC)	(13)	Btu/min	11708	11708	10800	9347
HEAT REJ. TO A/C - STAGE 1 (1AC)	(13)(14)	Btu/min	16043	16043	7871	2307
HEAT REJ. TO A/C - STAGE 2 (2AC)	(13)(14)	Btu/min	7319	7319	4454	2218

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+1AC)	(14)(15)	Btu/min	41037
TOTAL STAGE 2 AFTERCOOLER CIRCUIT (OC+2AC)	(14)(15)	Btu/min	21735
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

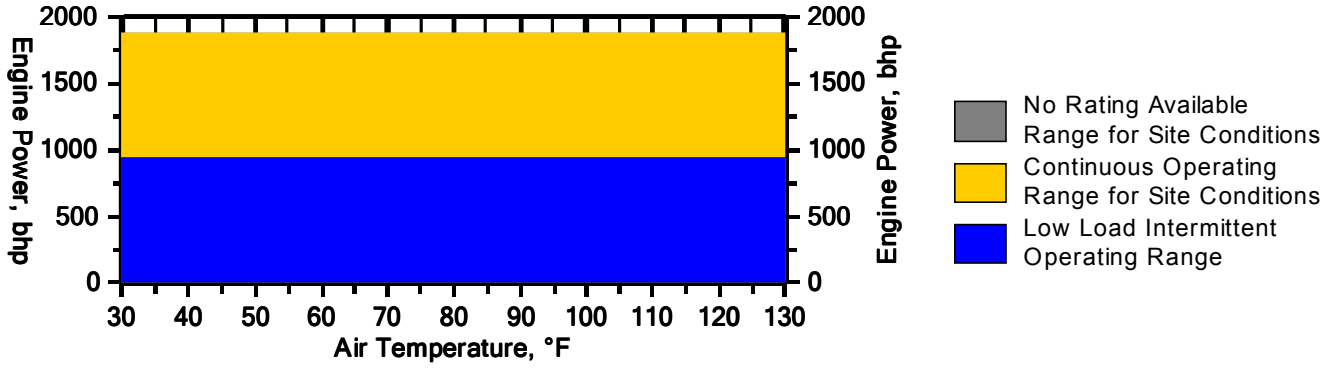
CONDITIONS AND DEFINITIONS

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

For notes information consult page three.

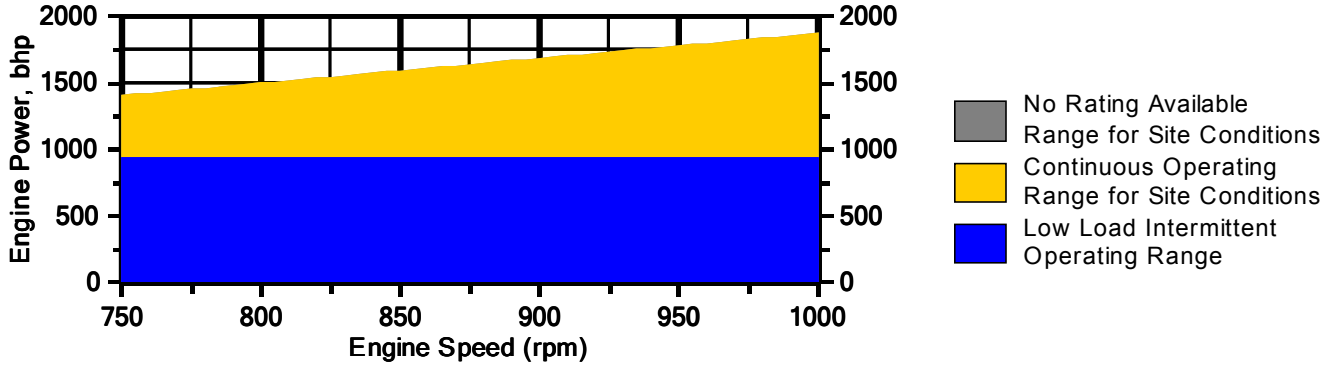
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1500 ft and 1000 rpm



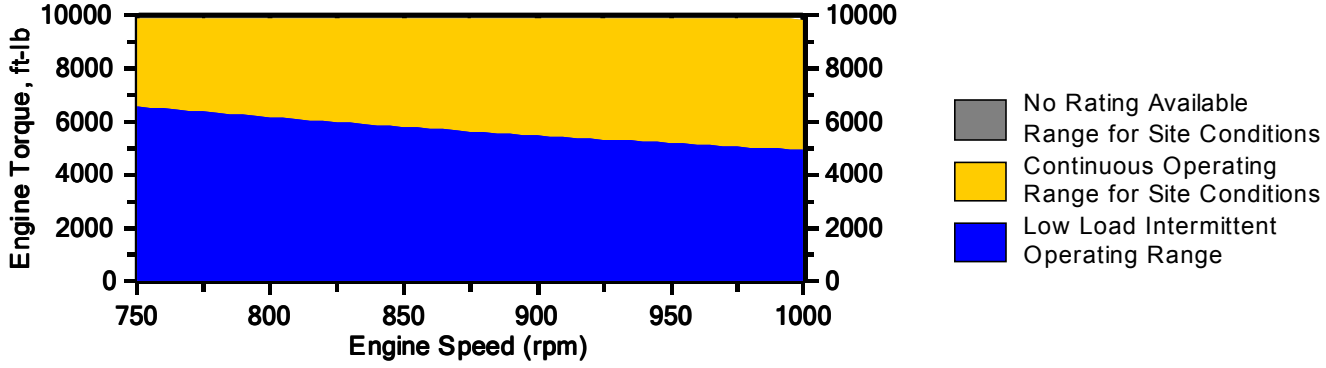
Engine Power vs. Engine Speed

Data represents speed sweep at 1500 ft and 100 ºF



Engine Torque vs. Engine Speed

Data represents speed sweep at 1500 ft and 100 ºF



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

NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0115	0.0115
Methane	CH4	96.7490	96.7380
Ethane	C2H6	2.4777	2.4774
Propane	C3H8	0.1257	0.1257
Isobutane	iso-C4H1O	0.0200	0.0200
Norbutane	nor-C4H1O	0.0210	0.0210
Isopentane	iso-C5H12	0.0204	0.0204
Norpentane	nor-C5H12	0.0134	0.0134
Hexane	C6H14	0.0346	0.0346
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.2943	0.2943
Carbon Dioxide	CO2	0.2438	0.2438
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0114	100.0001

Fuel Makeup:	Gas Analysis
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	90.8
Lower Heating Value (Btu/scf):	929
Higher Heating Value (Btu/scf):	1031
WOBBE Index (Btu/scf):	1227
THC: Free Inert Ratio:	184.82
Total % Inerts (% N2, CO2, He):	0.54%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.70
Stoich A/F Ratio (Mass/Mass):	16.94
Specific Gravity (Relative to Air):	0.573
Fuel Specific Heat Ratio (K):	1.311

CONDITIONS AND DEFINITIONS

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

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

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

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

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

FUEL LIQUIDS

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

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

EMIT Technologies, Inc.
2555 Heartland Dr.
Sheridan, WY. 82801

Proposal Prepared For:	**Prepared By:**	Jesse Stinson	**Proposal:** QUO-22071
Doug Kern		O: (307)675-5081	**Revision:** 1
Exterran		jstinson@emittechnologies.com	**Expires:** September 7, 2017

APPLICATION INFORMATION

DRIVER

Make:	Caterpillar
Model:	G3606 A4
Horsepower:	1875
RPM:	1000
Compression Ratio:	7.6
Exhaust Flow Rate (CFM):	11801
Exhaust Temperature (°F):	835
Allowable Backpressure:	12" WC
Reference:	EM0555-07-001
Fuel:	Custom
Annual Operating Hours:	8760

GAS COOLER

Make:	N/A
Model:	N/A
Orientation:	Horizontal

UNCONTROLLED EMISSIONS DATA

	g/bhp-hr
NO_x:	0.50
CO:	2.20
THC:	4.59
NMHC:	0.42
NMNEHC:	0.29
HCHO:	0.20
Oxygen:	10.90%

EMISSIONS AND SILENCING INFORMATION

HOUSING INFORMATION (Standard Offering)

HOUSING

Make:	Critical Grade Cooler Mount Catalyst/Silencer
Insertion Loss:	25-30 dBA
Model:	ELS-4200-1820F-4CE0-362
Element Capacity:	4
Weight:	1583 Lbs

CATALYST

Catalyst Model:	RT-3615-Z
Catalyst Type:	Oxidation, Standard Precious Metals Group
Catalyst Size:	Rectangle, 36" x 15" x 3.5"
Catalyst Qty:	4
Blank Qty:	0

POST CATALYST EMISSIONS - DTE Emissions

	g/bhp-hr	% Reduction
NO_x:	Unaffected by Oxidation Catalyst	
CO:	<0.11	>95%
VOC:	<0.09	>68%
HCHO:	<0.04	>80%

SYSTEM BACKPRESSURE (Standard Offering)

Total System Backpressure <6.30" WC

GILLETTE GENERATORS

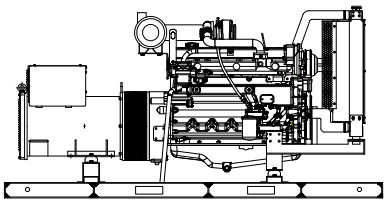
PRIME MODEL

PR-1800

60 HERTZ

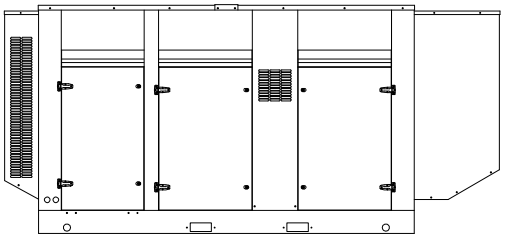
LIQUID COOLED NAT. GAS ENGINE GENERATOR SET

Model		PRIME 105°C RISE
	HZ	NATURAL GAS
PR-1800-60 HERTZ	60	180



"OPEN" GEN-SET

There is no enclosure, so gen-set must be placed within a weather protected area, un-inhabited by humans or animals, with proper ventilation. Silencer not supplied, as installation requirements are not known. However, this item is available as optional equipment.



"LEVEL 2" HOUSED GEN-SET

Full aluminum weather protection and superior sound attenuation for specific low noise applications. Critical grade muffler is standard.

All generator sets are USA prototype built and thoroughly tested. Production models are USA factory built and 100% load tested.

UL1446, UL508, UL142, UL498

NFPA 110, 99, 70, 37

All generator sets meet NFPA-110 Level 1, when equipped with the necessary accessories and installed per NFPA standards.

NEC 700, 701, 702, 708

NEMA ICS10, MG1, ICS6, AB1

ANSI C62.41, 27, 59, 32, 480, 40Q, 81U, 360-05

ASCE 7-05 & 7-10

All generator sets meet 180 MPH rating.

