August 29, 2017

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

Tracking No. 1Z 865 F5F 01 9044 9582

RE: DTE Appalachia Gathering, LLC
Daybrook Compressor Station (Facility ID No. 049-00138, Permit No. G35-C064E)
G35-D Construction Application

To Whom It May Concern:

On behalf of DTE Appalachia Gathering, LLC (DTE)[1], we are submitting this G35-D Construction Application to convert the Daybrook Compressor Station's current G35-C permit into a G35-D and correct details regarding source information.

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 $4,000. 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

[1] DTE Appalachia Holdings, LLC purchased 100% of M3 Appalachia Gathering, LLC (M3) and retained the company's Federal Employer Identification Number (FEIN). Subsequently, M3's name was changed to DTE Appalachia Gathering, LLC (DTE). DTE sent a concurrent notification to WVDEP regarding this change.

PROJECT REPORT

DTE Appalachia Gathering, LLC
Daybrook Compressor Station

G35-D Permit Application

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

August 2017

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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 an existing natural gas compressor station located in Marion County, West Virginia (Daybrook Compressor Station or 'Daybrook Station'). The Daybrook Station is currently operating under G35-C permit number G35-C064E. This general permit application seeks to replace the current G35-C permit with a G35-D permit and correct details regarding source information.

DTE is noting that this facility was recently purchased under a multi-asset acquisition. Subsequent to the purchase, DTE completed a comprehensive on-site emissions source verification, and reviewed all available historical permitting files and emission source information. The emissions calculations and information in this permit application represents the best currently available data and the best currently accepted calculation methodology (taking into account DTE's preferences for conservatism and using a current fuel/process gas analysis) for all sources. Therefore, certain discrepancies may exist between the information reflected in the current permit and this application. DTE is requesting that WVDEP issue a G35-D permit which reflects the information contained in this application, which has been certified by the Responsible Official to be true, accurate and complete based on reasonable efforts to provide the most comprehensive and up-to-date information possible.

1.1. FACILITY AND PROJECT DESCRIPTION

The Daybrook Station is an existing natural gas compressor station covered under standard industrial code (SIC) 1311. The station compresses natural gas from nearby wells for transportation across the pipeline.

The station currently consists of the following equipment:

- Two (2) Caterpillar G3516 compressor engines (CE-1 and CE-2), each rated at 1,380 bhp;
- One (1) Caterpillar G3612 compressor engine (CE-3)[1], rated at 3,750 bhp;
- Two (2) Caterpillar G3616 compressor engines (CE-4 and CE-5), each rated at 5,000 bhp;
- One (1) Caterpillar G3608 compressor engine (CE-6), rated at 2,370 bhp;
- One (1) 125 million standard cubic feet per day (MMscfd) triethylene glycol dehydration unit (RSV-1) with associated flash tank, and 1.5 MMBtu/hr reboiler (RBV-1); and
- Several miscellaneous tanks[2].

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:

[1] This source is permitted under the current G35C permit but has yet to be installed. DTE is also noting that a slightly different unit will be installed than that currently listed in the existing G35C permit; therefore, this application also seeks to correct that source's information prior to installation.

[2] Several small exempt tanks will be added at the same time that CE-3 is installed. This application contains a complete listing of all tanks to be located at the station.

"(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 Daybrook Station for air permitting purposes if, and only if, all three elements of the "stationary source" definition above are fulfilled. WVDEP previously determined that the Daybrook Station is a separate stationary source when the current permit was issued, and no other facilities are currently located within a quarter-mile radius of the facility.

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 dehydration unit, 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), carbon monoxide (CO), volatile organic compounds (VOC), and formaldehyde (HCHO) 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.

- **TEG Dehydration Unit:** Potential emissions of hazardous air pollutants (HAPs), volatile organic compounds (VOC), and methane from the dehydration unit are calculated using GRI-GLYCalc v4.0 and a site-specific gas analysis.

- **Storage Tanks and Liquid Loading:** Working, breathing and flashing emissions of VOC and HAPs from the waste fluid tanks 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.[3]

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.

[3] 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 remain a minor source with respect to the NSR program after the project 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 Marion County, which is designated as attainment/unclassifiable for all criteria pollutants.[4] 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 after the proposed project. Therefore, the facility is not a major source for Title V purposes.

[4] 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 GG – Stationary Gas Turbines
- 40 CFR Part 60 Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines
- 40 CFR Part 60 Subpart KKKK – Stationary Combustion Turbines
- 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 project 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 GG – Stationary Gas Turbines

Subpart GG, Standards of Performance for Stationary Gas Turbines, applies to all gas turbines with a heat input at peak load greater than or equal to 10 MMBtu/hr based on the lower heating value of the fuel fired. This standard was promulgated in 1979. The applicability of Subpart KKKK, promulgated in 2006, is similar to that of Subpart GG and applies to stationary combustion turbines that commence construction after February 18, 2005. There are no gas turbines located at the facility.

3.3.4. 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. All compressor engines are 4-stroke, lean burn spark ignition RICE, and rated anywhere from 1,380 to 5,000 bhp. As such, the engines are 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.

3.3.5. NSPS Subpart KKKK – Stationary Combustion Turbines

Subpart KKKK, Standards of Performance for Stationary Combustion Turbines, applies to stationary combustion units with a heat input at peak load equal to or greater than 10 MMBtu/hr, based on the higher heating value of the fuel, commencing construction after February 18, 2005. There are no turbines at the facility.

3.3.6. 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. With the exception of the compressor engine yet to be installed (CE-3), all reciprocating compressors are subject to this rule. The reciprocating compressors are 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 are also subject to the recordkeeping and annual reporting requirements of the rule. There are no other facilities subject to this regulation (pneumatic controllers are either intermittent or low bleed, and storage tank emissions are less than 6 tpt VOC).

3.3.7. 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 and processing 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 compressor associated with CE-3 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 compressor will also be subject to the recordkeeping and annual reporting requirements of the rule.

As a result of the installation of an additional compressor, the applicant 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. The applicant 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 currently at or 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 involved in this project.

3.3.8. 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 project.

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 benzene emissions from the dehydrator vent will be less than 0.90 megagrams per year (1 tpy), therefore, the facility is exempt from the requirements of NESHAP Subpart HH pursuant to 40 CFR §63.764(e)(1)(ii), except for the requirement to keep records of the actual average natural gas flow rate or actual average benzene emissions from the dehydrator, per 40 CFR §63.774(d)(1). The applicant will continue to comply with the requirements of Subpart HH.

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 have or will have commenced construction after this date, and are therefore 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 and generator engines fall into this category. Therefore, the 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. The reboiler is fueled by natural gas and thus exempt from this subpart, and there are no other 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". The reboiler is a fuel burning unit and therefore must comply with this regulation. Per 45 CSR 2-3, opacity of emissions from units shall not exceed 10 percent, based on a six-minute block average. Note that as the reboiler is less than 10 MMBtu/hr, it is exempt from PM emission limits.

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. The reboiler is rated less than 10 MMBtu/hr and as such is exempt from this rule.

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: 333 Technology Drive, Suite 255

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

Facility Name: Daybrook Compressor Station

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

City: Fairview | Zip Code: 26570 | County: Marion

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.57751
Longitude: -80.20288

SIC Code: 1311

NAICS Code: 211111

DAQ Facility ID No. (For existing facilities)
049-00138

CERTIFICATION OF INFORMATION

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

I hereby certify that is an Authorized Representative and in that capacity shall represent the interest of the business (e.g., Corporation, Partnership, Limited Liability Company, Association Joint Venture or Sole Proprietorship) and may obligate and legally bind the business. If the business changes its Authorized Representative, a Responsible Official shall notify the Director of the Division of Air Quality immediately.

I hereby certify that all information contained in this G35-D General Permit Registration Application and any supporting documents appended hereto is, to the best of my knowledge, true, accurate and complete, and that all reasonable efforts have been made to provide the most comprehensive information possible.

Responsible Official Signature: _____
Name and Title: Kenneth Magyar, VP, Project Development & Business Development
Phone: (724) 416-7263 Fax: n/a
Email: Kenneth.Magyar@dteenergy.com Date: August 25, 2017

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

If applicable:
Environmental Contact L Connelly
Name and Title: Ian Connelly, Gas Pipeline Engineer Phone: (724) 916-4938 Fax:
Email: ian.connelly@dteenergy.com Date: August 25, 2017

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 135 mi). Take exit 136 toward Stoney Rd (travel 0.4 mi). Turn left onto Fairmont Gateway Connector N (travel 0.8 mi). At the traffic circle, take the 2nd exit and stay on Fairmont Gateway Connector N (travel 0.2 mi). Continue onto Jefferson St (travel 0.4 mi). Turn left onto Jackson St (travel 0.1 mi). Keep right to stay on Jackson St. Turn right onto US-250 N/Cleveland Ave (travel 1.7 mi). Turn right onto Barrackville Rd (travel 0.2 mi). Continue onto Pike St (travel 1.6 mi). Continue onto Monumental Rd (travel 4.3 mi). Slight left onto Paw Paw Creek Rd (travel 0.6 mi). Turn right onto Toothman Run (travel 0.7 mi). The entrance of the facility will be on the right side.

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	
☒ Blowdown and Pigging Operations Data Sheet – Attachment S	
☒ Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment T	
☒ Emission Calculations (please be specific and include all calculation methodologies used) – Attachment U	
☒ Facility-wide Emission Summary Sheet(s) – Attachment V	
☒ Class I Legal Advertisement – Attachment W	
☒ One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments	

All attachments must be identified by name, divided into sections, and submitted in order.

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

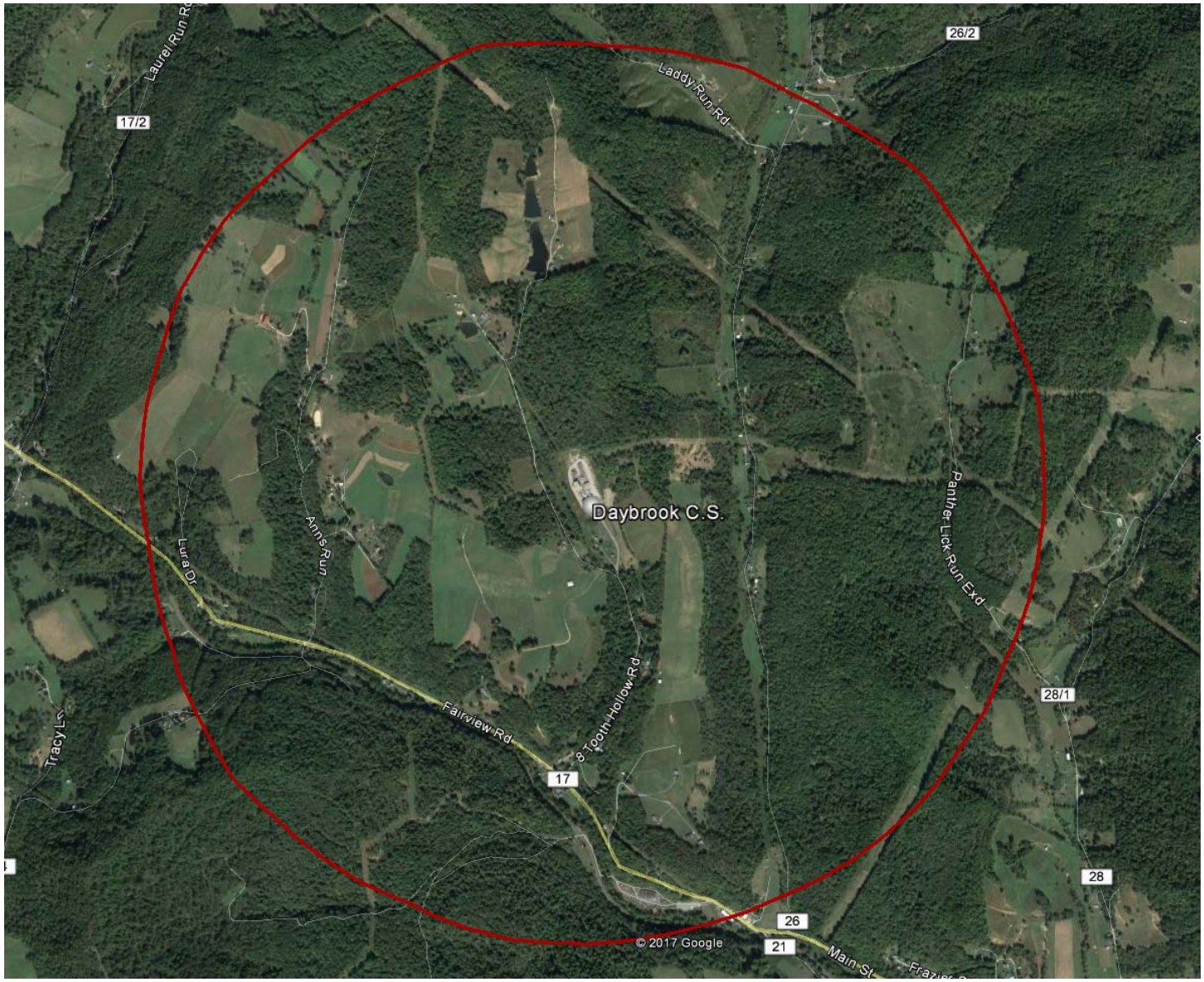


Figure 1 - Map of Location with 1 Mile Radius Circle

Coordinates:
Latitude: 39° 34' 36" N, Longitude: -80° 12' 08" 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.