EPA 40CFR Part 60, 1048, 1065, 1068

GENERATOR RATINGS

GENERATOR MODEL	VOLTAGE		PH	HZ	NATURAL GAS FUEL 105°C RISE PRIME RATING		POWER LEAD CONNECTIONS
	L-N	L-L			KW/KVA	AMP	
PR-1800-1-1	120	240	1	60	180/180	750	4 LEAD DEDICATED 1 PH.
PR-1800-3-2	120	208	3	60	180/225	625	12 LEAD LOW WYE
PR-1800-3-3	120	240	3	60	180/225	542	12 LEAD HIGH DELTA
PR-1800-3-4	277	480	3	60	180/225	271	12 LEAD HIGH WYE
PR-1800-3-5	127	220	3	60	180/225	591	12 LEAD LOW WYE
PR-1800-3-16	346	600	3	60	180/225	217	4 LEAD DEDICATED 3 PH.

RATINGS: All single phase gen-sets are dedicated 4 lead windings, rated at unity (1.0) power factor. All three phase gen-sets are 12 lead windings, rated at (.8) power factor. 105°C "PRIME RATINGS" are strictly for gen-sets provide the prime source of electric power, where normal utility power is unavailable or unreliable. A 10% overload is allowed for a total of 1 hour, within every 12 hours of operation of PRIME RATED systems. All gen-set power ratings are based on temperature rise measured by resistance method as defined by MIL-STD 705C and IEEE STD 115, METHOD 6.4.4. All generators have class H (180°C) insulation system on both rotor and stator windings. All factory tests and KW/KVA charts shown above are based on 105°C (prime) R/R winding temperature, within a maximum 40°C ambient condition. Specifications & ratings are subject to change without prior notice.

APPLICATION AND ENGINEERING DATA FOR MODEL PR-1800-60 HZ

GENERATOR SPECIFICATIONS

Manufacturer ..... Marathon Electric Generators
Model & Type ..... 432PSL6228, 4 Pole, 4 Lead, Single Phase
..... 431CSL6206, 4 Pole, 12 Lead, Three Phase
..... 431PSL6243, 4 Pole, 4 Lead, 600V, Three Phase
Exciter ..... Brushless, shunt excited
Voltage Regulator ..... Solid State, HZ/Volts
Voltage Regulation ..... ½%, No load to full load
Frequency ..... Field convertible, 60 HZ to 50 HZ
Frequency Regulation ..... ½% (½ cycle, no load to full load)
Unbalanced Load Capability ..... 100% of prime amps
Total Stator and Load Insulation ..... Class H, 180°C
Temperature Rise ..... 105°C R/R, prime rating @ 40°C amb.
1 Ø Motor Starting @ 30% Voltage Dip (240V) ..... 365 kVA
3 Ø Motor Starting @ 30% Voltage Dip (208-240V) ..... 430 kVA
3 Ø Motor Starting @ 30% Voltage Dip (480V) ..... 580 kVA
Bearing ..... 1, Pre-lubed and sealed
Coupling ..... Direct flexible disc
Total Harmonic Distortion ..... Max 3½% (MIL-STD705B)
Telephone Interference Factor ..... Max 50 (NEMA MG1-22)
Deviation Factor ..... Max 5% (MIL-STD 405B)
Ltd. Warranty Period ..... 24 Months from date of start-up or
..... 1000 hours use, first to occur.

GENERATOR FEATURES

- World Renown Marathon Electric Generator having UL-1446 certification.
- Full generator protection with **Deep Sea 7420** controller, having UL-508 certification.
- Automatic voltage regulator with over-excitation, under-frequency compensation, under-speed protection, and EMI filtering. Entire solid-state board is encapsulated for moisture protection.
- Generator power ratings are based on temperature rise, measured by resistance method, as defined in MIL-STD 705C and IEEE STD 115, Method 6.4.4.
- Power ratings will not exceed temperature rise limitation for class H insulation as per NEMA MG1-22.40.
- Insulation resistance to ground, exceeds 1.5 meg-ohm.
- Stator receives 2000 V. hi-potential test on main windings, and rotor windings receive a 1500 V. hi-potential test, as per MIL-STD 705B.
- Full amortisseur windings with UL-1446 certification.
- Complete engine-generator torsional acceptance, confirmed during initial prototype testing.
- Full load testing on all engine-generator sets, before shipping.
- Self ventilating and drip-proof & revolving field design

ENGINE SPECIFICATIONS AND APPLICATIONS DATA

ENGINE

Manufacturer ..... Power Solutions Inc. (PSI)
Model and Type ..... Heavy Duty 11.1LTCAC, 4 cycle
Aspiration ..... Turbocharged & Charge Air Cooled
Cylinder Arrangement ..... 6 Cylinders, Inline
Displacement Cu. In. (Liters) 674 (11.1)
Bore & Stroke In. (Cm.) ..... 4.84 x 6.1 (12.3 x 15.5)
Compression Ratio 10.5:1
Main Bearings & Style ..... 7, Precision Half-Shell
Cylinder Head ..... Cast Iron
Pistons ..... Cast Aluminum
Crankshaft ..... Forged Steel
Exhaust Valve ..... Inconel, A193
Governor ..... Electronic
Frequency Reg. (no load-full load) ..... Isochronous
Frequency Reg. (steady state) ..... ± 1/4%
Air Cleaner ..... Dry, Replaceable Cartridge
Engine Speed 1800
Piston Speed, ft/min (m./min) 18310 (558)
Max Power, bhp (kwm) Prime/NG 272 (203)
Ltd. Warranty Period ..... 12 Months or 2000 hrs., first to occur

FUEL SYSTEM

Type ..... NAT. GAS, Vapor Withdrawal
Fuel Pressure (kpa), in. H_2O ..... (1.74), 7”
Secondary Fuel Regulator ..... NG Vapor System
Auto Fuel Lock-Off Solenoid ..... Standard on all sets
Fuel Supply Inlet Line ..... 2” NPTF

FUEL CONSUMPTION

NAT. GAS: FT^3/HR (M^3/HR)	PRIME
100% LOAD	1980 (56.1)
75% LOAD	1500 (42.5)
50% LOAD	1075 (30.4)
NG = 1000 BTU X FT^3/HR = Total BTU/HR	

OIL SYSTEM

Type ..... Full Pressure
Oil Pan Capacity qt. (L) 26.4 (25.0)
Oil Pan Cap. W/ filter qt. (L) 28.8 (27.0)
Oil Filter ..... 1, Replaceable Spin-On

ELECTRICAL SYSTEM

Ignition System ..... Electronic
Eng. Alternator/Starter: 24 VDC, negative ground, 45 amp/hr.

Recommended battery to -18°C (0° F): ....(2) 12 VDC, BCI# 27, Max. Dimensions: 12”lg x 6 3/4” wi x 9” hi, with standard round posts. Min output 700 CCA. Battery tray (max. dim. at 12”lg x 7”wi). This model has (2) battery trays, (2) hold down straps, (2) sets of battery cables, and (1) battery charger. Installation of (2) 12VDC starting batteries connected in series for 24VDC output is required, with possible higher AMP/HR rating, as described above, if the normal environment temperature averages -13° F (-25°C) or cooler.

APPLICATION AND ENGINEERING DATA FOR MODEL PR-1800-60 HZ

COOLING SYSTEM

Type of System ..... Pressurized, closed recovery
Coolant Pump .....Pre-lubricated, self-sealing
Cooling Fan Type (no. of blades) .....Pusher (12)
Fan Diameter inches (mm)..... 38" (965)
Ambient Capacity of Radiator °F (°C).....125 (51.6)
Engine Jacket Coolant Capacity Gal (L).....5.5 (21.0)
Radiator Coolant Capacity Gal. (L) 30.6 (116)
Maximum Restriction of Cooling Air Intake
and discharge side of radiator in. H_20 (kpa)..... 0.5 (.125)
Water Pump Capacity gpm (L/min)..... ..... 75 (284)
Heat Reject Coolant: Btu/min (kw) 8100 (142)
Low Radiator Coolant Level Shutdown……...Standard
Note: Coolant temp. shut-down switch setting at 230°F (110°C) with 50/50 (water/antifreeze) mix.

AIR REQUIREMENTS

Combustion Air, cfm (m^3/min) 448 (12.7)
Radiator Air Flow cfm (m^3/min)…… ..…18,000 (510)
Heat Rejected to Ambient:
Engine: kw (btu/min)..... .....60.3 (3430)
Alternator: kw (btu/min)..... ..... 16 (910)

EXHAUST SYSTEM

Exhaust Outlet Size.....5"
Max. Back Pressure, in. hg (KPA).....3.0 (10.2)
Exhaust Flow, at rated kw: cfm (m^3/min) ....……1425 (40.3)
Exhaust Temp., at rated kw: °F (°C) ……..….1382 (750)
Engines are EPA certified for Natural Gas.

SOUND LEVELS MEASURED IN dB(A)

	Open Set	Level 2 Encl.
Level 2, Critical Silencer	90.....	 75

Note: Open sets (no enclosure) has (2) optional silencer system choices due to unknown job-site applications. Level 2 enclosure has installed critical silencer with upgrade to hospital silencer. Sound tests are averaged from several test points and taken at 23 ft. (7 m) from source of noise at normal operation.

DERATE GENERATOR FOR ALTITUDE

3% per 1000 ft.(305m) above 3000 ft. (914m) from sea level

DERATE GENERATOR FOR TEMPERATURE

2% per 10°F(5.6°C) above 85°F (29.4°C)

DIMENSIONS AND WEIGHTS

	Open Set	Level 2 Enclosure
Length in (cm).....	152 (368)	.....204 (518)
Width in (cm).....	72 (183)	..... 72 (183)
Height in (cm)	80 (203)	..... 94 (239)
3 Ø Net Weight lbs (kg).....	6475 (2937) ...	.....8975 (4071)
3 Ø Ship Weight lbs (kg)	6825 (3096) ...	.....9325 (4230)

DEEP SEA 7420 DIGITAL MICROPROCESSOR CONTROLLER

Deep Sea 7420

The "**7420**" controller is an auto start mains (utility) failure module for single gen-set applications. This controller includes a backlit LCD display which continuously displays the status of the engine and generator at all times.

The "**7420**" controller will also monitor speed, frequency, voltage, current, oil pressure, coolant temp., and fuel levels. These modules have been designed to display warning and shut down status. It also includes: (11) configurable inputs • (8) configurable outputs • voltage monitoring • mains (utility) failure detection • (250) event logs • configurable timers • automatic shutdown or warning during fault detection • remote start (on load) • engine preheat • advanced metering capability • hour meter • text LCD displays • protected solid state outputs • test buttons for: stop/reset • manual mode • auto mode • lamp test • start button • power monitoring (kWh, kVAr, kVAh, kVArh)

This controller includes expansion features including RS232, RS484 (using MODBUS-RTU/TCP), direct USB connection with PC, expansion optioned using DSENet for remote annunciation and remote relay interfacing for a distance of up to 3300FT. The controller software is freely downloadable from the internet and allows monitoring with direct USB cable, LAN, or by internet via the built in web interface.

Further expansion is available by adding the optional "WebNet" gateway interface module. This device will allow comprehensive monitoring of the generator via the cloud including identification, location, and status. Some advantages of this module include: reduced site visits and maintenance costs • remote fuel management • fault analysis • asset tracking • automatic system alerts • maximized system up-time.