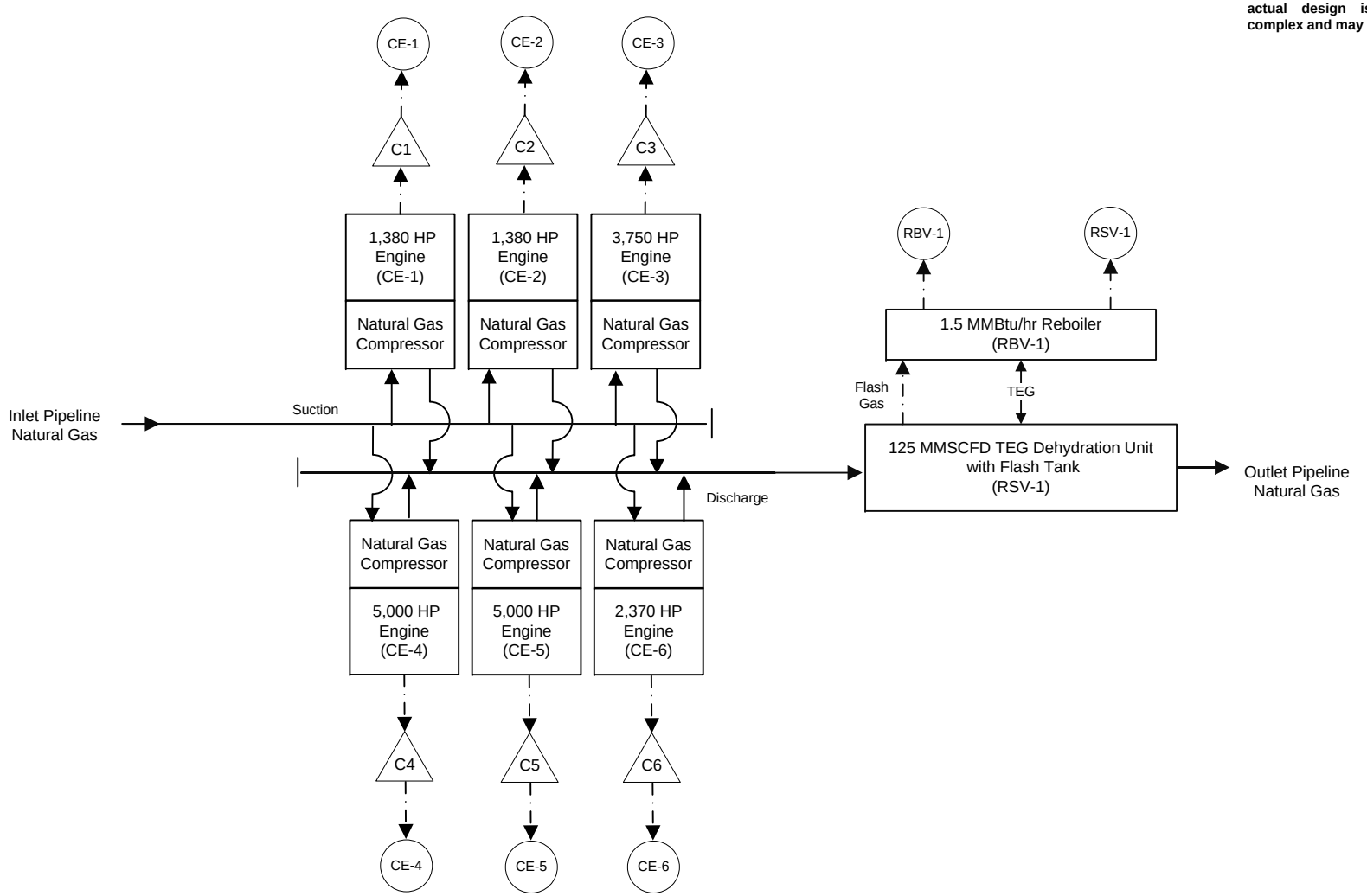
Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

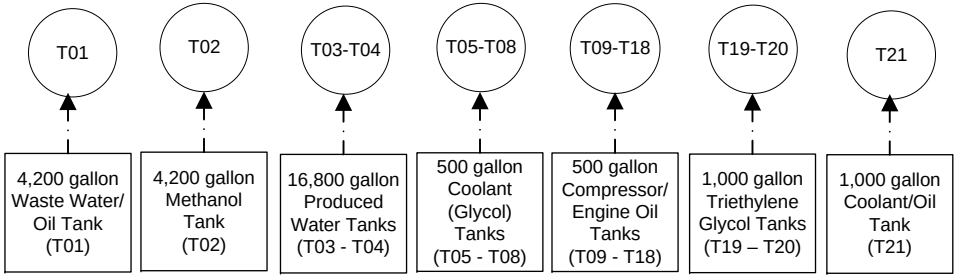
TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

atL006 v.4
L2060078272

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
Daybrook Compressor Station

Trinity Consultants

August 2017

ATTACHMENT E

Process Description

ATTACHMENT E: PROCESS DESCRIPTION

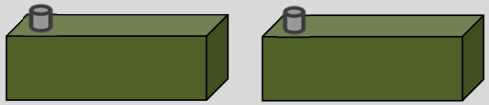
The Daybrook Compressor Station compresses and dehydrates natural gas from production wells prior to transmission along the pipeline system. Reciprocating compressors utilize the power created by reciprocating internal combustion engines (RICE) to compress (raise the pressure of) the incoming gas stream. Subsequently, the gas stream passes through triethylene glycol (TEG) dehydration unit, will introduces TEG to the stream in a contact tower to absorb water vapor from the gas to meet customer specifications. The TEG is then sent to the natural gas-fired reboiler, which uses heat to evaporate entrained water from the TEG. The TEG is then discharged back to the contact tower for reuse. The natural gas stream from the contact tower flows into the pipeline to be transported further along the pipeline system. The compressor engines' exhaust streams are controlled by oxidation catalysts.

A process flow diagram is included as Attachment D.

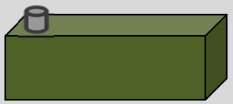
Plot Plan

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

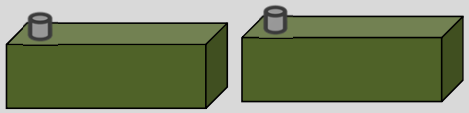
Entrance to facility



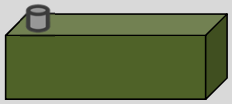
Compressor Engines
CE-1 to CE-2
1,380 HP



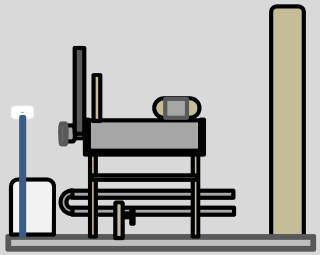
Compressor Engine
CE-3
3,750 HP



Compressor Engines
CE-4 to CE-5
5,000 HP



Compressor Engine
CE-6
2,370 HP



Tri-ethylene Glycol Dehy
RSV-1 (125 MMSCFD)
RBV-1 (1.5 MMbtu/hr)

Miscellaneous Tanks
T01 to T21
(Various Sizes)

Attachment F

Plot Plan

Area Map

ATTACHMENT G: AREA MAP

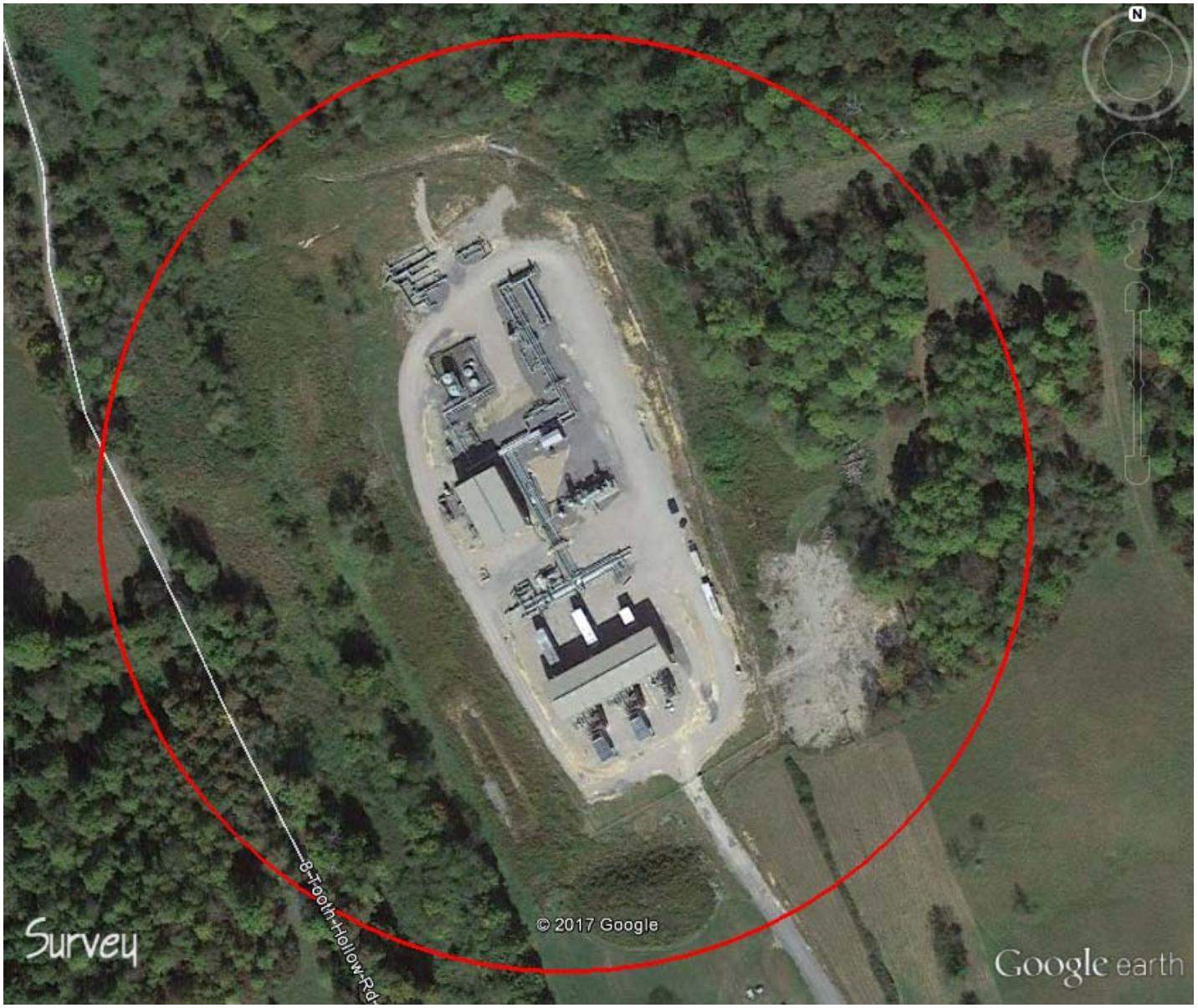


Figure 1 - Map of Location with 300 foot Boundary Circle

UTM Northing (KM): 4,381.091 UTM Easting (KM): 568.495 Elevation: ~1,120 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 G3516 Compressor Engine	2012	2012	1,380 HP	Existing	C1	---
CE-2	CE-2	Caterpillar G3516 Compressor Engine	2012	2012	1,380 HP	Existing	C2	---
CE-3	CE-3	Caterpillar G3612 Compressor Engine	TBD	TBD	3,750 HP	New*	C3	---
CE-4	CE-4	Caterpillar G3616 Compressor Engine	2014	2014	5,000 HP	Existing	C4	---
CE-5	CE-5	Caterpillar G3616 Compressor Engine	2014	2014	5,000 HP	Existing	C5	---
CE-6	CE-6	Caterpillar G3608 Compressor Engine	2014	2014	2,370 HP	Existing	C6	---
RSV-1	RSV-1	125 MMSCFD Dehydration Unit	2012	2012	125 MMSCFD	Existing	RBV-1	
RBV-1	RBV-1	1.5 MMBtu/hr Reboiler	2012	2012	1.5 MMBTU/hr	Existing	None	
T01	T01	Waste Water/Oil Tank	2012	2012	4,200 Gallons	Existing	None	---
T02	T02	Methanol Tank	2012	2012	4,200 Gallons	Existing	None	---
T03	T03	Produced Water Tank	2012	2012	16,800 Gallons	Existing	None	---
T04	T04	Produced Water Tank	2012	2012	16,800 Gallons	Existing	None	---
T05-T21	T05-T21	De Minimis Storage Tanks**	Varies	Varies	Varies	Varies	None	---
L01	L01	Liquid Loading	---	---	453,600 Gallons	Existing	None	---
---	---	Fugitives	---	---	---	Existing	None	---
---	---	Haul Roads	---	---	---	Existing	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.

*** Although currently listed in the permit, this source has yet to be installed. Therefore, since this application seeks a new permit, the status is noted as 'New'.**

**** See 'STORAGE TANK DATA TABLE' for details on all de minimis tanks**

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	1	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	0.19	6.8E-04	0.04
Valves	☐ Yes ☒ No	168	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	0.25	8.7E-04	19.48
Safety Relief Valves	☐ Yes ☒ No	11	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	0.28	9.9E-04	1.89
Open Ended Lines	☐ 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	1.3E-03	4.4E-06	0.79
Sampling Connections	☐ Yes ☒ No	---	N/A	☐ Gas ☐ Liquid ☐ Both	---	---	---
Connections (Not sampling)	☐ Yes ☒ No	752	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	0.34	1.2E-03	9.68
Compressors	☐ Yes ☒ No	6	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	0.34	1.2E-03	107.46
Flanges	☐ Yes ☐ No	---	(included in connections)	☐ Gas ☐ Liquid ☐ Both	---	---	---
Other[1]	☐ Yes ☒ No	41	Pneumatic Controllers 40 CFR 98 Subpart W	☒ Gas ☐ Liquid ☐ Both	1.27	4.5E-03	1,077.00

[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 Daybrook Compressor Station	2. Tank Name Waste Water/Oil 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. 4,200 gallons	
9A. Tank Internal Diameter (ft.) 9.5	9B. Tank Internal Height (ft.) 8
10A. Maximum Liquid Height (ft.) 8	10B. Average Liquid Height (ft.) 4
11A. Maximum Vapor Space Height (ft.) 8	11B. Average Vapor Space Height (ft.) 4
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume". 4,200 gallons	
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 Water Tank	0.052	0.229	<0.01	<0.01	<0.01	<0.01	0.052	0.229	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.

Emissions values are on a per-tank basis

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): 0.00	
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.			

GENERAL INFORMATION

1. Bulk Storage Area Name Daybrook Compressor Station	2. Tank Name Methanol
3. Emission Unit ID number T02	4. Emission Point ID number T02
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. 4,200 gallons	
9A. Tank Internal Diameter (ft.) 9.5	9B. Tank Internal Height (ft.) 8
10A. Maximum Liquid Height (ft.) 8	10B. Average Liquid Height (ft.) 4
11A. Maximum Vapor Space Height (ft.) 8	11B. Average Vapor Space Height (ft.) 4
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume". 4,200 gallons	
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	
Methanol Tank	<0.01	<0.01	0.010	0.043	0.006	0.025	0.016	0.069	EPA Tanks 4.0.9d

[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.

Emissions values are on a per-tank basis

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): 0.00

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 EPA Tanks 4.0.9d 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 EPA Tanks 4.0.9d 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.			

GENERAL INFORMATION

1. Bulk Storage Area Name Daybrook Compressor Station	2. Tank Name Produced Water Tanks
3. Emission Unit ID number T03 to T04	4. Emission Point ID number T03 to T04
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	
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 gallons	
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 Water Tank	0.105	0.459	<0.01	<0.01	<0.01	<0.01	0.105	0.459	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.

Emissions values are on a per-tank basis

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): 0.00

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]
T05	Existing*	Coolant (Glycol) Tank	500 Gallon
T06	Existing*	Coolant (Glycol) Tank	500 Gallon
T07	Existing*	Coolant (Glycol) Tank	500 Gallon
T08	Existing*	Coolant (Glycol) Tank	500 Gallon
T09	Existing*	Engine/Compressor Oil Tank	500 Gallon
T10	Existing*	Engine/Compressor Oil Tank	500 Gallon
T11	Existing*	Engine/Compressor Oil Tank	500 Gallon
T12	Existing*	Engine/Compressor Oil Tank	500 Gallon
T13	Existing*	Engine/Compressor Oil Tank	500 Gallon
T14	Existing*	Engine/Compressor Oil Tank	500 Gallon
T15	Existing*	Engine/Compressor Oil Tank	500 Gallon
T16	Existing*	Engine/Compressor Oil Tank	500 Gallon
T17	Existing*	Engine/Compressor Oil Tank	500 Gallon
T18	Existing*	Engine/Compressor Oil Tank	500 Gallon
T19	Existing*	Triethylene Glycol (TEG) Tank	1,000 Gallon
T20	Existing*	Triethylene Glycol (TEG) Tank	1,000 Gallon
T21	Existing*	Coolant/Oil Tank	1,000 Gallon

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.

*** The facility includes existing tanks and will be installing new tanks, however this permit application seeks to revise the list of tanks to ensure completeness and correctness. The permit application forms include a complete listing of tanks; the applicant is requesting that the issued permit reflect the forms (all tanks are listed as 'Existing*').**

Natural Gas Fired Fuel Burning Unit Data Sheet(s)

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

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

Emission Unit ID#[1]	Emission Point ID#[2]	Emission Unit Description (manufacturer, model #)	Year Installed/ Modified	Type[3] and Date of Change	Maximum Design Heat Input (MMBTU/hr)[4]	Fuel Heating Value (BTU/scf)[5]
RBV-1	RBV-1	Reboiler	2012	Existing	1.5	~1,072

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 to CE-2	CE-3	CE-4 to CE-5	CE-6
Engine Manufacturer/Model	Caterpillar G3516	Caterpillar G3612	Caterpillar G3616	Caterpillar G3608
Manufacturers Rated bhp/rpm	1,380	3,750	5,000	2,370
Source Status[2]	Existing	Existing*	Existing	Existing
Date Installed/ Modified/Removed/Relocated[3]	2012	TBD	2014	2014
Engine Manufactured /Reconstruction Date[4]	2012	TBD	2014	2014
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	4SLB	4SLB	4SLB
APCD Type[7]	OxCat	OxCat	OxCat	OxCat
Fuel Type[8]	PQ	PQ	PQ	PQ
H_2S (gr/100 scf)	Neg.	Neg.	Neg.	Neg.
Operating bhp/rpm	1,380	3,750	5,000	2,370
BSFC (BTU/bhp-hr)	8,257	7,431	7,511	7,531
Hourly Fuel Throughput	10,627 ft^3/hr	25,989 ft^3/hr	35,025 ft^3/hr	16,646 ft^3/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	11.39 MMft^3/yr	27.87 MMft^3/yr	37.56 MMft^3/yr	17.85 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]	Annual PTE (tpy)[11]	Hourly PTE (lb/hr)[11]	Annual PTE (tpy)[11]	Hourly PTE (lb/hr)[11]	Annual PTE (tpy)[11]	Hourly PTE (lb/hr)[11]	Annual PTE (tpy)[11]
See Emissions Calculations	NO_X	1.52	6.66	4.13	18.11	5.51	24.14	2.61	11.44
See Emissions Calculations	CO	6.08	26.65	1.50	6.55	1.65	7.24	0.99	4.34
See Emissions Calculations	VOC	1.58	6.93	2.40	10.50	3.42	14.97	1.67	7.32
See Emissions Calculations	SO_2	0.01	0.03	0.02	0.07	0.02	0.10	0.01	0.05
See Emissions Calculations	PM_{10}	0.11	0.50	0.28	1.22	0.38	1.64	0.18	0.78
See Emissions Calculations	Formaldehyde	0.12	0.53	0.33	1.45	0.66	2.90	0.31	1.37
See Emissions Calculations	Total HAPs	0.34	1.50	0.87	3.82	1.39	6.09	0.66	2.87
See Emissions Calculations	GHG (CO_2e)	1,744	7,639	4,198	18,385	5,509	24,127	3,000	13,141

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.

*** Although currently listed in the permit, this source has yet to be installed. Therefore, since this application seeks a new permit, the status is noted as 'New'.**

Engine Air Pollution Control Device
(Emission Unit ID# CE-1 to 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 #: RT-2415-H (or equivalent)
Design Operating Temperature: 992 ºF	Design gas volume: 9,126 acfm
Service life of catalyst: TBD	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: 9,126 acfm at 992 ºF	Operating temperature range for NSCR/Ox Cat: From 600 ºF to 1,250 ºF
Reducing agent used, if any: N/A	Ammonia slip (ppm): N/A

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

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

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,

Engine Air Pollution Control Device
(Emission Unit ID# CE-3, 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: Maxim Silencers (or equivalent)	Model #: MCCOG4-8-3026-C3 (or equivalent)
Design Operating Temperature: 848 °F	Design gas volume: 23,795 acfm
Service life of catalyst: TBD	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: 23,795 acfm at 848 °F	Operating temperature range for NSCR/Ox Cat: From 842 °F to 928 °F
Reducing agent used, if any: N/A	Ammonia slip (ppm): N/A

Pressure drop against catalyst bed (delta P): ~3.02 inches of H_2O

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

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,

Engine Air Pollution Control Device
(Emission Unit ID# CE-4 to CE-5, 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 #: EBH-9000-3036F-6C4E-48 (or equivalent)
Design Operating Temperature: 858 ºF	Design gas volume: 31,207 acfm
Service life of catalyst: TBD	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: 31,207 acfm at 858 ºF	Operating temperature range for NSCR/Ox Cat: From 600 ºF to 1,250 ºF
Reducing agent used, if any: N/A	Ammonia slip (ppm): N/A

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

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

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,

Engine Air Pollution Control Device
(Emission Unit ID# CE-6, use extra pages as necessary)

Air Pollution Control Device Manufacturer's Data Sheet included?
Yes ☐ No ☒ ***Source is in current permit***

☐ NSCR ☐ SCR ☒ Oxidation Catalyst

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

Manufacturer: Unknown	Model #: Unknown
Design Operating Temperature: 858 °F	Design gas volume: 16,106 acfm
Service life of catalyst: TBD	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: 16,106 acfm at 858 °F	Operating temperature range for NSCR/Ox Cat: From °F to °F
Reducing agent used, if any: N/A	Ammonia slip (ppm): N/A

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

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

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,

G3516B

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Exterran
M3 Midstream, LLC

CATERPILLAR®

CE-1 & CE-2

ENGINE SPEED (rpm):	1400	FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL
COMPRESSION RATIO:	8:1		
AFTERCOOLER - STAGE 2 INLET (°F):	130	**SITE CONDITIONS:**	
AFTERCOOLER - STAGE 1 INLET (°F):	201	FUEL:	Gas Analysis
JACKET WATER OUTLET (°F):	210	FUEL PRESSURE RANGE(psig):	7.0-50.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	89.4
IGNITION SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	929
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	1400
COMBUSTION:	Ultra Lean Burn	MAXIMUM INLET AIR TEMPERATURE(°F):	100
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	NAMEPLATE RATING:	1380 bhp@1400rpm
SET POINT TIMING:	31.6		

			MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING	**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(1)	bhp	1380	1380	1035	690
INLET AIR TEMPERATURE		°F	100	100	100	100
ENGINE DATA						
FUEL CONSUMPTION (LHV)	(2)	Btu/bhp-hr	7442	7442	7971	8561
FUEL CONSUMPTION (HHV)	(2)	Btu/bhp-hr	8257	8257	8844	9499
AIR FLOW	(3)(4)	lb/hr	13860	13860	10872	7601
AIR FLOW WET (77°F, 14.7 psia)	(3)(4)	scfm	3126	3126	2452	1714
INLET MANIFOLD PRESSURE	(5)	in Hg(abs)	94.6	94.6	76.8	54.0
EXHAUST STACK TEMPERATURE	(6)	°F	992	992	986	1006
EXHAUST GAS FLOW (@ stack temp, 14.5 psia)	(7)(4)	ft3/min	9106	9106	7122	5054
EXHAUST GAS MASS FLOW	(7)(4)	lb/hr	14341	14341	11258	7877
EMISSIONS DATA						
NOx (as NO2)	(8)	g/bhp-hr	0.50	0.50	0.50	0.50
CO	(8)	g/bhp-hr	2.43	2.43	2.60	2.55
THC (mol. wt. of 15.84)	(8)	g/bhp-hr	4.75	4.75	5.09	5.17
NMHC (mol. wt. of 15.84)	(8)	g/bhp-hr	0.71	0.71	0.76	0.77
NMNEHC (VOCs) (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	0.48	0.48	0.51	0.52
HCHO (Formaldehyde)	(8)	g/bhp-hr	0.43	0.43	0.43	0.42
CO2	(8)	g/bhp-hr	472	472	504	548
EXHAUST OXYGEN	(10)	% DRY	9.0	9.0	8.7	8.3
HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(11)	Btu/min	23634	23634	21718	20074
HEAT REJ. TO ATMOSPHERE	(11)	Btu/min	6110	6110	5092	4074
HEAT REJ. TO LUBE OIL (OC)	(11)	Btu/min	4449	4449	3947	3323
HEAT REJ. TO A/C - STAGE 1 (1AC)	(11)(12)	Btu/min	12581	12581	10513	3829
HEAT REJ. TO A/C - STAGE 2 (2AC)	(11)(12)	Btu/min	5629	5629	5299	3441

HEAT EXCHANGER SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(12)(13)	Btu/min	44546
TOTAL AFTERCOOLER CIRCUIT (2AC)	(12)(13)	Btu/min	5910
A cooling system safety factor of 0% has been added to the heat exchanger sizing criteria.			

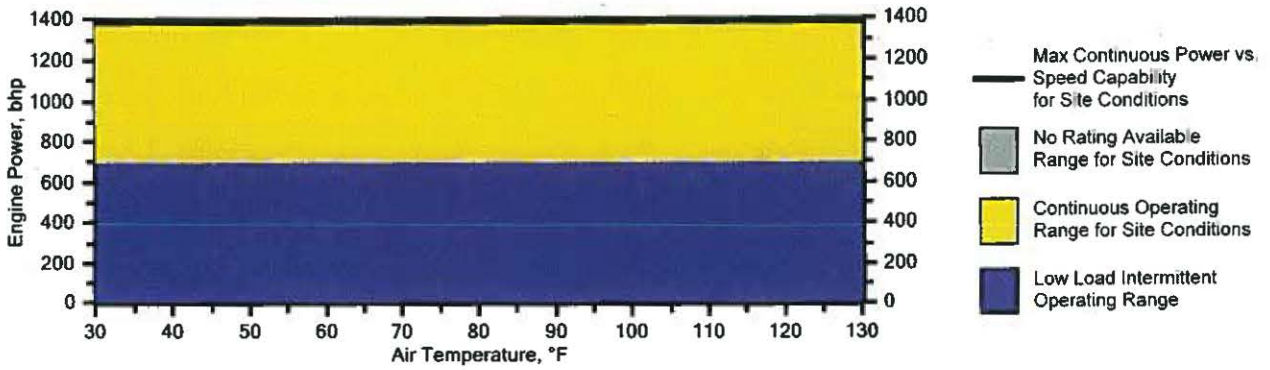
CONDITIONS AND DEFINITIONS
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature.
100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet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

For notes information consult page three.