STANDARD FEATURES FOR MODEL PR-1800-60 HZ

STANDARD FEATURES

CONTROL PANEL:

Deep Sea 7420 digital microprocessor with logic allows programming in the field. Controller has:

- STOP-MANUAL-AUTO modes and automatic engine shutdowns, signaled by full text LCD indicators:
- Low oil pressure
- High engine temp
- Low Radiator Level
- Three auxiliary alarms
- Battery fail alarm
- Engine fail to start
- Engine over speed
- Engine under speed
- Over & under voltage

Also included is tamper-proof engine hour meter

ENGINE:

Full flow oil filter • Air filter • Oil pump • Solenoid type starter motor • Hi-temp radiator • Jacket water pump • Thermostat • Pusher fan and guard • Exhaust manifold • 24 VDC battery charging alternator • Flexible exhaust connector • "Isochronous" duty, electronic governor • Secondary dry fuel regulator • Dry fuel lock-off solenoid • Vibration isolators • Closed coolant recovery system with 50/50 water to anti-freeze mixture • flexible oil & radiator drain hose.

Design & specifications subject to change without prior notice. Dimensions shown are approximate. Contact Gillette for certified drawings. DO NOT USE DIMENSIONS FOR INSTALLATION PURPOSES.

AC GENERATOR SYSTEM:

AC generator • Shunt excited • Brushless design • Circuit Breaker installed and wired to gen-set • Direct connection to engine with flex disc • Class H, 180°C insulation • Self ventilated • Drip proof construction • UL Certified

VOLTAGE REGULATOR:

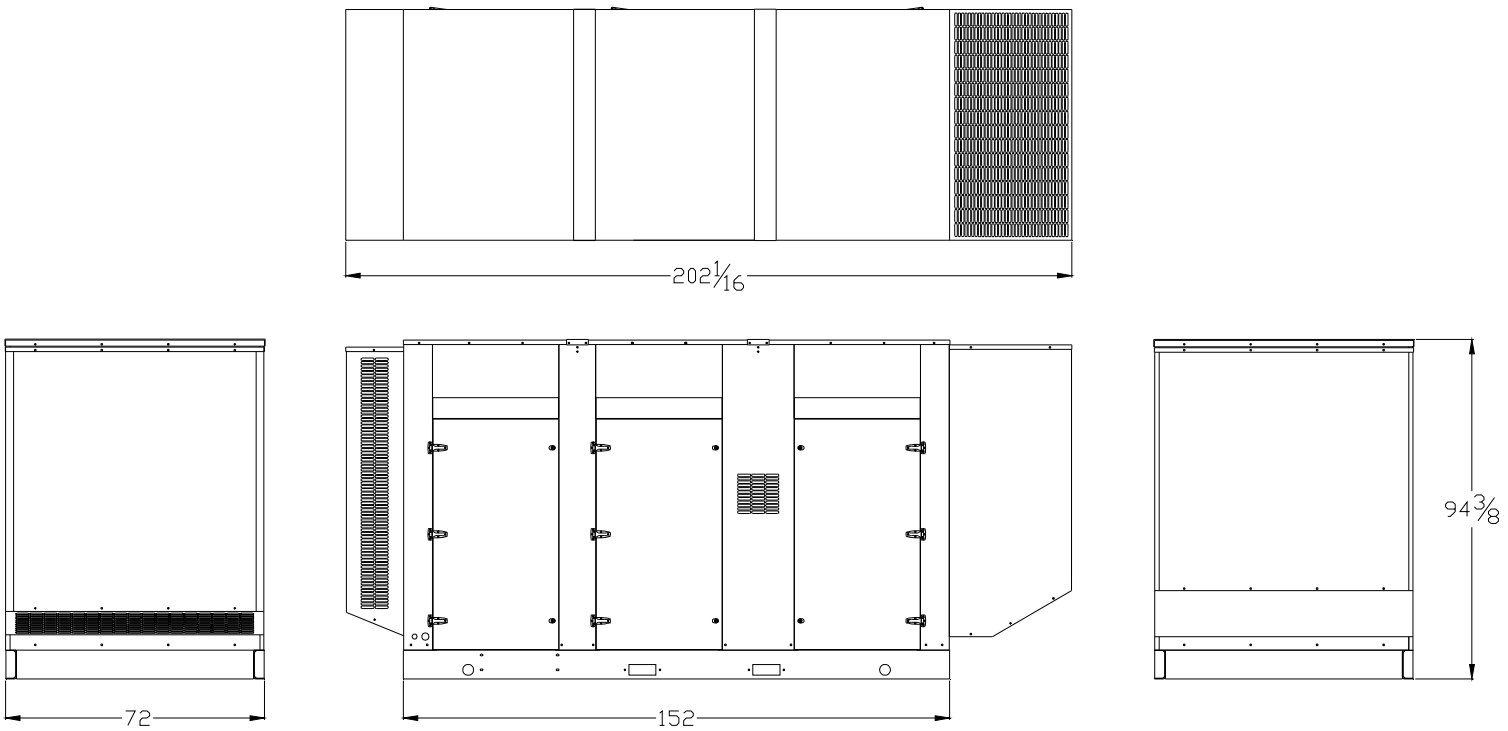
½% Voltage regulation • EMI filter • Under-speed protection • Over-excitation protection • total encapsulation

DC ELECTRICAL SYSTEM:

Battery tray • Battery cables • Battery hold down straps • 2-stage battery float charger with maintaining & recharging automatic charge stages

WEATHER/SOUND PROOF ALUMINUM HOUSING CORROSION RESISTANT PROTECTION CONSISTING OF:

- 9 Heated And Agitated Wash Stages
- Zinc Phosphate Etching-coating Stage
- Final Baked On Enamel Powder Coat
- 18/8 Stainless Steel Hardware



 Gillette Generators, Inc. • 2921 Thorne Dr. •Elkhart, IN • 46514 • Ph: 574-264-9639 • Fax: 574-262-1840 • Web: www.gillettegenerators.com • spc4-161228

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2015 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: FPSIB11.1NGP-016

Effective Date: 11/12/2014

Expiration Date: 12/31/2015

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 11/12/2014

Revision Date: N/A

Manufacturer: Power Solutions International, Inc.
Engine Family: FPSIB11.1NGP
Certification Type: Mobile and Stationary
Fuel : LPG/Propane
Natural Gas (CNG/LNG)
Emission Standards : VOC (g/Hp-hr) : 0.7
NOx (g/Hp-hr) : 1
CO (g/Hp-hr) : 2HC + NOx (g/kW-hr) : 2.7
CO (g/kW-hr) : 4.4
NMHC + NOx (g/kW-hr) : 2.7
Emergency Use Only : N

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 40 CFR Part 1048, 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, 40 CFR Part 1048 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, 40 CFR Part 1048 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60, 40 CFR Part 1048. 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, 40 CFR Part 1048. 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, 40 CFR Part 1048.

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.

Tanker Truck Loading Data Sheet(s)

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#: L01	Emission Point ID#: L01	Year Installed/Modified: N/A
Emission Unit Description: Liquid loading of waste fluids		
Loading Area Data		
Number of Pumps: 2	Number of Liquids Loaded: 1	Max number of trucks loading at one (1) time: 1
Are tanker trucks pressure tested for leaks at this or any other location? ☐ Yes ☒ No ☒ Not Required If Yes, Please describe:		
Provide description of closed vent system and any bypasses. N/A		
Are any of the following truck loadout systems utilized? ☐ Closed System to tanker truck passing a MACT level annual leak test? ☐ Closed System to tanker truck passing a NSPS level annual leak test? ☐ Closed System to tanker truck not passing an annual leak test and has vapor return?		

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

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	2	2	2	2
Days/week	5	5	5	5

Bulk Liquid Data (use extra pages as necessary)

Liquid Name	Produced Fluids		
Max. Daily Throughput (1000 gal/day)	0.55		
Max. Annual Throughput (1000 gal/yr)	201.6		
Loading Method[1]	SP		
Max. Fill Rate (gal/min)	~23		
Average Fill Time (min/loading)	~60		
Max. Bulk Liquid Temperature (°F)	52.14		
True Vapor Pressure[2]	0.3240		
Cargo Vessel Condition[3]	U		

Control Equipment or Method[4]		None		
Max. Collection Efficiency (%)		0		
Max. Control Efficiency (%)		0		
Max.VOC Emission Rate	Loading (lb/hr)	0.04		
	Annual (ton/yr)	0.01		
Max.HAP Emission Rate	Loading (lb/hr)	<0.01		
	Annual (ton/yr)	<0.01		
Estimation Method[5]		EPA		

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill

2 At maximum bulk liquid temperature

3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)
O Other (describe)

4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration

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

Glycol Dehydration Unit Data Sheet(s)

ATTACHMENT O – GLYCOL DEHYDRATION UNIT DATA SHEET – NOT APPLICABLE

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

Manufacturer:	Model:
Max. Dry Gas Flow Rate:	Reboiler Design Heat Input:
Design Type: ☐ TEG ☐ DEG ☐ EG	Source Status[1]:
Date Installed/Modified/Removed[2]:	Regenerator Still Vent APCD/ERD[3]:
Control Device/ERD ID#[3]:	Fuel HV (BTU/scf):
H_2S Content (gr/100 scf):	Operation (hours/year):
Pump Rate (scfm):	
Water Content (wt %) in: Dry Gas:	

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

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

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

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

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

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

If yes:
Is the reboiler configured to accept flash drum vapors (straight from the glycol dehydrator)? ☐ Yes ☐ No
Is the reboiler configured to accept still vent vapors (after a condenser)? ☐ Yes ☐ No
Is the reboiler configured to accept both in the same operation? ☐ Yes ☐ No

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

What happens when temperature controller shuts off fuel to the reboiler?
☐ Still vent emissions to the atmosphere.
☐ Still vent emissions stopped with valve.
☐ Still vent emissions to glow plug.

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

Control Device Technical Data

Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)

Emissions Data					
Emission Unit ID / Emission Point ID[4]	**Description**	**Calculation Methodology[5]**	**PTE[6]**	**Controlled Maximum Hourly Emissions (lb/hr)**	**Controlled Maximum Annual Emissions (tpy)**

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

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

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

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

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

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

Pneumatic Controller Data Sheet(s)

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.