PREPARED BY: Doug kern, Exterran
Data generated by Gas Engine Rating Pro Version 3.04.00
Ref. Data Set DM8800-04-002, Printed 06Apr2011

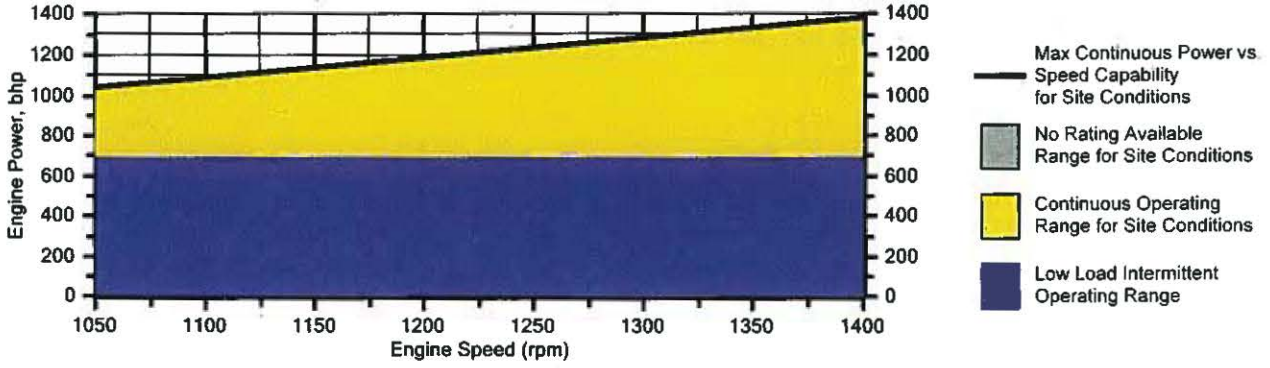
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1400 ft and 1400 rpm



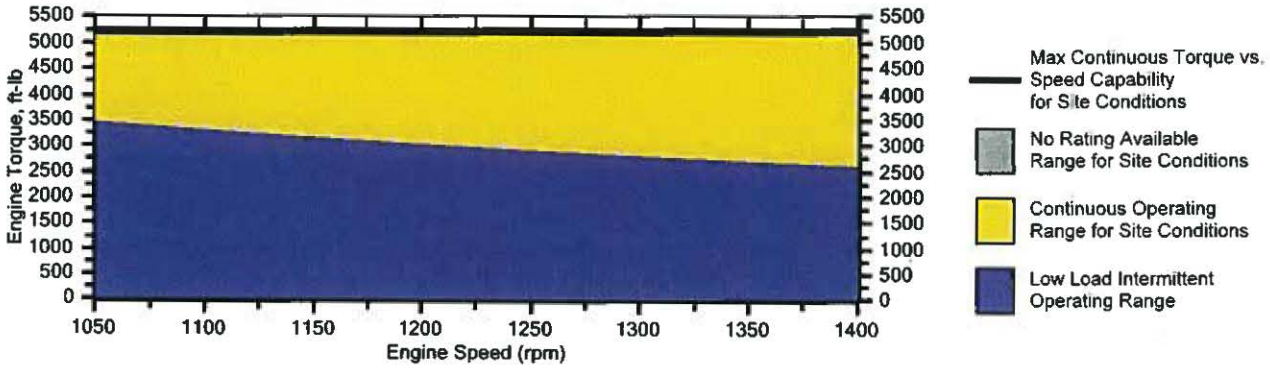
Engine Power vs. Engine Speed

Data represents speed sweep at 1400 ft and 100 °F



Engine Torque vs. Engine Speed

Data represents speed sweep at 1400 ft and 100 °F



Note: At site conditions of 1400 ft and 100°F inlet air temp., constant torque can be maintained down to 1050 rpm. The minimum speed for loading at these conditions is 1050 rpm.

PREPARED BY: Doug kern, Exterran
Data generated by Gas Engine Rating Pro Version 3.04.00
Ref. Data Set DM8800-04-002, Printed 06Apr2011

NOTES

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

2. Fuel consumption tolerance is ± 3.0% of full load data.

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

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

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

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

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

8. Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions, adjusted to the specified NOx level at 100% load. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

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

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

11. 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.

12. 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.

13. Heat exchanger sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

10497 Town & Country Way, Ste. 940
Houston, TX 77024
Office: 307.673.0883 | Direct: 307.675.5078
bwaggener@emittechnologies.com

Prepared For:
Joey Owens
TECHNICAL COMPLIANCE SOLUTIONS

QUOTE: QUO-13970-B6F9
Expires: November 20, 2014

INFORMATION PROVIDED BY CATERPILLAR

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

Uncontrolled Emissions

	g/bhp-hr	Lb/Hr	Tons/Year
NOx:	0.50	1.52	6.66
CO:	2.43	7.39	32.38
THC:	4.77	14.51	63.56
NMHC	0.72	2.19	9.59
NMNEHC:	0.48	1.46	6.40
HCHO:	0.44	1.34	5.86
O2:	9.00 %		

POST CATALYST EMISSIONS

	% Reduction	g/bhp-hr	Lb/Hr	Tons/Year
HCHO:	>92 %	<0.04	<0.11	<0.47

CONTROL EQUIPMENT

Catalyst Element

Model:	RT-2415-H
Catalyst Type:	Oxidation, Premium Precious Group Metals
Substrate Type:	BRAZED
Manufacturer:	EMIT Technologies, Inc
Element Quantity:	3
Element Size:	Rectangle 24" x 15" x 3.5"
Estimated Lead Time:	7-10 Business Days to Ship

10497 Town & Country Way, Ste. 940
Houston, TX 77024
Office: 307.673.0883 | Direct: 307.675.5078
bwaggener@emittechnologies.com

WARRANTY

EMIT Technologies, Inc. warrants that the goods supplied will be free from defects in workmanship by EMIT Technologies, Inc. for a period of two (2) years from date of shipment. EMIT Technologies, Inc. will not be responsible for any defects which result from improper use, neglect, failure to properly maintain or which are attributable to defects, errors or omissions in any drawings, specifications, plans or descriptions, whether written or oral, supplied to EMIT Technologies, Inc. by Buyer.

Catalyst performance using an EMIT Air/Fuel ratio controller is dependent upon properly defined set-points, variable with engine and fuel gas composition. Air/fuel ratio controller performance is guaranteed, but not limited, to fuel gas with a HHV content of 1400 BTU/SCF.

Catalyst performance will be guaranteed for a period of 1 year from installation, or 8760 operating hours, whichever comes first. The catalyst shall be operated with an automatic air/fuel ratio controller. The performance guarantee shall not cover the effects of excessive ash masking due to operation at low load, improper engine maintenance, or inappropriate lubrication oil. The performance guarantee shall not cover the effects of continuous engine misfires (cylinder or ignition) exposing the catalyst to excessive exothermic reaction temperatures. In most cases, excluding thermal deactivation, catalyst performance is redeemable by means of proper washing (refer to EMIT Catalyst/Silencer Housing Manual for element wash information, or contact a local EMIT Sales representative).

The exhaust temperature operating range at the converter inlet is a minimum of 600°F for oxidation catalyst and 750 °F for NSCR catalyst, and a maximum of 1250°F.

If a properly functioning, high temperature shut down switch is not installed, thermal deactivation of catalyst at sustained temperatures above 1250°F is not covered. If excessive exposure to over oxygenation of NSCR catalyst occurs due to improperly functioning or non-existent Air/Fuel ratio control, then deactivation of catalyst is not warranted.

The catalyst conversion efficiencies (% reduction) will be guaranteed for engine loads of 50 to 100 percent. Standard Oxidation Catalyst conversion efficiencies (% reduction) will be guaranteed for fuel gas containing less than 1.5% mole fraction of non-methane, non-ethane hydrocarbons. Applications where fuel gas exceeds this level will require a Premium Oxidation Catalyst to maintain guaranteed VOC conversion efficiencies.

Engine lubrication oil shall contain less than 0.5 wt% Sulfated Ash with a maximum allowable specific oil consumption of 0.7 g/bhp-hr. The catalyst shall be limited to a maximum ash loading of 0.022 lb/ft3. Phosphorous and zinc additives are limited to 0.03 wt%. New or Reconstructed engines must operate for a minimum of 50 hours prior to catalyst installation, otherwise the warranty is void.

The catalyst must not be exposed to the following know poisoning agents, including: antimony, arsenic, chromium, copper, iron, lead, lithium, magnesium, mercury, nickel, phosphorous, potassium, silicon, sodium, sulfur, tin, and zinc. Total poison concentrations in the fuel gas must be limited to 0.25 ppm or less for catalyst to function properly.

Shipment - Promised shipping dates are approximate lead times from the point of manufacture and are not guaranteed. EMIT Technologies, Inc. will not be liable for any loss, damage or delay in manufacture or delivery resulting from any cause beyond its control including, but not limited to a period equal to the time lost by reason of that delay. All products will be crated as per best practice to prevent any damage during shipment. Unless otherwise specified, Buyer will pay for any special packing and shipping requirements. Acceptance of goods by common carrier constitutes delivery to Buyer. EMIT Technologies, Inc. shall not be responsible for goods damaged or lost in transit.

Terms: Credit is extended to purchaser for net 30 time period. If payment is not received in the net 30 timeframe, interest on the unpaid balance will accrue at a rate of 1.5% per month from the invoice date.

Order Cancellation Terms: Upon cancellation of an order once submittal of a Purchase Order has occurred, the customer will pay a 25% restocking fee for Catalyst Housings, Catalyst Elements, and Air/Fuel Ratio Controllers; 50% restocking fee for Cooler Top Solutions Exhaust System Accessories, and other Custom Built Products; 100% of all associated shipping costs incurred by EMIT; 100% of all project expenses incurred by EMIT for Field Services.

G3612

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
99488 DTE Energy Daybrook 3612

CE-3

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:	92.0
CONTROL SYSTEM:	ADEM4	FUEL LHV (Btu/scf):	928
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	1615
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	100
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	3750 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	3750	3750	2813	1875
INLET AIR TEMPERATURE		°F	100	100	100	100
ENGINE DATA						
FUEL CONSUMPTION (LHV)	(3)	Btu/bhp-hr	6699	6699	6901	7367
FUEL CONSUMPTION (HHV)	(3)	Btu/bhp-hr	7431	7431	7655	8171
AIR FLOW (@inlet air temp, 14.7 psia) (WET)	(4)(5)	ft3/min	9408	9408	7111	4877
AIR FLOW (WET)	(4)(5)	lb/hr	40000	40000	30234	20738
FUEL FLOW (60ºF, 14.7 psia)		scfm	451	451	349	248
INLET MANIFOLD PRESSURE	(6)	in Hg(abs)	97.1	97.1	73.7	52.0
EXHAUST TEMPERATURE - ENGINE OUTLET	(7)	°F	850	850	904	973
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia) (WET)	(8)(5)	ft3/min	23476	23476	18503	13352
EXHAUST GAS MASS FLOW (WET)	(8)(5)	lb/hr	41179	41179	31145	21387
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	2.19	2.19	2.19	2.19
THC (mol. wt. of 15.84)	(9)(10)	g/bhp-hr	3.95	3.95	4.14	4.13
NMHC (mol. wt. of 15.84)	(9)(10)	g/bhp-hr	0.37	0.37	0.38	0.38
NMNEHC (VOCs) (mol. wt. of 15.84)	(9)(10)(11)	g/bhp-hr	0.25	0.25	0.26	0.26
HCHO (Formaldehyde)	(9)(10)	g/bhp-hr	0.20	0.20	0.21	0.24
CO2	(9)(10)	g/bhp-hr	418	418	431	460
EXHAUST OXYGEN	(9)(12)	% DRY	11.4	11.4	11.1	10.7
HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(13)	Btu/min	39518	39518	32130	26892
HEAT REJ. TO ATMOSPHERE	(13)	Btu/min	17707	17707	16913	13961
HEAT REJ. TO LUBE OIL (OC)	(13)	Btu/min	18843	18843	17146	15195
HEAT REJ. TO A/C - STAGE 1 (1AC)	(13)(14)	Btu/min	36228	36228	16657	3246
HEAT REJ. TO A/C - STAGE 2 (2AC)	(13)(14)	Btu/min	7148	7148	5241	3453

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+1AC)	(14)(15)	Btu/min	81509
TOTAL STAGE 2 AFTERCOOLER CIRCUIT (OC+2AC)	(14)(15)	Btu/min	30117
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

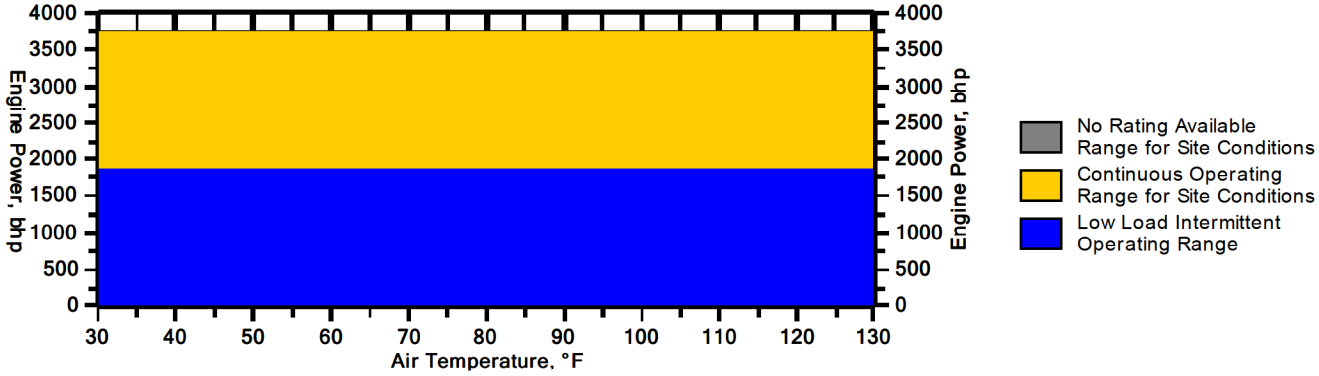
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating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

For notes information consult page three.