Centrifugal Compressor Data Sheet(s)

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

Reciprocating Compressor Data Sheet(s)

ATTACHMENT R – RECIPROCATING COMPRESSOR DATA SHEET

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

☐ Yes ☒ No

Please list:

Emission Unit ID#	Compressor Description

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

☒ Yes ☐ No

Please list:

Emission Unit ID#	Compressor Description
CE-1	Reciprocating Compressor #1
CE-2	Reciprocating Compressor #2

Blowdown and Pigging Operation Data Sheet(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	120	4,500	16.55	11.79	0.0041	0.05
Compressor Startup	120	1,000	16.55	2.62	0.0041	0.01
Plant Shutdown	1	500,000	16.55	10.92	0.0041	0.04
Low Pressure Pig Venting	52	1,000	16.55	1.14	0.0041	4.6E-03
High Pressure Pig Venting	52	1,000	16.55	1.14	0.0041	4.6E-03

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	120	4,500	16.55	11.79	<0.0001	<0.01
Compressor Startup	120	1,000	16.55	2.62	<0.0001	<0.01
Plant Shutdown	1	500,000	16.55	10.92	<0.0001	<0.01
Low Pressure Pig Venting	52	1,000	16.55	1.14	<0.0001	<0.01
High Pressure Pig Venting	52	1,000	16.55	1.14	<0.0001	<0.01

Air Pollution Control Device Data Sheet(s)

ATTACHMENT T – AIR POLLUTION CONTROL DEVICE / EMISSION REDUCTION DEVICE SHEETS – NOT APPLICABLE

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

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

The following five (5) rows are only to be completed if registering an alternative air pollution control device.	
Emission Unit ID: N/A	Make/Model:
Primary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No
Secondary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No

VAPOR COMBUSTION
(Including Enclosed Combustors)

General Information

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

Control Device Information

Type of Vapor Combustion Control?

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

Manufacturer: Model:	Hours of operation per year?

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

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

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

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

Waste Gas Information

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

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

Pilot Gas Information

Number of Pilot Lights	Fuel Flow Rate to Pilot Flame per Pilot scfh	Heat Input per Pilot BTU/hr	Will automatic re-ignition be used? ☐ Yes ☐ No

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

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

Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty. *(If unavailable, please indicate).*

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

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

ADSORPTION SYSTEM

General Information

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

Operating Parameters

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

Control Device Technical Data

Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)

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

VAPOR RECOVERY UNIT

General Information

Emission Unit ID#: N/A	Installation Date: ☐ New ☐ Modified ☐ Relocated

Device Information

Manufacturer:
Model:

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

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

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

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

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

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

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

ATTACHMENT U

Emission Calculations

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Facility-Wide Emission Summary - Controlled

Wells	0	per site
Storage Tanks:	2	per site
Sand Separator Tank	0	per site
Line Heaters:	0	per site
TEGs:	0	per site
Dehy Reboilers:	0	per site
Glycol Dehydrators:	0	per site
Dehy Drip Tanks:	0	per site
Dehy Combustors:	0	per site
Compressors:	2	per site
High Pressure Separators:	2	per site
Low Pressure Separator	0	per site
Vapor Recovery Unit	0	per site
Tank Combustor	0	per site
Length of lease road:	3,200	feet

Carbon equivalent emissions (CO_2e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:

CO_2	1
CH_4	25
N_2O	298

Emission Point ID #	Emission Source ID#s	Emission Source Description	NO_X		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		CH_4		CO_2e	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	CE-1	Compressor Engine	2.07	9.05	0.45	1.99	0.54	2.35	0.01	0.04	0.14	0.62	0.14	0.62	17.24	75.50	2,221.76	9,731.29
CE-2	CE-2	Compressor Engine	2.07	9.05	0.45	1.99	0.54	2.35	0.01	0.04	0.14	0.62	0.14	0.62	17.24	75.50	2,221.76	9,731.29
GE-1	GE-1	Generator	0.60	2.63	1.20	5.25	0.46	2.02	1.2E-03	0.01	0.04	0.17	0.04	0.17	0.00	0.02	238.86	1,046.20
T01	T01	Produced Fluids Tank	---	---	---	---	0.05	0.23	---	---	---	---	---	---	1.0E-03	0.01	0.03	0.15
T02 to T08	T02 to T08	De minimis storage tanks	---	---	---	---	0.01	0.03	---	---	---	---	---	---	---	---	---	---
L01	L01	Liquid Loading	---	---	---	---	0.04	0.01	---	---	---	---	---	---	---	---	---	---
---	---	Fugitives	---	---	---	---	---	0.95	---	---	---	---	---	---	---	48.61	---	1,215.20
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	0.08	---	0.01	---	---	---	---
Facility Total			4.73	20.73	2.11	9.24	1.63	7.95	0.02	0.08	0.32	1.49	0.32	1.42	34.48	199.63	4,682.39	21,724.12
Facility Total (excluding fugitive emissions)			4.73	20.73	2.11	9.24	1.63	6.99	0.02	0.08	0.32	1.41	0.32	1.41	34.48	151.03	4,682.39	20,508.92

Emission Point ID #	Emission Source ID#s	Emission Source Description	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		n-Hexane		Total BTEX		Total HAP	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	CE-1	Compressor Engine	0.17	0.72	6.2E-03	2.7E-02	5.8E-03	2.5E-02	5.6E-04	2.5E-03	2.6E-03	1.1E-02	0.02	0.07	0.02	0.07	0.44	1.93
CE-2	CE-2	Compressor Engine	0.17	0.72	6.2E-03	2.7E-02	5.8E-03	2.5E-02	5.6E-04	2.5E-03	2.6E-03	1.1E-02	0.02	0.07	0.02	0.07	0.44	1.93
GE-1	GE-1	Generator	0.04	0.18	3.2E-03	1.4E-02	1.1E-03	5.0E-03	5.1E-05	2.2E-04	4.0E-04	1.7E-03	---	---	4.8E-03	0.02	0.07	0.29
T01	T01	Produced Fluids Tank	---	---	<0.01	2.0E-03	<0.01	1.0E-03	<0.01	<0.01	<0.01	<0.01	3.0E-03	1.3E-02	<0.01	3.0E-03	0.01	0.02
T02 to T08	T02 to T08	De minimis storage tanks	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.01	0.03
L01	L01	Liquid Loading	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.4E-03	8.9E-04
---	---	Fugitives	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Facility Total			0.37	1.63	0.02	0.07	0.01	0.06	1.2E-03	0.01	0.01	0.02	0.03	0.15	0.04	0.16	0.96	4.19
Facility Total (excluding fugitive emissions)			0.37	1.63	0.02	0.07	0.01	0.06	1.2E-03	0.01	0.01	0.02	0.03	0.15	0.04	0.16	0.96	4.19

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Compressor Engines

Engine Information:

Source Designation:	**CE-1 and CE-2**
Manufacturer:	Caterpillar
Model No.:	G3606
Stroke Cycle:	4-stroke
Type of Burn:	Lean
Rated Horsepower (bhp):	1,875

Engine Fuel Information:

Fuel Type:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,030
Specific Fuel Consumption (Btu/bhp-hr):	7,556
Maximum Fuel Consumption at 100% Load (scf/hr):	13,754
Heat Input (MMBtu/hr):	14.17
Potential Fuel Consumption (MMBtu/yr):	124,107
Max. Fuel Consumption at 100% (MMscf/hr):	0.0138
Max. Fuel Consumption (MMscf/yr):	120.5
Max. Annual Hours of Operation (hr/yr):	8,760

Engine Emissions Data:

Pollutant	Emission Factor	Units	Maximum Potential Emissions		Estimation Basis / Emission Factor Source
			lbs/hr	tpy	
NO_X	0.50	g/bhp-hr	2.07	9.05	Manufacturer Specifications
VOC (excludes HCHO)	0.09	g/bhp-hr	0.37	1.63	Manufacturer Specifications
VOC (includes HCHO)	---	---	0.54	2.35	VOC + HCHO
CO	0.11	g/bhp-hr	0.45	1.99	Manufacturer Specifications
SO_X	0.001	lb/MMBtu	0.01	0.04	AP-42, Table 3.2-2 (Jul-2000)
PM_{10}	0.01	lb/MMBtu	0.14	0.62	AP-42, Table 3.2-2 (Jul-2000)
$PM_{2.5}$	0.01	lb/MMBtu	0.14	0.62	AP-42, Table 3.2-2 (Jul-2000)
Formaldehyde (HCHO)	0.04	g/bhp-hr	0.17	0.72	Manufacturer Specifications
GHG (CO_2e)	See Table Below		2,222	9,731	40 CFR 98, Tables C-1 & C-2
Other (Total HAP)	See Table Below		0.44	1.93	AP-42, Table 3.2-2 (Jul-2000)

Notes:

1. PM_{10} and $PM_{2.5}$ are total values (filterable + condensable).
2. GHG (CO_2e) is carbon dioxide equivalent, which is the summation of CO_2 (GWP = 1) + CH_4 (GWP = 25) + N_2O (GWP = 298).
3. Total HAP is the summation of all hazardous air pollutants for which there is a published emission factor for this source type.

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Compressor Engines

Greenhouse Gas (GHG) & Hazardous Air Pollutant (HAP) Emissions Calculations:

Pollutant	Emission Factor	Units	Maximum Potential Emissions		Estimation Basis / Emission Factor Source
			lbs/hr	tpy	
GHGs:					
CO_2	433	g/bhp-hr	1,789.89	7,839.71	Manufacturer Specifications
CH_4	4.17	g/bhp-hr	17.24	75.50	Manufacturer (THC - NMHC)
N_2O	0.0001	kg/MMBtu	0.00	0.01	40 CFR 98, Table C-2
GHG (CO_2e)			**2,222**	**9,731**	
Organic HAPs:					
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	5.7E-04	2.5E-03	AP-42, Table 3.2-2 (Jul-2000)
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	4.5E-04	2.0E-03	AP-42, Table 3.2-2 (Jul-2000)
1,3-Butadiene	2.67E-04	lb/MMBtu	3.8E-03	1.7E-02	AP-42, Table 3.2-2 (Jul-2000)
1,3-Dichloropropene	2.64E-05	lb/MMBtu	3.7E-04	1.6E-03	AP-42, Table 3.2-2 (Jul-2000)
2-Methylnapthalene	3.32E-05	lb/MMBtu	4.7E-04	2.1E-03	AP-42, Table 3.2-2 (Jul-2000)
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	3.5E-03	1.6E-02	AP-42, Table 3.2-2 (Jul-2000)
Acenaphthene	1.25E-06	lb/MMBtu	1.8E-05	7.8E-05	AP-42, Table 3.2-2 (Jul-2000)
Acenaphthylene	5.53E-06	lb/MMBtu	7.8E-05	3.4E-04	AP-42, Table 3.2-2 (Jul-2000)
Acetaldehyde	8.36E-03	lb/MMBtu	1.2E-01	5.2E-01	AP-42, Table 3.2-2 (Jul-2000)
Acrolein	5.14E-03	lb/MMBtu	7.3E-02	3.2E-01	AP-42, Table 3.2-2 (Jul-2000)
Benzene	4.40E-04	lb/MMBtu	6.2E-03	2.7E-02	AP-42, Table 3.2-2 (Jul-2000)
Benzo(b)fluoranthene	1.66E-07	lb/MMBtu	2.4E-06	1.0E-05	AP-42, Table 3.2-2 (Jul-2000)
Benzo(e)pyrene	4.15E-07	lb/MMBtu	5.9E-06	2.6E-05	AP-42, Table 3.2-2 (Jul-2000)
Benzo(g,h,i)perylene	4.14E-07	lb/MMBtu	5.9E-06	2.6E-05	AP-42, Table 3.2-2 (Jul-2000)
Biphenyl	2.12E-04	lb/MMBtu	3.0E-03	1.3E-02	AP-42, Table 3.2-2 (Jul-2000)
Carbon Tetrachloride	3.67E-05	lb/MMBtu	5.2E-04	2.3E-03	AP-42, Table 3.2-2 (Jul-2000)
Chlorobenzene	3.04E-05	lb/MMBtu	4.3E-04	1.9E-03	AP-42, Table 3.2-2 (Jul-2000)
Chloroform	2.85E-05	lb/MMBtu	4.0E-04	1.8E-03	AP-42, Table 3.2-2 (Jul-2000)
Chrysene	6.93E-07	lb/MMBtu	9.8E-06	4.3E-05	AP-42, Table 3.2-2 (Jul-2000)
Ethylbenzene	3.97E-05	lb/MMBtu	5.6E-04	2.5E-03	AP-42, Table 3.2-2 (Jul-2000)
Ethylene Dibromide	4.43E-05	lb/MMBtu	6.3E-04	2.7E-03	AP-42, Table 3.2-2 (Jul-2000)
Fluoranthene	1.11E-06	lb/MMBtu	1.6E-05	6.9E-05	AP-42, Table 3.2-2 (Jul-2000)
Fluorene	5.67E-06	lb/MMBtu	8.0E-05	3.5E-04	AP-42, Table 3.2-2 (Jul-2000)
Methanol	2.50E-03	lb/MMBtu	3.5E-02	1.6E-01	AP-42, Table 3.2-2 (Jul-2000)
Methylene Chloride	2.00E-05	lb/MMBtu	2.8E-04	1.2E-03	AP-42, Table 3.2-2 (Jul-2000)
n-Hexane	1.11E-03	lb/MMBtu	1.6E-02	6.9E-02	AP-42, Table 3.2-2 (Jul-2000)
Naphthalene	7.44E-05	lb/MMBtu	1.1E-03	4.6E-03	AP-42, Table 3.2-2 (Jul-2000)
PAH	2.69E-05	lb/MMBtu	3.8E-04	1.7E-03	AP-42, Table 3.2-2 (Jul-2000)
Phenanthrene	1.04E-05	lb/MMBtu	1.5E-04	6.5E-04	AP-42, Table 3.2-2 (Jul-2000)
Phenol	2.40E-05	lb/MMBtu	3.4E-04	1.5E-03	AP-42, Table 3.2-2 (Jul-2000)
Pyrene	1.36E-06	lb/MMBtu	1.9E-05	8.4E-05	AP-42, Table 3.2-2 (Jul-2000)
Styrene	2.36E-05	lb/MMBtu	3.3E-04	1.5E-03	AP-42, Table 3.2-2 (Jul-2000)
Tetrachloroethane	2.48E-06	lb/MMBtu	3.5E-05	1.5E-04	AP-42, Table 3.2-2 (Jul-2000)
Toluene	4.08E-04	lb/MMBtu	5.8E-03	2.5E-02	AP-42, Table 3.2-2 (Jul-2000)
Vinyl Chloride	1.49E-05	lb/MMBtu	2.1E-04	9.2E-04	AP-42, Table 3.2-2 (Jul-2000)
Xylene	1.84E-04	lb/MMBtu	2.6E-03	1.1E-02	AP-42, Table 3.2-2 (Jul-2000)
Total HAP (including HCHO)			**0.44**	**1.93**	

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Generator Engine

Engine Information:

Source Designation:	**GE-1**
Manufacturer:	PSI
Model No.:	Heavy Duty 11.1LTCAC
Stroke Cycle:	4-stroke
Type of Burn:	Rich
Rated Horsepower (bhp):	272
Rated Power (kW):	203

Engine Fuel Information:

Fuel Type:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,030
Maximum Fuel Consumption at 100% Load (scf/hr):	1,980
Heat Input (MMBtu/hr):	2.04
Potential Fuel Consumption (MMBtu/yr):	17,866
Max. Fuel Consumption at 100% (MMscf/hr):	0.0020
Max. Fuel Consumption (MMscf/yr):	17.3
Max. Annual Hours of Operation (hr/yr):	8,760

Engine Emissions Data:

Pollutant	Emission Factor	Units	Maximum Potential Emissions		Estimation Basis / Emission Factor Source
			lbs/hr	tpy	
NO_X	1.0	g/hp-hr	0.60	2.63	EPA Certificate of Conformity
VOC (excludes HCHO)	0.7	g/hp-hr	0.42	1.84	EPA Certificate of Conformity
VOC (includes HCHO)	---	---	0.46	2.02	VOC + HCHO
CO	2.0	g/hp-hr	1.20	5.25	EPA Certificate of Conformity
SO_X	0.001	lb/MMBtu	1.20E-03	0.01	AP-42, Table 3.2-3 (Aug-2000)
PM_{10}	0.02	lb/MMBtu	0.04	0.17	AP-42, Table 3.2-3 (Aug-2000)
$PM_{2.5}$	0.02	lb/MMBtu	0.04	0.17	AP-42, Table 3.2-3 (Aug-2000)
Formaldehyde (HCHO)	0.02	lb/MMBtu	0.04	0.18	AP-42, Table 3.2-3 (Aug-2000)
GHG (CO_2e)	See Table Below		239	1,046	40 CFR 98, Tables C-1 & C-2
Other (Total HAP)	See Table Below		0.07	0.29	AP-42, Table 3.2-3 (Aug-2000)

Notes:

1. PM_{10} and $PM_{2.5}$ are total values (filterable + condensable).
2. GHG (CO_2e) is carbon dioxide equivalent, which is the summation of CO_2 (GWP = 1) + CH_4 (GWP = 25) + N_2O (GWP = 298).
3. Total HAP is the summation of all hazardous air pollutants for which there is a published emission factor for this source type.

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Generator Engine

Greenhouse Gas (GHG) & Hazardous Air Pollutant (HAP) Emissions Calculations:

Pollutant	Emission Factor	Units	Maximum Potential Emissions		Estimation Basis / Emission Factor Source
			lbs/hr	tpy	
GHGs:					
CO_2	53.06	kg/MMBtu	238.61	1045.12	40 CFR 98, Table C-1
CH_4	0.001	kg/MMBtu	4.5E-03	2.0E-02	40 CFR 98, Table C-2
N_2O	0.0001	kg/MMBtu	4.5E-04	2.0E-03	40 CFR 98, Table C-2
GHG (CO_2e)			**239**	**1,046**	
Organic HAPs:					
1,1,2,2-Tetrachloroethane	2.53E-05	lb/MMBtu	5.2E-05	2.3E-04	AP-42, Table 3.2-3 (Aug-2000)
1,1,2-Trichloroethane	1.53E-05	lb/MMBtu	3.1E-05	1.4E-04	AP-42, Table 3.2-3 (Aug-2000)
1,3-Butadiene	6.63E-04	lb/MMBtu	1.4E-03	5.9E-03	AP-42, Table 3.2-3 (Aug-2000)
1,3-Dichloropropene	1.27E-05	lb/MMBtu	2.6E-05	1.1E-04	AP-42, Table 3.2-3 (Aug-2000)
Acetaldehyde	2.79E-03	lb/MMBtu	5.7E-03	2.5E-02	AP-42, Table 3.2-3 (Aug-2000)
Acrolein	2.63E-03	lb/MMBtu	5.4E-03	2.3E-02	AP-42, Table 3.2-3 (Aug-2000)
Benzene	1.58E-03	lb/MMBtu	3.2E-03	1.4E-02	AP-42, Table 3.2-3 (Aug-2000)
Carbon Tetrachloride	1.77E-05	lb/MMBtu	3.6E-05	1.6E-04	AP-42, Table 3.2-3 (Aug-2000)
Chlorobenzene	1.29E-05	lb/MMBtu	2.6E-05	1.2E-04	AP-42, Table 3.2-3 (Aug-2000)
Chloroform	1.37E-05	lb/MMBtu	2.8E-05	1.2E-04	AP-42, Table 3.2-3 (Aug-2000)
Ethylbenzene	2.48E-05	lb/MMBtu	5.1E-05	2.2E-04	AP-42, Table 3.2-3 (Aug-2000)
Ethylene Dibromide	2.13E-05	lb/MMBtu	4.3E-05	1.9E-04	AP-42, Table 3.2-3 (Aug-2000)
Methanol	3.06E-03	lb/MMBtu	6.2E-03	2.7E-02	AP-42, Table 3.2-3 (Aug-2000)
Methylene Chloride	4.12E-05	lb/MMBtu	8.4E-05	3.7E-04	AP-42, Table 3.2-3 (Aug-2000)
Naphthalene	9.71E-05	lb/MMBtu	2.0E-04	8.7E-04	AP-42, Table 3.2-3 (Aug-2000)
PAH	1.41E-04	lb/MMBtu	2.9E-04	1.3E-03	AP-42, Table 3.2-3 (Aug-2000)
Styrene	1.19E-05	lb/MMBtu	2.4E-05	1.1E-04	AP-42, Table 3.2-3 (Aug-2000)
Toluene	5.58E-04	lb/MMBtu	1.1E-03	5.0E-03	AP-42, Table 3.2-3 (Aug-2000)
Vinyl Chloride	7.18E-06	lb/MMBtu	1.5E-05	6.4E-05	AP-42, Table 3.2-3 (Aug-2000)
Xylene	1.95E-04	lb/MMBtu	4.0E-04	1.7E-03	AP-42, Table 3.2-3 (Aug-2000)
Total HAP (including HCHO)			**0.07**	**0.29**	

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Storage Vessels

Operational Hours 8,760 hrs/yr

Storage Tanks - Uncontrolled [1,2,3]

Source Designation:	**T01**		**T02**		**T03 to T04**		**T05 to T06**		**T07 to T08**	
Contents:	Produced Fluids		Waste Oil		Compressor Oil		Engine Oil		Methanol	
Number:	1 tank(s)		1 tank(s)		2 tank(s)		2 tank(s)		2 tank(s)	
Capacity:	16,800 gal (each)		8,820 gal (each)		500 gal (each)		500 gal (each)		500 gal (each)	
Throughput:	201,600 gal (each)		105,840 gal (each)		6,000 gal (each)		6,000 gal (each)		6,000 gal (each)	
Condensate Throughput:	0.1 bbl/day (each)		---		---		---		---	
Emissions (per tank)	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**
VOC	0.052	0.229	4.4E-04	0.002	3.7E-05	1.6E-04	3.7E-05	1.6E-04	0.003	0.011
HAP	0.005	0.020	4.4E-04	0.002	3.7E-05	1.6E-04	3.7E-05	1.6E-04	0.003	0.011
Benzene	<0.001	0.002	---	---	---	---	---	---	---	---
Toluene	<0.001	0.001	---	---	---	---	---	---	---	---
Ethylbenzene	<0.001	<0.001	---	---	---	---	---	---	---	---
Xylene	<0.001	<0.001	---	---	---	---	---	---	---	---
n-Hexane	0.003	0.013	---	---	---	---	---	---	---	---
Methane	0.001	0.006	---	---	---	---	---	---	---	---

[1] Uncontrolled emissions calculation using E&P TANK v2.0 for tanks with flashing; emissions include working, breathing and flashing losses. Conservatively assumes 1% condensate in waste fluids.