PREPARED BY: Kevin Guinn, Exterran
Data generated by Gas Engine Rating Pro Version 6.04.00
Ref. Data Set EM0755-09-001, Printed 22Feb2017

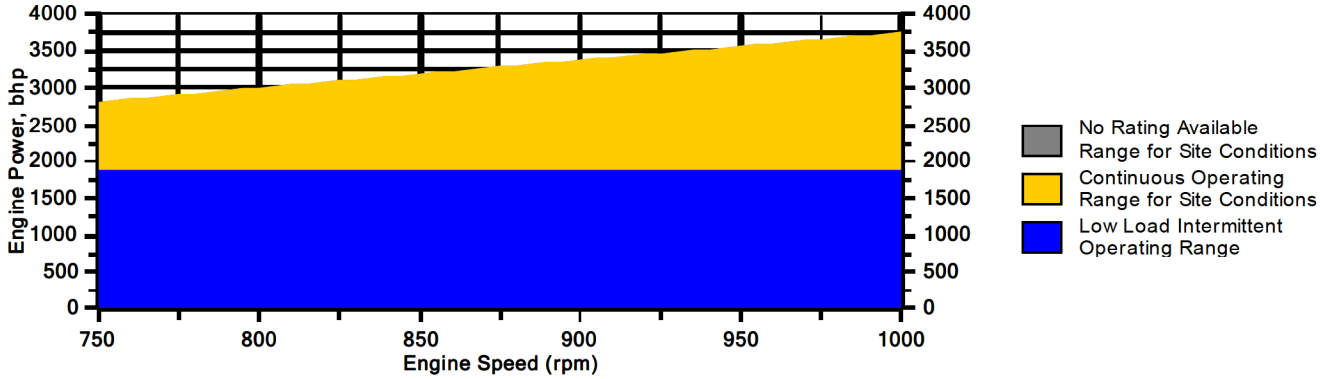
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1615 ft and 1000 rpm



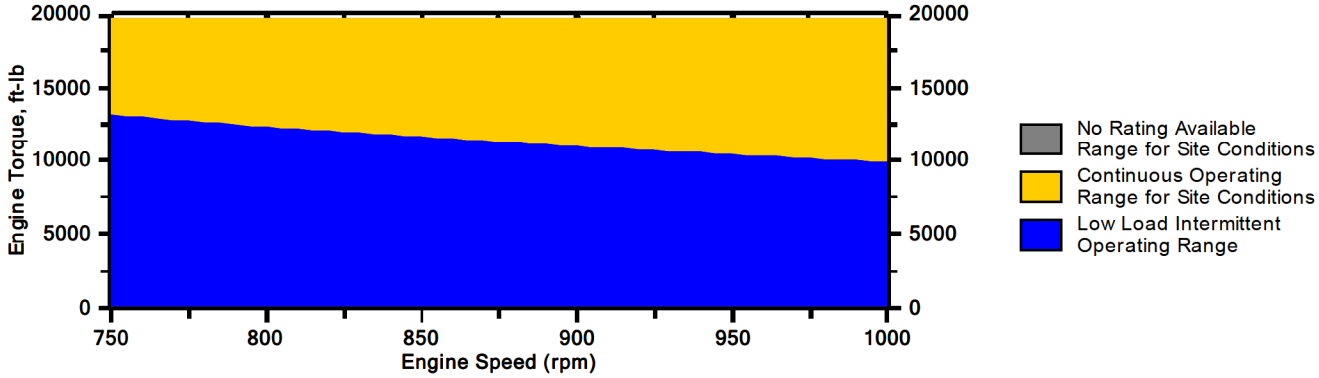
Engine Power vs. Engine Speed

Data represents speed sweep at 1615 ft and 100 ºF



Engine Torque vs. Engine Speed

Data represents speed sweep at 1615 ft and 100 ºF



Note: At site conditions of 1615 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.

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
99488 DTE Energy Daybrook 3612

NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	96.7125	96.7125
Ethane	C2H6	2.6452	2.6452
Propane	C3H8	0.1242	0.1242
Isobutane	iso-C4H10	0.0028	0.0028
Norbutane	nor-C4H10	0.0092	0.0092
Isopentane	iso-C5H12	0.0005	0.0005
Norpentane	nor-C5H12	0.0005	0.0005
Hexane	C6H14	0.0000	0.0000
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.2418	0.2418
Carbon Dioxide	CO2	0.2633	0.2633
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 %)		100.0000	100.0000

Fuel Makeup:	Gas Analysis
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	92.0
Lower Heating Value (Btu/scf):	928
Higher Heating Value (Btu/scf):	1029
WOBBE Index (Btu/scf):	1227
THC: Free Inert Ratio:	196.98
Total % Inerts (% N2, CO2, He):	0.51%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.69
Stoich A/F Ratio (Mass/Mass):	16.95
Specific Gravity (Relative to Air):	0.572
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.

ENGINE POWER (bhp):	3550	COOLING SYSTEM:	JW, OC+AC
ENGINE SPEED (rpm):	1000	AFTERCOOLER WATER INLET (°F):	130
EXHAUST MANIFOLD:	DRY	JACKET WATER OUTLET (°F):	190

Free Field Mechanical and Exhaust Noise

SOUND POWER LEVEL (dB)											
		Octave Band Center Frequency (OBCF)									
100% Load Data	**dB(A)**	**16 Hz**	**32 Hz**	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8 kHz**
Mechanical Sound	125.7	100.7	108	121.3	125.7	119.6	119.6	118.9	119.7	118.8	110.9
Exhaust (Right) Sound	143.6	101.6	107.9	122.9	121	120.5	122.5	127.5	132.8	139	140.3
Exhaust (Left) Sound	125.2	88.7	104.1	120.7	119.7	114.3	111.7	120.5	115.5	114.6	118.7
Air Inlet (Left) Sound	122.5	<90	<90	<90	<90	<90	93.4	<90	105.1	116.2	120.1

SOUND PARAMETER DEFINITION:

Sound Power Level Data - DM8702-03

Sound power is defined as the total sound energy emanating from a source irrespective of direction or distance. Sound power level data is presented under two index headings:
Sound power level -- Mechanical
Sound power level -- Exhaust

Mechanical: Sound power level data is calculated in accordance with ISO 3747. The data is recorded with the exhaust sound source isolated.

Exhaust: Sound power level data is calculated in accordance with ISO 6798 Annex A. Exhaust data is post-catalyst on gas engine ratings labeled as "Integrated Catalyst".

Measurements made in accordance with ISO 3747 and ISO 6798 for mechanical and exhaust sound level only. Frequency bands outside the displayed ranges are not measured, due to physical test, and environmental conditions that affect the accuracy of the measurement. No cooling system noise is included unless specifically indicated. Sound level data is indicative of noise levels recorded on one engine sample in a survey grade 3 environment.

How an engine is packaged, installed and the site acoustical environment will affect the site specific sound levels. For site specific sound level guarantees, sound data collection needs to be done on-site or under similar conditions.

Maxim Silencers
10635 Brighton Lane
Stafford, Texas 77477
Phone: 832 554-0980
Fax: 832 554-0990

September 26, 2016

Emission Control Application Data Sheet

Powertherm Co., Inc.

Customer:	**EXTERRAN**	Project:	**DTE DAY BROOK-3612A4**	Date:	**2/28/2017**
Customer Contact		Powertherm Contact:		Order/Quote #:	**0**

Engine Data:

Engine Model:	**CAT 3612A4**		Speed:	**1000**	RPM
Fuel & Operating Type:	**Natural Gas Lean Burn**		Engine Power:	**3750** **2823**	Hp KW
Exhaust Flow Rate:	**23795** **40428** **43224**	**acfm** **m^3/hr** **lbs/hr**	Exhaust Temperature:	**848** **453**	°F °C

Catalyst Data:

Number of Core layers:	**1**						
Model:	**MCCOG4-8-3026-C3**				Inlet Size:	**26**	in
Grade:	**HOSPITAL**				Outlet Size:	**30**	in
Body Diameter:	**72**	in			Body Length:	**297**	in
Estimated weight:	**10200** **4628**	lbs Kg			Estimated Back Pressure of the unit:	**6.02** **15.0**	in of WC mbar
Core Part Number:	**CE-7140-2, (15.44 X 24.75)**		Qty	**5**	Speed through inlet:	**5013**	ft/min
Cell Density	300	cpsi			Back Pressure across Element(s) only	3.02 **7.5**	in of WC mbar

Emission:

Min. Temp. at Core Face:	**842**	°F	**450**	°C	Catalyst Type:	**Oxidation**	
Max. Temp. at Core Face:	**928**	°F	**498**	°C			
					O_2 in Exhaust		vol %
					H_2O in Exhaust		vol %

	Pollutant						
	NOx	CO	NMNEHC/VOC	CH_2O/CHCO	ORGANIC PM10		
Engine Out / Pre Emission:	**0.5**	**2.58**	**0.67**	**0.2**	**0**	g/bhp-hr	
	124.45	**642.16**	**166.76**	**49.78**	**0.00**	mg/Nm3	
Post Emission:	**0.500**	**0.181**	**0.335**	**0.040**	**0.000**	g/bhp-hr	
	124.45	**44.95**	**83.38**	**9.96**	**0.00**	mg/Nm3	
	0.0	***93.0***	***50.0***	***80.0***	***50.0***	% Reduction	
	4.17	1.51	2.80	0.33		lb/hr	
	18.27	6.60	12.24	1.46		tons/year operation	**8760** hr/year
	59.8	21.6	40.0	4.8		ppmv	
						ppmvd @ 15% O2	

Acoustics:

Frequency Band (Hz):	31.5	63	125	250	500	1000	2000	4000	8000	
Raw Noise SPL (dB) at 3.28 ft.:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	7 dBA
Estimated Attenuation (dB):	**30**	**42**	**41**	**38**	**39**	**36**	**33**	**37**	**39**	No Element
Plus:	**30**	**43**	**43**	**40**	**43**	**41**	**39**	**43**	**44**	One Element Layer
Silenced SPL (dB) at 3.28 ft.:										

Warranty & Notes:

- **If Pre-Emission levels are not as noted above, contact Maxim Silencers for a re-quote.**
- To achieve Post Emissions levels detailed above, exhaust temperature and Pre-Emission data must be as specified.
- Maximum allowable exhaust temperature at core face is 1350°F.
- If applicable, the engine will require an air/fuel ratio controller to meet above emission levels. For Rich Burn engines λ must be 0.96 - 0.99.
- Catalyst cleaning/regeneration required, if initial backpressure increases by 2" of WC.
- Engine operation to be stable and reproducible.
- QAC is not designed to withstand a backfire, therefore measures should be taken prior to QAC unit to alleviate backfire pressure.
- Maximum lubrication oil consumption rate to be less than 0.0015 lb/bhp/hr.
- Lube oil sulfate ash contents should not exceed 0.5%.
- Phosphorus and/or Zinc should not exceed 5 ppmv in the exhaust stream.
- A high temperature alarm/shutdown to be maintained at downstream of catalyst at 1300°F.
- Fuel not to contain heavy or transition metals such as Pb, Ar, Zn, Cu, Sn, Fe, Ba, Ni, Cr etc.
- Chlorinated or Silicone containing compounds in the exhaust not to exceed 1 ppmv.
- Sulfur compounds in the exhaust gas stream not to exceed 25 ppmv.
- Performance guarantee is voided should the catalyst become masked or de-activated by any contaminant in the exhaust stream.
- Engine to be maintained and operated in accordance within manufacturer's recommended practice.
- Under no condition will Maxim Silencers assume any contingent liabilities.
- Operating manual is available online at www.maximsilencers.com or contact a Maxim sales representative.
- Nomenclature: QAC4-292-8, 4 is grade (Super Critical), 29 is catalyst block size, 2 is no. of catalyst(s) and 8 is flange diameter.
- Organic PM10 are estimate only and not a guarantee because of the variability in fuels and additives which change PM10.
- Maxim Silencers standard one year warranty applies.

Rev level: 86

G3616

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

G14-3600-182-00

CATERPILLAR®

CE-4 & CE-5

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	7.6	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	GAV WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 2 INLET (°F):	130		
AFTERCOOLER - STAGE 1 INLET (°F)	174	**SITE CONDITIONS**	
JACKET WATER OUTLET (°F):	190	FUEL:	G14-3600-182 (00)
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig):	60.9-65
COOLING SYSTEM:	JW+1AC, OC+2AC	FUEL METHANE NUMBER:	81.8
CONTROL SYSTEM:	ADEM4	FUEL LHV (Btu/scf):	957
EXHAUST MANIFOLD:	DRY	ALTITUDE (ft):	961
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	106
NOx EMISSION LEVEL(g/bhp-hr NOx):	0.5	NAMEPLATE RATING:	5000 bhp@1000rpm

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(1)	bhp	5000	5000		
INLET AIR TEMPERATURE			°F	106	106		
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(2)	Btu/bhp-hr	6772	6772		
FUEL CONSUMPTION (HHV)		(2)	Btu/bhp-hr	7511	7511		
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3) (4)	ft3/min	12571	12571		
AIR FLOW	(WET)	(3) (4)	lb/hr	52900	52900		
FUEL FLOW (60°F, 14.7 psia)			scfm	590	590		
INLET MAN. PRESSURE		(5)	in HG(abs)	100.0	100.0		
EXHAUST TEMPERATURE - ENGINE OUTLET		(6)	°F	856	856		
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(7) (4)	ft3/min	31206	31206		
EXHAUST GAS MASS FLOW	(WET)	(7) (4)	lb/hr	54490	54490		
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(8) (9)	g/bhp-hr	0.50	0.50		
CO		(8) (9)	g/bhp-hr	2.22	2.22		
THC (mol. wt. of 15.84)		(8) (9)	g/bhp-hr	4.01	4.01		
NMHC (mol. wt. of 15.84)		(8) (9)	g/bhp-hr	0.47	0.47		
NMNEHC (VOCs)(mol. wt. of 15.84)		(8) (9) (10)	g/bhp-hr	0.25	0.25		
HCHO (Formaldehyde)		(8) (9)	g/bhp-hr	0.22	0.22		
CO2		(8) (9)	g/bhp-hr	411	411		
EXHAUST OXYGEN		(8) (11)	% DRY	11.6	11.6		
HEAT REJECTION							
HEAT REJECTION TO JACKET WATER (JW)		(12)	Btu/min	54681	54681		
HEAT REJECTION TO ATMOSPHERE		(12)	Btu/min	19797	19797		
HEAT REJECTION TO LUBE OIL (OC)		(12)	Btu/min	27655	27655		
HEAT REJECTION TO A/C - STAGE 1 (1AC)		(12) (13)	Btu/min	50516	50516		
HEAT REJECTION TO A/C - STAGE 2 (2AC)		(12) (13)	Btu/min	12879	12879		

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+1AC)	(13) (14)	Btu/min	113192
TOTAL STAGE 2 AFTERCOOLER CIRCUIT (OC+2AC)	(13) (14)	Btu/min	46708
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 3

The engine technical performance data listed above is preliminary in nature and can change as the development program for this new product progresses. This data represents Caterpillar's best knowledge to date on this product but carries no guarantees or warranty, either expressed or implied. This data will be superseded by the final production data when the product completes the development program and the production data is published in TMI. This data should not be used for final designs, sizing, purchase of equipment or financial calculations as it is subject to change.