[2] Uncontrolled emissions calculation using EPA Tanks 4.0.9d for tanks without flashing; emissions include working and breathing losses.

[3] Conservatively assumes one turnover per month, per tank. Assumes that waste oil tank receives all used oil.

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Liquid Loading

Throughput 201,600 gal/yr
Capture Efficiency 0% non-tested tanker trucks
Control Efficiency 0% Combustor destruction efficiency

Liquid Loading Emissions

Source ID:	L01

Uncontrolled Loading Losses: L_L (lb/10^3 gal) = 12.46 (SPM)/T
Controlled Loading Losses: L_L (lb/10^3 gal) = 12.46 (SPM)/T * (1 - Capture Efficiency * Control Efficiency)

Parameter	Value	Description
S	0.60	Saturation factor for "Submerged Loading: dedicated normal service" (AP-42 Table 5.2-1)
Capture Efficiency	0%	Capture Efficiency
Control Efficiency	0%	Control Efficiency
P	0.3240	true vapor pressure of liquid loaded (psia) - from EPA TANKS run
M	19.3610	molecular weight of vapors (lb/lb-mol) - from EPA TANKS run
T	511.81	bulk liquid temperature of liquids loaded (deg R) - from EPA TANKS run

Description	Uncontrolled Loading Losses (lb/10^3 gal)	Maximum Throughput [1] (gal/yr)	VOC Emissions (tpy)	VOC Emissions (lb/hr)[2]	HAP Emissions (tpy)	HAP Emissions (lb/hr)[2]
Truck Loading of Produced Fluids	0.09	201,600	0.01	0.04	0.00	0.00

[1] Total estimated maximum annual throughput for the waste fluid tank.
[1] Lb/hr values assume two (2) hours of loading per day, five (5) days per week.

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Fugitive Emissions

Fugitive Emissions from Component Leaks

Facility Equipment Type[1]	Valves	Connectors	Open-Ended Lines	Pressure Relief Devices
Wellhead	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 Subpart W of Part 98 —Default Average Component Counts for Major Onshore Natural Gas Production

Fugitive VOC/Total Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Annual Fugitive Emissions (tpy)	Weight Fraction VOC	Weight Fraction HAP	VOC Emissions[3] (tpy)	HAP Emissions[3] (tpy)
Pumps	Light Liquid	0.01990	3	0.58	1.00	0.0E+00	0.58	0.0E+00
Compressor	Gas	0.22800	2	4	0.00	0.0E+00	0.02	0.0E+00
Valves	Gas	0.00597	57	3.29	0.00	0.0E+00	0.01	0.0E+00
Pressure Relief Valves	Gas	0.10400	4	4.02	0.00	0.0E+00	0.02	0.0E+00
Open-Ended Lines	All	0.00170	0	0.00	0.00	0.0E+00	0.0E+00	0.0E+00
Connectors	All	0.00183	257	4.53	0.00	0.0E+00	0.02	0.0E+00
Intermittent Pneumatic Devices[4]	Gas	13.5	12	---	---	---	0.13	0.0E+00
			Emission Totals:	**16.82**	**---**	**---**	**0.77**	**0.0E+00**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-1. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). SOCMI factors were used as it was representative of natural gas extraction. The pneumatic controller value is from 40 CFR 98 Subpart W, Table W-1A (units of scf/hr-component).

[2] Assumes one pump for each tank and one meter. Pressure relief valves count includes two for each storage tank. Pneumatic controllers operate on air (no gas emissions). A 50% compliance margin is added to the component counts based on Subpart W counts.

[3] Potential emissions VOC/HAP (tpy) = Emission factor (kg/hr/source) * Number of Sources * Weight % VOC/HAP x 2.2046 (lb/kg) x 8,760 (hr/yr) ÷ 2,000 (lb/ton)

[4] Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Fugitive Emissions

Fugitive Specific HAP Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Annual Fugitive Emissions (tpy)	Benzene Emissions[3] (tpy)	Toluene Emissions[3] (tpy)	Ethylbenzene Emissions[3] (tpy)	Xylene Emissions[3] (tpy)	n-Hexane Emissions[4] (tpy)
Pumps	Light Liquid	0.01990	3	0.58	<0.01	<0.01	<0.01	<0.01	<0.01
Compressor	Gas	0.22800	2	4.40	<0.01	<0.01	<0.01	<0.01	<0.01
Valves	Gas	0.00597	57	3.29	<0.01	<0.01	<0.01	<0.01	<0.01
Pressure Relief Valves	Gas	0.10400	4	4.02	<0.01	<0.01	<0.01	<0.01	<0.01
Open-Ended Lines	All	0.00170	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Connectors	All	0.00183	257	4.53	<0.01	<0.01	<0.01	<0.01	<0.01
Intermittent Pneumatic Devices[4]	Gas	13.5	12	---	<0.01	<0.01	<0.01	<0.01	<0.01
			Emission Totals:	**16.82**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-1. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). SOCMI factors were used as it was representative of natural gas liquids extraction. Pneumatic controllers operate on air (no gas emissions).

[2] Assumes one pump for each tank. Pressure relief valves count includes one Emergency Pressure Relief valve and one lock-down hatch for each storage tank. Pneumatic controllers operate on air (no gas emissions). A 50% compliance margin is added to the component counts based on Subpart W counts.

[3] Potential emissions HAP (tpy) = Emission factor (kg/hr/source) * Number of Sources * Weight % HAP x 2.2046 (lb/kg) x 8,760 (hr/yr) ÷ 2,000 (lb/ton)

[4] Potential emissions HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

GHG Fugitive Emissions from Component Leaks

Component	Component Count	GHG Emission Factor[1] scf/hr/componen	CH_4 Emissions[2,3] (tpy)	CO_2 Emissions[2,3] (tpy)	CO_2e Emissions[4] (tpy)
Pumps	3	0.01	0.01	3.8E-05	0.13
Compressor	2	4.17	1.50	0.01	37.39
Valves	57	0.027	0.28	2.0E-03	6.90
Pressure Relief Devices	4	0.04	0.03	2.0E-04	0.72
Open-Ended Lines	0	0.061	0.0E+00	0.0E+00	0.0E+00
Connectors	257	0.003	0.14	9.8E-04	3.45
Intermittent Pneumatic Devices	12	6	4.30	0.03	107.60
Total			**6.25**	**0.04**	**156.19**

[1] Population emission factors for gas service in the Eastern U.S. from *Table W-1A of Subpart W - Default Whole Gas Emission Factors for Onshore Production* , 40 CFR 98, Subpart W (table W-6 for compressor).

[2] Calculated in accordance with Equations W-32a, W-35 and W-36 in Subpart W of 40 CFR 98. See footnote 4 above for sample calculation.

[3] Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)
Mole fractions of CH_4 and CO_2 based on gas analysis:
CH_4: 97% CO_2: 0.25%

[4] Carbon equivalent emissions (CO_2e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:
Carbon Dioxide (CO_2): 1
Methane (CH_4): 25

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Fugitive Emissions

Fugitive Emissions from Venting

Source	Number of Events (events per yr)	Gas Vented Per Event (scf/event)	Total Volume Vented (scf/yr)	Total Emissions (ton/yr)	VOC Emissions (tpy)	Benzene Emissions (tpy)	Toluene Emissions (tpy)	Ethylbenzene Emissions (tpy)	Xylene Emissions (tpy)	n-Hexane Emissions (tpy)	HAP Emissions (tpy)	CH_4 Emissions (tpy)	CO_2 Emissions (tpy)	CO_2e Emissions (tpy)
Rod Packing Venting	---	805,920	805,920	17.60	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	16.49	0.12	412
Compressor Blowdown	120	4,500	540,000	11.79	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	11.05	0.08	276
Compressor Startup	120	1,000	120,000	2.62	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.46	0.02	61
Plant Shutdown	1	500,000	500,000	10.92	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	10.23	0.07	256
Low Pressure Pig Venting	52	1,000	52,000	1.14	4.6E-03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.06	0.01	27
High Pressure Pig Venting	52	1,000	52,000	1.14	4.6E-03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.06	0.01	27
Total	**---**	**---**	2,069,920	45.21	**0.18**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**42.36**	**0.30**	**1,059**

[1] VOC and HAP emissions are based on sum of the fractions of the pollutants in the site-specific gas analysis in those classifications, and are calculated in accordance with standard conversion methodology and factors.
[2] CH_4 and CO_2 emissions are based on fractions of these pollutants in the site-specific gas analysis, and are calculated in accordance with Equations W-35 and W-36 in Subpart W of 40 CFR 98.
[3] GHG (CO_2e) is carbon dioxide equivalent, which is the summation of CO_2 (GWP = 1) + CH_4 (GWP = 25) + N_2O (GWP = 298).
[4] Total gas volume emitted (and thus subsequent emissions values) is estimated based on engineering judgement and is conservative.
[5] Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)
[6] Potential emissions CH_4/CO_2 (tpy) = Gas volume vented (scf/yr) * Mole % CH_4/CO_2 ÷ 100 * Density CH_4/CO_2 (kg/scf) * 1,000 (g/kg) ÷ 453.6 (g/lb) ÷ 2,000 (lb/ton)

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Haul Roads

Estimated Potential Road Fugitive Emissions

Unpaved Road Emissions

Unpaved Roads: $E\ (lb/VMT) = k(s/12)^a(W/3)^b*[(365-p)/365]$

	PM	PM_{10}	$PM_{2.5}$	
k Factor (lb/VMT)	4.9	1.5	0.15	AP-42 Table 13.2.2-2 (Final, 11/06)
Silt content, s	4.8 %			AP-42 Table 13.2.2-1 (11/06), for Sand and Gravel Processing
Number of Rain Days, p	150			AP-42 Figure 13.2.1-2
a	0.7	0.9	0.9	AP-42 Table 13.2.2-2 (Final, 11/06)
b	0.45	0.45	0.45	AP-42 Table 13.2.2-2 (Final, 11/06)

Description	Weight of Empty Truck (tons)	Weight of Truck w/ Max Load (tons)	Mean Vehicle Weight (tons)	Length of Unpaved Road Traveled (mile)	Trips Per Year	Mileage Per Year	Control (%)	Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
Liquids Hauling	20	40	30	0.61	50	61	0	0.13	0.03	0.00
Employee Vehicles	3	3	3	0.61	200	242	0	0.18	0.05	0.00
Total Potential Emissions								**0.32**	**0.08**	**0.01**

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Carrico Compressor Station
Project Description: G35-D Application