PREPARED BY:
Data generated by Gas Engine Data Master Version 3.36
Special Rating Request G14-3600-182-00, Printed 8/11/2014

NOTES:

1. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.
2. Fuel consumption tolerance is ± 2.5% of full load data.
3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.
4. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.
5. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.
6. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.
7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.
8. Emissions data is at engine exhaust flange prior to any after treatment.
9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.
10. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
11. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.
12. Heat rejection values are nominal. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for radiation, ± 20% for lube oil circuit, and ± 5% for aftercooler circuit.
13. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.
14. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

G3616

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

GAS COMPRESSION APPLICATION

G14-3600-182-00

CATERPILLAR®

CONSTITUENT	ABBREV	MOLE %	NORM
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	94.1143	94.1143
Ethane	C2H6	4.7030	4.7030
Propane	C3H8	0.0493	0.0493
Isobutane	iso-C4H10	0.7390	0.7390
Norbutane	nor-C4H10	0.0000	0.0000
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.0000	0.0000
Hexane	C6H14	0.0024	0.0024
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.2650	0.2650
Carbon Dioxide	CO2	0.1270	0.1270
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 %)		100.0000	100.0000

Fuel Makeup:	G14-3600-182 (00)
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	81.8
Lower Heating Value (Btu/scf):	957
Higher Heating Value (Btu/scf):	1062
WOBBE Index (Btu/scf):	1246
THC Free Inert Ratio	254.1
Total % Inerts(%N2, CO2, He)	0.39%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.99
Stoich A/F Ratio (Mass/Mass):	16.93
Specific Gravity (Relative to Air):	0.59
Specific Heat Constant:	1.307

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

Project specific technical data sheets generated by the gas engine data master program take the Caterpillar methane number and RPC into account when generating a site rating.

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

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and releated 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 seperator 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.

10497 Town & Country Way, Ste. 94(
Houston, TX 77024
Office: 307.673.0883 | Direct: 307.675.5073
cparisi@emittechnologies.com

Prepared For:
Sam Purdy
EXTERRAN

QUOTE: QUO-13269-H9S9
Expires: August 25, 2013

INFORMATION PROVIDED BY CATERPILLAR

Engine:	G3616
Horsepower:	5000
RPM:	1000
Compression Ratio:	7.6
Exhaust Flow Rate:	31207 CFM
Exhaust Temperature:	858 °F
Reference:	EM0455-00-001
Fuel:	Natural Gas
Annual Operating Hours:	8760

Uncontrolled Emissions

	g/bhp-hr
NOx:	0.50
CO:	2.20
THC:	6.31
NMHC	0.94
NMNEHC:	0.63
HCHO:	0.26
O2:	12.00 %

POST CATALYST EMISSIONS

	% Reduction	g/bhp-hr
NOx:	Unaffected by Oxidation Catalyst	
CO:	>93 %	<0.15
VOC:	>50 %	<0.32
HCHO:	>76 %	<0.06

CONTROL EQUIPMENT

Catalyst Housing

Model:	EBH-9000-3036F-6C4E-48
Manufacturer:	EMIT Technologies, Inc
Element Size:	Rectangle 48" x 15" x 3.5"
Housing Type:	6 Element Capacity
Catalyst Installation:	Ground Level Accessible Housing
Construction:	3/16" Carbon Steel
Sample Ports:	9 (0.5" NPT)
Inlet Connections:	30" Flat Face Flange
Outlet Connections:	36" Flat Face Flange
Configuration:	Side In / End Out
Silencer:	Integrated
Silencer Grade:	Hospital
Insertion Loss:	35-40 dBA
Estimated Lead Time:	2-4 Weeks to Ship

Catalyst Element

Model:	RT-4815-Z
Catalyst Type:	Oxidation, Standard Precious Group Metals
Substrate Type:	BRAZED
Manufacturer:	EMIT Technologies, Inc
Element Quantity:	4
Element Size:	Rectangle 48" x 15" x 3.5"
Estimated Lead Time:	7-10 Business Days to Ship

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PRICING

		Unit Price	Quantity	Extended Price
EBH-9000-3036F-6C4E-48	*Carbon Steel*	$28,540.00	1	$28,540.00
RT-4815-Z		$5,620.00	4	$22,480.00
36" STACK ASSY 36" TUBING FLANGE		$1,480.00	1	$1,480.00
GASKET, HIGH TEMP, FLANGE 36"		$133.00	1	$133.00
36" FLANGE - BOLT W/NUT, 1 1/2"-6 X 5.5"		$37.00	32	$1,184.00
			TOTAL	$53,817.00

NOTES:

*This application requires QTY (4) RT-4815-Z Oxidation catalyst elements to meet shown emissions reductions based on customer supplied fuel gas analysis.

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WARRANTY

EMIT Technologies, Inc. warrants that the goods supplied will be free from defects in workmanship by EMIT Technologies, Inc. for a period of two (2) years from date of shipment. EMIT Technologies, Inc. will not be responsible for any defects which result from improper use, neglect, failure to properly maintain or which are attributable to defects, errors or omissions in any drawings, specifications, plans or descriptions, whether written or oral, supplied to EMIT Technologies, Inc. by Buyer.

Catalyst performance using an EMIT Air/Fuel ratio controller is dependent upon properly defined set-points, variable with engine and fuel gas composition. Air/fuel ratio controller performance is guaranteed, but not limited, to fuel gas with a HHV content of 1400 BTU/SCF.

Catalyst performance will be guaranteed for a period of 1 year from installation, or 8760 operating hours, whichever comes first. The catalyst shall be operated with an automatic air/fuel ratio controller. The performance guarantee shall not cover the effects of excessive ash masking due to operation at low load, improper engine maintenance, or inappropriate lubrication oil. The performance guarantee shall not cover the effects of continuous engine misfires (cylinder or ignition) exposing the catalyst to excessive exothermic reaction temperatures. In most cases, excluding thermal deactivation, catalyst performance is redeemable by means of proper washing (refer to EMIT Catalyst/Silencer Housing Manual for element wash information, or contact a local EMIT Sales representative).

The exhaust temperature operating range at the converter inlet is a minimum of 600°F for oxidation catalyst and 750 °F for NSCR catalyst, and a maximum of 1250°F.

If a properly functioning, high temperature shut down switch is not installed, thermal deactivation of catalyst at sustained temperatures above 1250°F is not covered. If excessive exposure to over oxygenation of NSCR catalyst occurs due to improperly functioning or non-existent Air/Fuel ratio control, then deactivation of catalyst is not warranted.

The catalyst conversion efficiencies (% reduction) will be guaranteed for engine loads of 50 to 100 percent. Standard Oxidation Catalyst conversion efficiencies (% reduction) will be guaranteed for fuel gas containing less than 1.5% mole fraction of non-methane, non-ethane hydrocarbons. Applications where fuel gas exceeds this level will require a Premium Oxidation Catalyst to maintain guaranteed VOC conversion efficiencies.

Engine lubrication oil shall contain less than 0.5 wt% Sulfated Ash with a maximum allowable specific oil consumption of 0.7 g/bhp-hr. The catalyst shall be limited to a maximum ash loading of 0.022 lb/ft3. Phosphorous and zinc additives are limited to 0.03 wt%. New or Reconstructed engines must operate for a minimum of 100 hours prior to catalyst installation, otherwise the warranty is void.

The catalyst must not be exposed to the following know poisoning agents, including: antimony, arsenic, chromium, copper, iron, lead, lithium, magnesium, mercury, nickel, phosphorous, potassium, silicon, sodium, sulfur, tin, and zinc. Total poison concentrations in the fuel gas must be limited to 0.25 ppm or less for catalyst to function properly.

Shipment - Promised shipping dates are approximate lead times from the point of manufacture and are not guaranteed. EMIT Technologies, Inc. will not be liable for any loss, damage or delay in manufacture or delivery resulting from any cause beyond its control including, but not limited to a period equal to the time lost by reason of that delay. All products will be crated as per best practice to prevent any damage during shipment. Unless otherwise specified, Buyer will pay for any special packing and shipping requirements. Acceptance of goods by common carrier constitutes delivery to Buyer. EMIT Technologies, Inc. shall not be responsible for goods damaged or lost in transit.

Terms: Credit is extended to purchaser for net 30 time period. If payment is not received in the net 30 timeframe, interest on the unpaid balance will accrue at a rate of 1.5% per month from the invoice date.

Order Cancellation Terms: Upon cancellation of an order once submittal of a Purchase Order has occurred, the customer will pay a 25% restocking fee for Catalyst Housings, Catalyst Elements, and Air/Fuel Ratio Controllers; 50% restocking fee for Cooler Top Solutions Exhaust System Accessories, and other Custom Built Products; 100% of all associated shipping costs incurred by EMIT; 100% of all project expenses incurred by EMIT for Field Services.

G3608

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Exterran
M3 Appliachia

CE-6

GAS COMPRESSION APPLICATION

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	9.2:1	FUEL SYSTEM:	GAV
AFTERCOOLER TYPE:	SCAC		WITH AIR FUEL RATIO CONTROL
AFTERCOOLER WATER INLET (°F):	130	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	190	FUEL:	Gas Analysis
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig):	42.8-47.0
COOLING SYSTEM:	JW, OC+AC	FUEL METHANE NUMBER:	81.8
CONTROL SYSTEM:	CIS/ADEM3	FUEL LHV (Btu/scf):	957
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:	2370 bhp@1000rpm

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(1)	bhp	2370	2370	1777	1185
INLET AIR TEMPERATURE			°F	100	100	100	100
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(2)	Btu/bhp-hr	6791	6791	7082	7785
FUEL CONSUMPTION (HHV)		(2)	Btu/bhp-hr	7531	7531	7854	8634
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3)(4)	ft3/min	6445	6440	4975	3432
AIR FLOW	(WET)	(3)(4)	lb/hr	27382	27382	21152	14593
FUEL FLOW (60ºF, 14.7 psia)			scfm	280	280	219	161
INLET MANIFOLD PRESSURE		(5)	in Hg(abs)	75.2	75.2	57.6	40.9
EXHAUST TEMPERATURE - ENGINE OUTLET		(6)	°F	858	858	897	978
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(7)(4)	ft3/min	16106	16106	12822	9405
EXHAUST GAS MASS FLOW	(WET)	(7)(4)	lb/hr	28137	28137	21743	15026
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(8)(9)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(8)(9)	g/bhp-hr	2.74	2.74	2.74	2.74
THC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	6.30	6.30	6.56	6.80
NMHC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	0.94	0.94	0.98	1.02
NMNEHC (VOCs) (mol. wt. of 15.84)		(8)(9)(10)	g/bhp-hr	0.63	0.63	0.66	0.68
HCHO (Formaldehyde)		(8)(9)	g/bhp-hr	0.26	0.26	0.28	0.31
CO2		(8)(9)	g/bhp-hr	440	440	459	505
EXHAUST OXYGEN		(8)(11)	% DRY	12.0	12.0	11.8	11.4
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(12)	Btu/min	24121	24121	20997	17429
HEAT REJ. TO ATMOSPHERE		(12)	Btu/min	9388	9388	8812	8457
HEAT REJ. TO LUBE OIL (OC)		(12)	Btu/min	12071	12071	11541	11532
HEAT REJ. TO AFTERCOOLER (AC)		(12)(13)	Btu/min	22319	22319	10473	2113

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW)	(13)	Btu/min	26533
TOTAL AFTERCOOLER CIRCUIT (OC+AC)	(13)(14)	Btu/min	37921
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

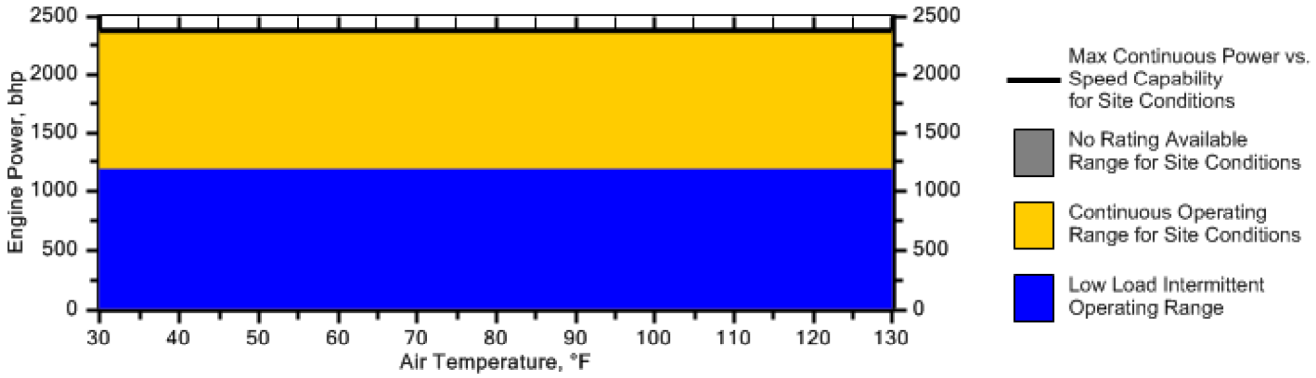
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Max. rating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

For notes information consult page three.

PREPARED BY: doug kern, Exterran
Data generated by Gas Engine Rating Pro Version 4.04.00
Ref. Data Set DM8606-04-001, Printed 10Jul2013

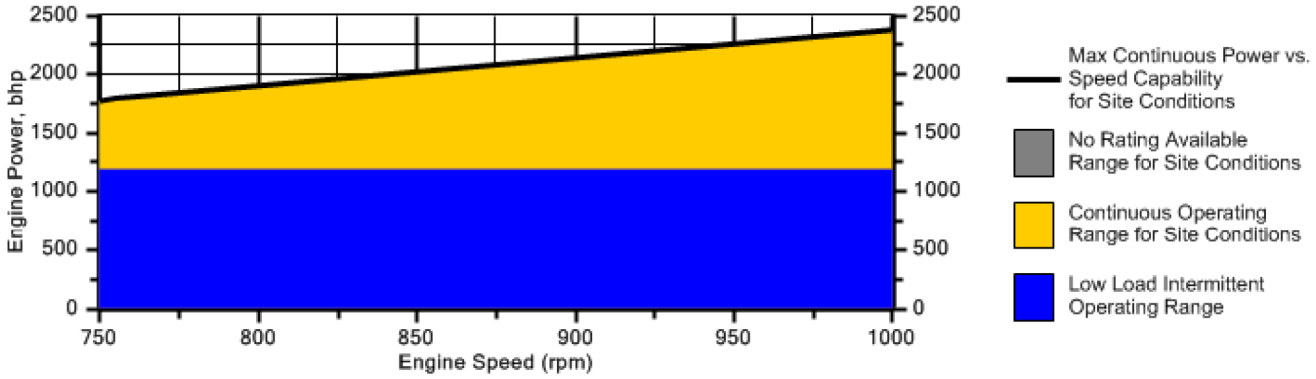
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1500 ft and 1000 rpm



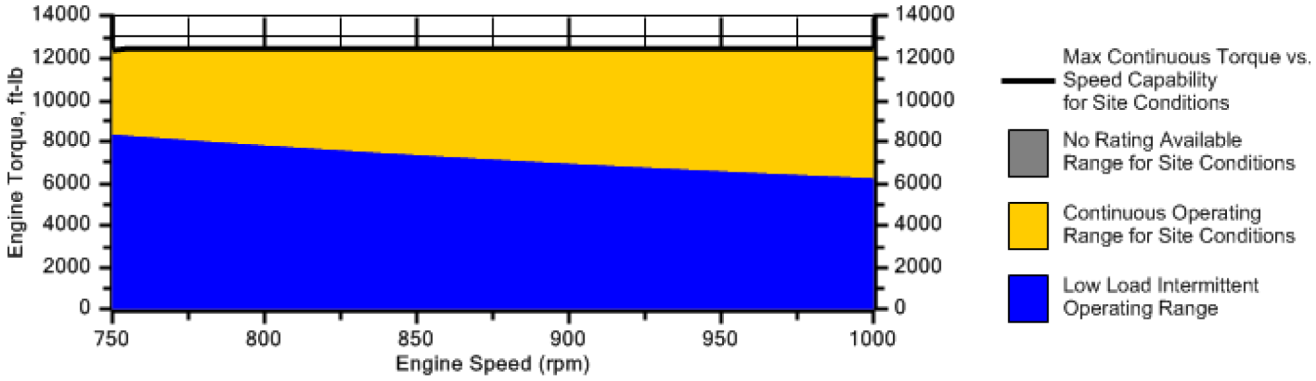
Engine Power vs. Engine Speed

Data represents speed sweep at 1500 ft and 100 °F



Engine Torque vs. Engine Speed

Data represents speed sweep at 1500 ft and 100 °F



Note: At site conditions of 1500 ft and 100°F inlet air temp., constant torque can be maintained down to 755 rpm. The minimum speed for loading at these conditions is 750 rpm.

NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	94.1143	94.1166
Ethane	C2H6	4.7030	4.7031
Propane	C3H8	0.0493	0.0493
Isobutane	iso-C4H1O	0.7390	0.7390
Norbutane	nor-C4H1O	0.0000	0.0000
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.0000	0.0000
Hexane	C6H14	0.0000	0.0000
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.2650	0.2650
Carbon Dioxide	CO2	0.1270	0.1270
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 %)		99.9976	100.0000

Fuel Makeup:	Gas Analysis
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	81.8
Lower Heating Value (Btu/scf):	957
Higher Heating Value (Btu/scf):	1061
WOBBE Index (Btu/scf):	1246
THC: Free Inert Ratio:	254.1
Total % Inerts (% N2, CO2, He):	0.39%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.99
Stoich A/F Ratio (Mass/Mass):	16.93
Specific Gravity (Relative to Air):	0.590
Specific Heat Constant (K):	1.307

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.

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: 3	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	Waste Fluids		
Max. Daily Throughput (1000 gal/day)	1.2		
Max. Annual Throughput (1000 gal/yr)	453.6		
Loading Method[1]	SP		
Max. Fill Rate (gal/min)	~70		
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)	0.08		
	Annual (ton/yr)	0.02		
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

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: **Source Designation RSV-1**	Model: 125 MMSCFD
Max. Dry Gas Flow Rate: 125 mmscf/day	Reboiler Design Heat Input: 1.5 MMBTU/hr
Design Type: ☒ TEG ☐ DEG ☐ EG	Source Status[1]: Existing
Date Installed/Modified/Removed[2]: 2012	Regenerator Still Vent APCD/ERD[3]: RBV-1
Control Device/ERD ID#[3]: RBV-1	Fuel HV (BTU/scf): ~1,072
H_2S Content (gr/100 scf): neg.	Operation (hours/year): 8,760
Pump Rate (scfm): 15 gpm glycol	
Water Content (wt %) in: Wet Gas: Saturated	Dry Gas: 7.0 lbs/MMscf

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

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

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

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

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

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

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 (%)

The dehydration unit utilizes a flash tank, which recovers the gas entrained in the rich glycol for use as fuel in the reboiler burner. The still column vapors are routed to the reboiler for control.

Emissions Data

Emission Unit ID / Emission Point ID[4]	Description	Calculation Methodology[5]	PTE[6]	Controlled Maximum Hourly Emissions (lb/hr)	Controlled Maximum Annual Emissions (tpy)
RBV-1	Reboiler Vent	AP	NO_x	0.14	0.61
		AP	CO	0.12	0.51
		AP	VOC	0.01	0.03
		AP	SO_2	8.4E-04	3.7E-03
		AP	PM_{10}	0.01	0.05
		40 CFR 98	GHG (CO_2e)	175.68	769.47
RSV-1	Glycol Regenerator Still Vent	GRI-GlyCalc™	VOC	0.35	1.52
		GRI-GlyCalc™	Benzene	<0.01	<0.01
		GRI-GlyCalc™	Toluene	<0.01	<0.01
		GRI-GlyCalc™	Ethylbenzene	<0.01	<0.01
		GRI-GlyCalc™	Xylenes	<0.01	<0.01
		GRI-GlyCalc™	n-Hexane	0.07	0.30
RSV-1	Glycol Flash Tank	GRI-GlyCalc™	VOC	6.20	27.16
		GRI-GlyCalc™	Benzene	<0.01	<0.01
		GRI-GlyCalc™	Toluene	<0.01	<0.01
		GRI-GlyCalc™	Ethylbenzene	<0.01	<0.01
		GRI-GlyCalc™	Xylenes	<0.01	<0.01
		GRI-GlyCalc™	n-Hexane	0.28	1.24

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. 25

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
CE-1	Reciprocating Compressor #1
CE-2	Reciprocating Compressor #2
CE-4	Reciprocating Compressor #4
CE-5	Reciprocating Compressor #5
CE-6	Reciprocating Compressor #6

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-3	Reciprocating Compressor #3

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	360	4,500	17.24	36.85	0.0254	0.94
Compressor Startup	360	1,000	17.24	8.19	0.0254	0.21
Plant Shutdown	1	900,000	17.24	20.47	0.0254	0.52
Low Pressure Pig Venting	52	1,000	17.24	1.18	0.0254	0.03
High Pressure Pig Venting	104	1,000	17.24	2.37	0.0254	0.06

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	360	4,500	17.24	36.85	0.0001	3.3E-03
Compressor Startup	360	1,000	17.24	8.19	0.0001	7.4E-04
Plant Shutdown	1	900,000	17.24	20.47	0.0001	1.8E-03
Low Pressure Pig Venting	52	1,000	17.24	1.18	0.0001	1.1E-04
High Pressure Pig Venting	104	1,000	17.24	2.37	0.0001	2.1E-04

Air Pollution Control Device Data Sheet(s)

ATTACHMENT T – AIR POLLUTION CONTROL DEVICE / EMISSION REDUCTION DEVICE SHEETS

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

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

The following five (5) rows are only to be completed if registering an alternative air pollution control device.	
Emission Unit ID: 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: Daybrook Compressor Station
Project Description: G35-D Application

Facility-Wide Emission Summary - Controlled

Wells	0	per site
Storage Tanks:	4	per site
Sand Separator Tank	0	per site
Line Heaters:	0	per site
TEGs:	0	per site
Dehy Reboilers:	1	per site
Glycol Dehydrators:	1	per site
Dehy Drip Tanks:	0	per site
Dehy Combustors:	0	per site
Compressors:	6	per site
High Pressure Separators:	4	per site
Low Pressure Separator	0	per site
Vapor Recovery Unit	0	per site
Tank Combustor	0	per site
Length of lease road:	800	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	Caterpillar G3516 Comp. Engine	1.52	6.66	6.08	26.65	1.58	6.93	0.01	0.03	0.11	0.50	0.11	0.50	12.29	53.84	1,744.04	7,638.90
CE-2	CE-2	Caterpillar G3516 Comp. Engine	1.52	6.66	6.08	26.65	1.58	6.93	0.01	0.03	0.11	0.50	0.11	0.50	12.29	53.84	1,744.04	7,638.90
CE-3	CE-3	Caterpillar G3612 Comp. Engine	4.13	18.11	1.50	6.55	2.40	10.50	0.02	0.07	0.28	1.22	0.28	1.22	29.60	129.64	4,197.53	18,385.16
CE-4	CE-4	Caterpillar G3616 Comp. Engine	5.51	24.14	1.65	7.24	3.42	14.97	0.02	0.10	0.38	1.64	0.38	1.64	39.02	170.92	5,508.54	24,127.41
CE-5	CE-5	Caterpillar G3616 Comp. Engine	5.51	24.14	1.65	7.24	3.42	14.97	0.02	0.10	0.38	1.64	0.38	1.64	39.02	170.92	5,508.54	24,127.41
CE-6	CE-6	Caterpillar G3608 Comp. Engine	2.61	11.44	0.99	4.34	1.67	7.32	0.01	0.05	0.18	0.78	0.18	0.78	28.01	122.67	3,000.31	13,141.37
RSV-1	RSV-1	125 MMSCFD Dehydration Unit	---	---	---	---	6.55	28.68	---	---	---	---	---	---	161.46	707.21	4,036.60	17,680.30
RBV-1	RBV-1	1.5 MMbtu/hr Reboiler	0.14	0.61	0.12	0.51	0.01	0.03	8.4E-04	3.7E-03	0.01	0.05	0.01	0.05	0.00	0.01	175.68	769.47
T01	T01	Waste Water/Oil Tank	---	---	---	---	0.05	0.23	---	---	---	---	---	---	1.0E-03	0.01	0.03	0.15
T02	T02	Methanol Tank	---	---	---	---	0.02	0.07	---	---	---	---	---	---	---	---	---	---
T03	T03	Produced Water Tank	---	---	---	---	0.11	0.46	---	---	---	---	---	---	3.0E-03	0.01	0.08	0.33
T04	T04	Produced Water Tank	---	---	---	---	0.11	0.46	---	---	---	---	---	---	3.0E-03	0.01	0.08	0.33
T05 to T21	T05 to T21	De Minimis Storage Tanks	---	---	---	---	0.21	0.92	---	---	---	---	---	---	---	---	---	---
L1	L1	Liquid Loading	---	---	---	---	0.08	0.02	---	---	---	---	---	---	---	---	---	---
---	---	Fugitives	---	---	---	---	---	5.69	---	---	---	---	---	---	---	151.64	---	3,791.08
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	0.03	---	3.0E-03	---	---	---	---
Facility Total			20.95	91.77	18.08	79.19	21.19	98.17	0.09	0.37	1.44	6.36	1.44	6.33	321.70	1,560.71	25,915.45	117,300.80
Facility Total (excluding fugitive emissions)			20.95	91.77	18.08	79.19	21.19	92.48	0.09	0.37	1.44	6.33	1.44	6.33	321.70	1,409.06	25,915.45	113,509.72