Gas Analysis

Sample Location: Coopers Run
HHV (Btu/scf): 1,030

Constituent	Natural Gas Stream Speciation (Mole %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.2500	44.01	0.11	0.01	0.665
Nitrogen	0.2900	28.01	0.08	0.00	0.491
Methane	96.7000	16.04	15.51	0.94	93.696
Ethane	2.6100	30.07	0.78	0.05	4.741
Propane	0.1400	44.10	0.06	0.00	0.373
Isobutane	<0.001	58.12	0.00	0.00	0.000
n-Butane	0.0100	58.12	0.01	0.00	0.035
Isopentane	<0.001	72.15	0.00	0.00	0.000
n-Pentane	<0.001	72.15	0.00	0.00	0.000
Cyclopentane	<0.001	70.1	0.0	0.0	0.000
n-Hexane	<0.001	86.18	0.00	0.00	0.000
Cyclohexane	<0.001	84.16	0.00	0.00	0.000
Other Hexanes	<0.001	86.18	0.00	0.00	0.000
Heptanes	<0.001	100.21	0.00	0.00	0.000
Methylcyclohexane	<0.001	98.19	0.00	0.00	0.000
2,2,4-Trimethylpentane	<0.001	114.23	0.00	0.00	0.000
Benzene*	<0.001	78.11	0.00	0.00	0.000
Toluene*	<0.001	92.14	0.00	0.00	0.000
Ethylbenzene*	<0.001	106.17	0.00	0.00	0.000
Xylenes*	<0.001	106.16	0.00	0.00	0.000
C8 + Heavies	<0.001	130.80	0.00	0.00	0.000
Totals	100.000		16.55	1.00	100

TOC (Total)	99.46	98.84
VOC (Total)	0.15	0.41
HAP (Total)	0.00	0.00

****
* Project Setup Information *
****

Project File : P:\Client\DTE\West Virginia\Carrico\Projects\173901.0171 Carrico G35D\04 Draft\2017-
Flowsheet Selection : Oil Tank with Separator
Calculation Method : RVP Distillation
Control Efficiency : 100.0%
Known Separator Stream : Geographical Region
Geographical Region : All Regions in US
Entering Air Composition : No

Filed Name : Carrico Compressor Station
Well Name : Produced Fluid Tank
Date : 2017.12.13

****
* Data Input *
****

Separator Pressure : 50.00[psig]
Separator Temperature : 125.00[F]
Ambient Pressure : 14.70[psia]
Ambient Temperature : 125.00[F]
C10+ SG : 0.8420
C10+ MW : 287.00

-- Low Pressure Oil ----------

No.	Component	mol %
1	H2S	1.2800
2	O2	0.0000
3	CO2	0.0300
4	N2	0.0000
5	C1	1.2700
6	C2	2.0800
7	C3	4.5700
8	i-C4	1.8900
9	n-C4	6.4800
10	i-C5	3.8800
11	n-C5	7.0400
12	C6	3.0500
13	C7	6.8200
14	C8	7.7800
15	C9	7.2300
16	C10+	37.9300
17	Benzene	0.8300
18	Toluene	1.0200
19	E-Benzene	0.0700
20	Xylenes	0.6500
21	n-C6	6.1000
22	224Trimethylp	0.0000

-- Sales Oil ----------
Production Rate : 0.1[bbl/day]
Days of Annual Operation : 365 [days/year]
API Gravity : 49.0
Reid Vapor Pressure : 8.90[psia]

****
* Calculation Results *
****

-- Emission Summary ----------

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]

Total HAPs	0.020	0.005
Total HC	0.254	0.058
VOCs, C2+	0.247	0.056
VOCs, C3+	0.229	0.052

Uncontrolled Recovery Info.

Vapor	10.6600 x1E-3	[MSCFD]
HC Vapor	9.9100 x1E-3	[MSCFD]
GOR	106.60	[SCF/bbl]

-- Emission Composition ----------

No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
1	H2S	0.012	0.003
2	O2	0.000	0.000
3	CO2	0.000	0.000
4	N2	0.000	0.000
5	C1	0.006	0.001
6	C2	0.018	0.004
7	C3	0.049	0.011
8	i-C4	0.020	0.005
9	n-C4	0.059	0.013
10	i-C5	0.026	0.006
11	n-C5	0.039	0.009
12	C6	0.008	0.002
13	C7	0.008	0.002
14	C8	0.004	0.001
15	C9	0.002	0.000
16	C10+	0.000	0.000
17	Benzene	0.002	0.000
18	Toluene	0.001	0.000
19	E-Benzene	0.000	0.000
20	Xylenes	0.000	0.000
21	n-C6	0.013	0.003
22	224Trimethylp	0.000	0.000
	Total	0.267	0.061

-- Stream Data ----------

No.	Component	MW	LP Oil mol %	Flash Oil mol %	Sale Oil mol %	Flash Gas mol %	W&S Gas mol %	Total Emissions mol %
1	H2S	34.80	1.2800	0.2130	0.2130	6.8990	0.0000	6.8990
2	O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	CO2	44.01	0.0300	0.0021	0.0021	0.1768	0.0000	0.1768
4	N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	C1	16.04	1.2700	0.0369	0.0369	7.7635	0.0000	7.7635
6	C2	30.07	2.0800	0.2466	0.2466	11.7345	0.0000	11.7345
7	C3	44.10	4.5700	1.3445	1.3445	21.5554	0.0000	21.5554
8	i-C4	58.12	1.8900	0.9750	0.9750	6.7085	0.0000	6.7085
9	n-C4	58.12	6.4800	3.9279	3.9279	19.9192	0.0000	19.9192
10	i-C5	72.15	3.8800	3.2983	3.2983	6.9431	0.0000	6.9431
11	n-C5	72.15	7.0400	6.3906	6.3906	10.4595	0.0000	10.4595
12	C6	86.16	3.0500	3.2895	3.2895	1.7886	0.0000	1.7886
13	C7	100.20	6.8200	7.8112	7.8112	1.6004	0.0000	1.6004
14	C8	114.23	7.7800	9.1297	9.1297	0.6724	0.0000	0.6724
15	C9	128.28	7.2300	8.5561	8.5561	0.2466	0.0000	0.2466
16	C10+	166.00	37.9300	45.1329	45.1329	0.0000	0.0000	0.0000
17	Benzene	78.11	0.8300	0.9150	0.9150	0.3821	0.0000	0.3821
18	Toluene	92.13	1.0200	1.1834	1.1834	0.1596	0.0000	0.1596
19	E-Benzene	106.17	0.0700	0.0825	0.0825	0.0041	0.0000	0.0041
20	Xylenes	106.17	0.6500	0.7670	0.7670	0.0341	0.0000	0.0341
21	n-C6	86.18	6.1000	6.6977	6.6977	2.9524	0.0000	2.9524
22	224Trimethylp	114.24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	MW		159.21	179.60	179.60	51.88	0.00	51.88
	Stream Mole Ratio		1.0000	0.8404	0.8404	0.1596	0.0000	0.1596
	Heating Value	[BTU/SCF]				2822.40	0.00	2822.40
	Gas Gravity	[Gas/Air]				1.79	0.00	1.79
	Bubble Pt. @ 100F	[psia]	76.98	12.70	12.70			

RVP @ 100F	[psia]	27.72	8.66	8.66
Spec. Gravity @ 100F		0.690	0.698	0.698

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

Identification

User Identification:	Carrico Station (Methanol Tanks)
City:	
State:	West Virginia
Company:	
Type of Tank:	Horizontal Tank
Description:	Methanol Tanks

Tank Dimensions

Shell Length (ft):	6.00
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	12.00
Net Throughput(gal/yr):	6,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Elkins, West Virginia (Avg Atmospheric Pressure = 13.73 psia)

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

Carrico Station (Methanol Tanks) - Horizontal Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Methyl alcohol	All	57.20	47.16	67.23	52.14	1.3195	0.9508	1.8044	32.0400			32.04	Option 2: A=7.897, B=1474.08, C=229.13

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

Carrico Station (Methanol Tanks) - Horizontal Tank

Annual Emission Calcaulations	
Standing Losses (lb):	16.5979
Vapor Space Volume (cu ft):	48.0243
Vapor Density (lb/cu ft):	0.0076
Vapor Space Expansion Factor:	0.1416
Vented Vapor Saturation Factor:	0.8773
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	48.0243
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.5293
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0076
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.3195
Daily Avg. Liquid Surface Temp. (deg. R):	516.8667
Daily Average Ambient Temp. (deg. F):	49.0583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	511.8083
Tank Paint Solar Absorptance (Shell):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,193.8870
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1416
Daily Vapor Temperature Range (deg. R):	40.1436
Daily Vapor Pressure Range (psia):	0.8536
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.3195
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.9508
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	1.8044
Daily Avg. Liquid Surface Temp. (deg R):	516.8667
Daily Min. Liquid Surface Temp. (deg R):	506.8308
Daily Max. Liquid Surface Temp. (deg R):	526.9026
Daily Ambient Temp. Range (deg. R):	24.1833
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8773
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	1.3195
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	6.0396
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.3195
Annual Net Throughput (gal/yr.):	6,000.0000
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	22.6374

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

Emissions Report for: Annual

Carrico Station (Methanol Tanks) - Horizontal Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Methyl alcohol	6.04	16.60	22.64

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

Identification

User Identification:	Carrico Station (Oil Tanks)
City:	
State:	West Virginia
Company:	
Type of Tank:	Horizontal Tank
Description:	Compressor and Engine Lube Oil Tanks

Tank Dimensions

Shell Length (ft):	6.00
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	12.00
Net Throughput(gal/yr):	6,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Elkins, West Virginia (Avg Atmospheric Pressure = 13.73 psia)

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

Carrico Station (Oil Tanks) - Horizontal Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	57.20	47.16	67.23	52.14	0.0066	0.0041	0.0086	130.0000			188.00	Option 1: VP50 = .0045 VP60 = .0074

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

Carrico Station (Oil Tanks) - Horizontal Tank

Annual Emission Calcaulations	
Standing Losses (lb):	0.1991
Vapor Space Volume (cu ft):	48.0243
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0736
Vented Vapor Saturation Factor:	0.9993
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	48.0243
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.5293
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0066
Daily Avg. Liquid Surface Temp. (deg. R):	516.8667
Daily Average Ambient Temp. (deg. F):	49.0583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	511.8083
Tank Paint Solar Absorptance (Shell):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,193.8870
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0736
Daily Vapor Temperature Range (deg. R):	40.1436
Daily Vapor Pressure Range (psia):	0.0045
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0066
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0041
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0086
Daily Avg. Liquid Surface Temp. (deg R):	516.8667
Daily Min. Liquid Surface Temp. (deg R):	506.8308
Daily Max. Liquid Surface Temp. (deg R):	526.9026
Daily Ambient Temp. Range (deg. R):	24.1833
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9993
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0066
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	0.1223
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0066
Annual Net Throughput (gal/yr.):	6,000.0000
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.3214

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

Emissions Report for: Annual

Carrico Station (Oil Tanks) - Horizontal Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.12	0.20	0.32

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

Identification

User Identification:	Carrico Station - Waste Oil Tank
City:	
State:	West Virginia
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	Waste Oil

Tank Dimensions

Shell Height (ft):	15.00
Diameter (ft):	10.00
Liquid Height (ft) :	15.00
Avg. Liquid Height (ft):	8.00
Volume (gallons):	8,820.00
Turnovers:	12.00
Net Throughput(gal/yr):	105,840.00
Is Tank Heated (y/n):	N

Paint Characteristics

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

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Elkins, West Virginia (Avg Atmospheric Pressure = 13.73 psia)

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

Carrico Station - Waste Oil Tank - Vertical Fixed Roof Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	55.41	46.54	64.27	51.30	0.0061	0.0040	0.0081	130.0000			188.00	Option 1: VP50 = .0045 VP60 = .0074

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

Carrico Station - Waste Oil Tank - Vertical Fixed Roof Tank

Annual Emission Calcaulations	
Standing Losses (lb):	1.8783
Vapor Space Volume (cu ft):	557.9599
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0648
Vented Vapor Saturation Factor:	0.9977
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	557.9599
Tank Diameter (ft):	10.0000
Vapor Space Outage (ft):	7.1042
Tank Shell Height (ft):	15.0000
Average Liquid Height (ft):	8.0000
Roof Outage (ft):	0.1042
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1042
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0061
Daily Avg. Liquid Surface Temp. (deg. R):	515.0759
Daily Average Ambient Temp. (deg. F):	49.0583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	510.9683
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,193.8870
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0648
Daily Vapor Temperature Range (deg. R):	35.4636
Daily Vapor Pressure Range (psia):	0.0041
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0061
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0040
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0081
Daily Avg. Liquid Surface Temp. (deg R):	515.0759
Daily Min. Liquid Surface Temp. (deg R):	506.2100
Daily Max. Liquid Surface Temp. (deg R):	523.9417
Daily Ambient Temp. Range (deg. R):	24.1833
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9977
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0061
Vapor Space Outage (ft):	7.1042
Working Losses (lb):	1.9878
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0061
Annual Net Throughput (gal/yr.):	105,840.0000
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	8,820.0000
Maximum Liquid Height (ft):	15.0000
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	3.8661

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

Emissions Report for: Annual

Carrico Station - Waste Oil Tank - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	1.99	1.88	3.87

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

Identification

User Identification:	Carrico Station (Liquid Loading)
City:	
State:	West Virginia
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	Liquid loading parameter calculations for truck loading of produced fluids

Tank Dimensions

Shell Height (ft):	14.00
Diameter (ft):	10.00
Liquid Height (ft) :	14.00
Avg. Liquid Height (ft):	7.00
Volume (gallons):	8,820.00
Turnovers:	22.86
Net Throughput(gal/yr):	201,600.00
Is Tank Heated (y/n):	N

Paint Characteristics

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

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.00

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Elkins, West Virginia (Avg Atmospheric Pressure = 13.73 psia)

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

Carrico Station (Liquid Loading) - Vertical Fixed Roof Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Produced Water	All	57.20	47.16	67.23	52.14	0.2365	0.1708	0.3240	19.3610			18.17	
Benzene						1.0800	0.8090	1.4225	78.1100	0.0001	0.0004	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Butane (-n)						0.4772	0.3937	0.5736	58.1200	0.0005	0.0009	58.12	Option 2: A=5.09536, B=935.86, C=238.73
Decane (-n)						0.0313	0.0249	0.0394	142.2900	0.0045	0.0006	142.29	Option 1: VP50 = .026411 VP60 = .033211
Ethylbenzene						0.0984	0.0684	0.1390	106.1700	0.0000	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Heptane (-n)						0.5620	0.4123	0.7572	100.2000	0.0008	0.0017	100.20	Option 3: A=37358, B=8.2585
Hexane (-n)						1.7780	1.3561	2.3024	86.1700	0.0010	0.0071	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopentane						9.4118	7.3180	11.8312	72.1500	0.0003	0.0123	72.15	Option 1: VP50 = 7.889 VP60 = 10.005
Nonane (-n)						0.0614	0.0482	0.0782	128.2600	0.0009	0.0002	128.26	Option 1: VP50 = .051285 VP60 = .065278
Octane (-n)						0.1362	0.1051	0.1764	114.2300	0.0009	0.0005	114.23	Option 1: VP50 = .112388 VP60 = .145444
Pentane (-n)						6.4211	5.1036	8.0084	72.1500	0.0006	0.0163	72.15	Option 3: A=27691, B=7.558
Propane (-n)						103.5663	88.7398	120.2028	44.0956	0.0002	0.0657	44.10	Option 2: A=7.340862493, B=1104.2267744, C=291.70993941
Toluene						0.3024	0.2186	0.4120	92.1300	0.0001	0.0001	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2277	0.1634	0.3135	18.0150	0.9900	0.8941	18.02	Option 1: VP50 = .178 VP60 = .247
Xylene (-m)						0.0818	0.0567	0.1160	106.1700	0.0001	0.0000	106.17	Option 2: A=7.009, B=1462.266, C=215.11

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

Carrico Station (Liquid Loading) - Vertical Fixed Roof Tank

Annual Emission Calcaulations	
Standing Losses (lb):	12.8805
Vapor Space Volume (cu ft):	549.7787
Vapor Density (lb/cu ft):	0.0008
Vapor Space Expansion Factor:	0.0846
Vented Vapor Saturation Factor:	0.9193
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	549.7787
Tank Diameter (ft):	10.0000
Vapor Space Outage (ft):	7.0000
Tank Shell Height (ft):	14.0000
Average Liquid Height (ft):	7.0000
Roof Outage (ft):	0.0000
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.0000
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0000
Shell Radius (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0008
Vapor Molecular Weight (lb/lb-mole):	19.3610
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2365
Daily Avg. Liquid Surface Temp. (deg. R):	516.8667
Daily Average Ambient Temp. (deg. F):	49.0583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	511.8083
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,193.8870
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0846
Daily Vapor Temperature Range (deg. R):	40.1436
Daily Vapor Pressure Range (psia):	0.1531
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2365
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1708
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3240
Daily Avg. Liquid Surface Temp. (deg R):	516.8667
Daily Min. Liquid Surface Temp. (deg R):	506.8308
Daily Max. Liquid Surface Temp. (deg R):	526.9026
Daily Ambient Temp. Range (deg. R):	24.1833
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9193
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2365
Vapor Space Outage (ft):	7.0000
Working Losses (lb):	21.9798
Vapor Molecular Weight (lb/lb-mole):	19.3610
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2365
Annual Net Throughput (gal/yr.):	201,600.0000
Annual Turnovers:	22.8571
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	8,820.0000
Maximum Liquid Height (ft):	14.0000
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	34.8603

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

Emissions Report for: Annual

Carrico Station (Liquid Loading) - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Produced Water	21.98	12.88	34.86
Decane (-n)	0.01	0.01	0.02
Nonane (-n)	0.00	0.00	0.01
Ethylbenzene	0.00	0.00	0.00
Octane (-n)	0.01	0.01	0.02
Toluene	0.00	0.00	0.01
Heptane (-n)	0.04	0.02	0.06
Benzene	0.01	0.00	0.01
Hexane (-n)	0.16	0.09	0.25
Isopentane	0.27	0.16	0.43
Pentane (-n)	0.36	0.21	0.57
Water	19.65	11.52	31.17
Propane (-n)	1.44	0.85	2.29
Butane (-n)	0.02	0.01	0.03
Xylene (-m)	0.00	0.00	0.00

ATTACHMENT V

Facility-Wide Emission Summary

ATTACHMENT V – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

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

Emission Point ID#	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		GHG (CO_2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	2.07	9.05	0.45	1.99	0.54	2.35	0.01	0.04	0.14	0.62	0.14	0.62	2,221.76	9,731.29
CE-2	2.07	9.05	0.45	1.99	0.54	2.35	0.01	0.04	0.14	0.62	0.14	0.62	2,221.76	9,731.29
GE-1	0.60	2.63	1.20	5.25	0.46	2.02	1.2E-03	0.01	0.04	0.17	0.04	0.17	238.86	1,046.20
T01	---	---	---	---	0.05	0.23	---	---	---	---	---	---	0.03	0.15
De minimis storage tanks (T02 to T08)	---	---	---	---	0.01	0.03	---	---	---	---	---	---	---	---
L01	---	---	---	---	0.04	0.01	---	---	---	---	---	---	---	---
Fugitives	---	---	---	---	---	0.95	---	---	---	---	---	---	---	1,215.20
Haul Roads	---	---	---	---	---	---	---	---	---	0.08	---	0.01	---	---
FACILITY TOTAL	4.73	20.73	2.11	9.24	1.63	7.95	0.02	0.08	0.32	1.49	0.32	1.42	4,682.39	21,724.12
FACILITY TOTAL (Excluding fugitives)	4.73	20.73	2.11	9.24	1.63	6.99	0.02	0.08	0.32	1.41	0.32	1.41	4,682.39	20,508.92

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
CE-1	0.17	0.72	6.2E-03	2.7E-02	5.8E-03	2.5E-02	5.6E-04	2.5E-03	2.6E-03	1.1E-02	0.02	0.07	0.44	1.93
CE-2	0.17	0.72	6.2E-03	2.7E-02	5.8E-03	2.5E-02	5.6E-04	2.5E-03	2.6E-03	1.1E-02	0.02	0.07	0.44	1.93
GE-1	0.04	0.18	3.2E-03	1.4E-02	1.1E-03	5.0E-03	5.1E-05	2.2E-04	4.0E-04	1.7E-03	---	---	0.07	0.29
T01	---	---	<0.01	2.0E-03	<0.01	1.0E-03	<0.01	<0.01	<0.01	<0.01	3.0E-03	1.3E-02	0.01	0.02
De minimis storage tanks (T02 to T08)	---	---	---	---	---	---	---	---	---	---	---	---	0.01	0.03
L01	---	---	---	---	---	---	---	---	---	---	---	---	3.4E-03	8.9E-04
Fugitives	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FACILITY TOTAL	0.37	1.63	0.02	0.07	0.01	0.06	1.2E-03	0.01	0.01	0.02	0.03	0.15	0.96	4.19
FACILITY TOTAL (Excluding fugitives)	0.37	1.63	0.02	0.07	0.01	0.06	1.2E-03	0.01	0.01	0.02	0.03	0.15	0.96	4.19

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.

Class I Legal Advertisement

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that DTE Appalachia Gathering, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G35D permit for a new natural gas compressor station (Carrico Compressor Station) located off Jakes Run Road (Route 29) and 1 mile south of Pentress, WV and is in Monongalia County, West Virginia. Site Latitude and Longitude Coordinates are: 39.69716, -80.16659.

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

Pollutant	Facility Wide (tpy)	Facility Wide excluding Fugitive Emissions (tpy)
Nitrogen Oxides	20.73	20.73
Carbon Monoxide	9.24	9.24
Particulate Matter-10	1.49	1.41
Particulate Matter-2.5	1.42	1.41
Volatile Organic Compounds	7.95	6.99
Sulfur Dioxide	0.08	0.08
Formaldehyde	1.63	1.63
Benzene	0.07	0.07
Toluene	0.06	0.06
Ethylbenzene	0.01	0.01
Xylenes	0.02	0.02
Hexane	0.15	0.15
Total Hazardous Air Pollutants	4.19	4.19
Carbon Dioxide Equivalents (CO2e)	21,724.12	20,508.92

The facility is currently in operation and is seeking to add additional compression and ancillary equipment. 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 XX Day of January, 2018.

By: DTE Appalachia Gathering, LLC
Adam Snee, Gas Pipeline Engineer
1000 Noble Energy Drive, 5th Floor
Canonsburg, PA 15317