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	Caterpillar G3516 Comp. Engine	0.12	0.53	5.0E-03	2.2E-02	4.6E-03	2.0E-02	4.5E-04	2.0E-03	2.1E-03	9.2E-03	0.01	0.06	0.01	0.05	0.34	1.50
CE-2	CE-2	Caterpillar G3516 Comp. Engine	0.12	0.53	5.0E-03	2.2E-02	4.6E-03	2.0E-02	4.5E-04	2.0E-03	2.1E-03	9.2E-03	0.01	0.06	0.01	0.05	0.34	1.50
CE-3	CE-3	Caterpillar G3612 Comp. Engine	0.33	1.45	1.2E-02	5.4E-02	1.1E-02	5.0E-02	1.1E-03	4.8E-03	5.1E-03	2.2E-02	0.03	0.14	0.03	0.13	0.87	3.82
CE-4	CE-4	Caterpillar G3616 Comp. Engine	0.66	2.90	1.7E-02	7.2E-02	1.5E-02	6.7E-02	1.5E-03	6.5E-03	6.9E-03	3.0E-02	0.04	0.18	0.04	0.18	1.39	6.09
CE-5	CE-5	Caterpillar G3616 Comp. Engine	0.66	2.90	1.7E-02	7.2E-02	1.5E-02	6.7E-02	1.5E-03	6.5E-03	6.9E-03	3.0E-02	0.04	0.18	0.04	0.18	1.39	6.09
CE-6	CE-6	Caterpillar G3608 Comp. Engine	0.31	1.37	7.9E-03	3.4E-02	7.3E-03	3.2E-02	7.1E-04	3.1E-03	3.3E-03	1.4E-02	0.02	0.09	0.02	0.08	0.66	2.88
RSV-1	RSV-1	125 MMSCFD Dehydration Unit	---	---	---	---	---	---	---	---	---	---	0.35	1.54	---	---	0.35	1.54
RBV-1	RBV-1	1.5 MMbtu/hr Reboiler	1.0E-04	4.6E-04	2.9E-06	1.3E-05	4.8E-06	2.1E-05	---	---	---	---	2.5E-03	0.01	7.7E-06	3.4E-05	2.6E-03	0.01
T01	T01	Waste Water/Oil Tank	---	---	<0.01	2.0E-03	<0.01	1.0E-03	<0.01	<0.01	<0.01	<0.01	2.0E-03	0.01	<0.01	3.0E-03	0.01	0.02
T02	T02	Methanol Tank	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.02	0.07
T03	T03	Produced Water Tank	---	---	1.0E-03	3.0E-03	<0.01	2.0E-03	<0.01	<0.01	<0.01	<0.01	6.0E-03	2.6E-02	1.0E-03	0.01	0.01	0.03
T04	T04	Produced Water Tank	---	---	1.0E-03	3.0E-03	<0.01	2.0E-03	<0.01	<0.01	<0.01	<0.01	6.0E-03	2.6E-02	1.0E-03	0.01	0.01	0.03
T05 to T21	T05 to T21	De Minimis Storage Tanks	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.04	0.15
L1	L1	Liquid Loading	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.01	2.0E-03
---	---	Fugitives	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Facility Total			2.21	9.68	0.07	0.28	0.06	0.26	5.7E-03	0.02	0.03	0.12	0.53	2.31	0.16	0.69	5.43	23.73
Facility Total (excluding fugitive emissions)			2.21	9.68	0.07	0.28	0.06	0.26	5.7E-03	0.02	0.03	0.12	0.53	2.31	0.16	0.69	5.43	23.73

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

Compressor Engines

Engine Information:

Source Designation:	**CE-1 to CE-2**
Manufacturer:	Caterpillar
Model No.:	G3516
Stroke Cycle:	4-stroke
Type of Burn:	Lean
Rated Horsepower (bhp):	1,380

Engine Fuel Information:

Fuel Type:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,072
Specific Fuel Consumption (Btu/bhp-hr):	8,257
Maximum Fuel Consumption at 100% Load (scf/hr):	10,627
Heat Input (MMBtu/hr):	11.39
Potential Fuel Consumption (MMBtu/yr):	99,817
Max. Fuel Consumption at 100% (MMscf/hr):	0.0106
Max. Fuel Consumption (MMscf/yr):	93.1
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	1.52	6.66	Manufacturer Specifications
VOC (excludes HCHO)	0.48	g/bhp-hr	1.46	6.40	Manufacturer Specifications
VOC (includes HCHO)	---	---	1.58	6.93	VOC + HCHO
CO	2.00	g/bhp-hr	6.08	26.65	Subpart JJJJ Limit
SO_X	0.001	lb/MMBtu	0.01	0.03	AP-42, Table 3.2-2 (Jul-2000)
PM_{10}	0.01	lb/MMBtu	0.11	0.50	AP-42, Table 3.2-2 (Jul-2000)
$PM_{2.5}$	0.01	lb/MMBtu	0.11	0.50	AP-42, Table 3.2-2 (Jul-2000)
Formaldehyde (HCHO)	0.04	g/bhp-hr	0.12	0.53	Vendor Specifications
GHG (CO_2e)	See Table Below		1,744	7,639	40 CFR 98, Tables C-1 & C-2
Other (Total HAP)	See Table Below		0.34	1.50	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: Daybrook 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	472	g/bhp-hr	1,436.01	6,289.73	Manufacturer Specifications
CH_4	4.04	g/bhp-hr	12.29	53.84	Manufacturer (THC - NMHC)
N_2O	0.0001	kg/MMBtu	0.00	0.01	40 CFR 98, Table C-2
GHG (CO_2e)			**1,744**	**7,639**	
Organic HAPs:					
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	4.6E-04	2.0E-03	AP-42, Table 3.2-2 (Jul-2000)
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	3.6E-04	1.6E-03	AP-42, Table 3.2-2 (Jul-2000)
1,3-Butadiene	2.67E-04	lb/MMBtu	3.0E-03	1.3E-02	AP-42, Table 3.2-2 (Jul-2000)
1,3-Dichloropropene	2.64E-05	lb/MMBtu	3.0E-04	1.3E-03	AP-42, Table 3.2-2 (Jul-2000)
2-Methylnapthalene	3.32E-05	lb/MMBtu	3.8E-04	1.7E-03	AP-42, Table 3.2-2 (Jul-2000)
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	2.8E-03	1.2E-02	AP-42, Table 3.2-2 (Jul-2000)
Acenaphthene	1.25E-06	lb/MMBtu	1.4E-05	6.2E-05	AP-42, Table 3.2-2 (Jul-2000)
Acenaphthylene	5.53E-06	lb/MMBtu	6.3E-05	2.8E-04	AP-42, Table 3.2-2 (Jul-2000)
Acetaldehyde	8.36E-03	lb/MMBtu	9.5E-02	4.2E-01	AP-42, Table 3.2-2 (Jul-2000)
Acrolein	5.14E-03	lb/MMBtu	5.9E-02	2.6E-01	AP-42, Table 3.2-2 (Jul-2000)
Benzene	4.40E-04	lb/MMBtu	5.0E-03	2.2E-02	AP-42, Table 3.2-2 (Jul-2000)
Benzo(b)fluoranthene	1.66E-07	lb/MMBtu	1.9E-06	8.3E-06	AP-42, Table 3.2-2 (Jul-2000)
Benzo(e)pyrene	4.15E-07	lb/MMBtu	4.7E-06	2.1E-05	AP-42, Table 3.2-2 (Jul-2000)
Benzo(g,h,i)perylene	4.14E-07	lb/MMBtu	4.7E-06	2.1E-05	AP-42, Table 3.2-2 (Jul-2000)
Biphenyl	2.12E-04	lb/MMBtu	2.4E-03	1.1E-02	AP-42, Table 3.2-2 (Jul-2000)
Carbon Tetrachloride	3.67E-05	lb/MMBtu	4.2E-04	1.8E-03	AP-42, Table 3.2-2 (Jul-2000)
Chlorobenzene	3.04E-05	lb/MMBtu	3.5E-04	1.5E-03	AP-42, Table 3.2-2 (Jul-2000)
Chloroform	2.85E-05	lb/MMBtu	3.2E-04	1.4E-03	AP-42, Table 3.2-2 (Jul-2000)
Chrysene	6.93E-07	lb/MMBtu	7.9E-06	3.5E-05	AP-42, Table 3.2-2 (Jul-2000)
Ethylbenzene	3.97E-05	lb/MMBtu	4.5E-04	2.0E-03	AP-42, Table 3.2-2 (Jul-2000)
Ethylene Dibromide	4.43E-05	lb/MMBtu	5.0E-04	2.2E-03	AP-42, Table 3.2-2 (Jul-2000)
Fluoranthene	1.11E-06	lb/MMBtu	1.3E-05	5.5E-05	AP-42, Table 3.2-2 (Jul-2000)
Fluorene	5.67E-06	lb/MMBtu	6.5E-05	2.8E-04	AP-42, Table 3.2-2 (Jul-2000)
Methanol	2.50E-03	lb/MMBtu	2.8E-02	1.2E-01	AP-42, Table 3.2-2 (Jul-2000)
Methylene Chloride	2.00E-05	lb/MMBtu	2.3E-04	1.0E-03	AP-42, Table 3.2-2 (Jul-2000)
n-Hexane	1.11E-03	lb/MMBtu	1.3E-02	5.5E-02	AP-42, Table 3.2-2 (Jul-2000)
Naphthalene	7.44E-05	lb/MMBtu	8.5E-04	3.7E-03	AP-42, Table 3.2-2 (Jul-2000)
PAH	2.69E-05	lb/MMBtu	3.1E-04	1.3E-03	AP-42, Table 3.2-2 (Jul-2000)
Phenanthrene	1.04E-05	lb/MMBtu	1.2E-04	5.2E-04	AP-42, Table 3.2-2 (Jul-2000)
Phenol	2.40E-05	lb/MMBtu	2.7E-04	1.2E-03	AP-42, Table 3.2-2 (Jul-2000)
Pyrene	1.36E-06	lb/MMBtu	1.5E-05	6.8E-05	AP-42, Table 3.2-2 (Jul-2000)
Styrene	2.36E-05	lb/MMBtu	2.7E-04	1.2E-03	AP-42, Table 3.2-2 (Jul-2000)
Tetrachloroethane	2.48E-06	lb/MMBtu	2.8E-05	1.2E-04	AP-42, Table 3.2-2 (Jul-2000)
Toluene	4.08E-04	lb/MMBtu	4.6E-03	2.0E-02	AP-42, Table 3.2-2 (Jul-2000)
Vinyl Chloride	1.49E-05	lb/MMBtu	1.7E-04	7.4E-04	AP-42, Table 3.2-2 (Jul-2000)
Xylene	1.84E-04	lb/MMBtu	2.1E-03	9.2E-03	AP-42, Table 3.2-2 (Jul-2000)
Total HAP (including HCHO)			**0.34**	**1.50**	

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

Compressor Engines

Engine Information:

Source Designation:	**CE-3**
Manufacturer:	Caterpillar
Model No.:	G3612
Stroke Cycle:	4-stroke
Type of Burn:	Lean
Rated Horsepower (bhp):	3,750

Engine Fuel Information:

Fuel Type:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,072
Specific Fuel Consumption (Btu/bhp-hr):	7,431
Maximum Fuel Consumption at 100% Load (scf/hr):	25,989
Heat Input (MMBtu/hr):	27.87
Potential Fuel Consumption (MMBtu/yr):	244,108
Max. Fuel Consumption at 100% (MMscf/hr):	0.0260
Max. Fuel Consumption (MMscf/yr):	227.7
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	4.13	18.11	Manufacturer Specifications
VOC (excludes HCHO)	0.25	g/bhp-hr	2.07	9.05	Manufacturer Specifications
VOC (includes HCHO)	---	---	2.40	10.50	VOC + HCHO
CO	0.18	g/bhp-hr	1.50	6.55	Vendor Specifications
SO_X	0.001	lb/MMBtu	0.02	0.07	AP-42, Table 3.2-2 (Jul-2000)
PM_{10}	0.01	lb/MMBtu	0.28	1.22	AP-42, Table 3.2-2 (Jul-2000)
$PM_{2.5}$	0.01	lb/MMBtu	0.28	1.22	AP-42, Table 3.2-2 (Jul-2000)
Formaldehyde (HCHO)	0.04	g/bhp-hr	0.33	1.45	Vendor Specifications
GHG (CO_2e)	See Table Below		4,198	18,385	40 CFR 98, Tables C-1 & C-2
Other (Total HAP)	See Table Below		0.87	3.82	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: Daybrook 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	418	g/bhp-hr	3,455.76	15,136.25	Manufacturer Specifications
CH_4	3.58	g/bhp-hr	29.60	129.64	Manufacturer (THC - NMHC)
N_2O	0.0001	kg/MMBtu	0.01	0.03	40 CFR 98, Table C-2
GHG (CO_2e)			**4,198**	**18,385**	
Organic HAPs:					
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	1.1E-03	4.9E-03	AP-42, Table 3.2-2 (Jul-2000)
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	8.9E-04	3.9E-03	AP-42, Table 3.2-2 (Jul-2000)
1,3-Butadiene	2.67E-04	lb/MMBtu	7.4E-03	3.3E-02	AP-42, Table 3.2-2 (Jul-2000)
1,3-Dichloropropene	2.64E-05	lb/MMBtu	7.4E-04	3.2E-03	AP-42, Table 3.2-2 (Jul-2000)
2-Methylnapthalene	3.32E-05	lb/MMBtu	9.3E-04	4.1E-03	AP-42, Table 3.2-2 (Jul-2000)
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	7.0E-03	3.1E-02	AP-42, Table 3.2-2 (Jul-2000)
Acenaphthene	1.25E-06	lb/MMBtu	3.5E-05	1.5E-04	AP-42, Table 3.2-2 (Jul-2000)
Acenaphthylene	5.53E-06	lb/MMBtu	1.5E-04	6.7E-04	AP-42, Table 3.2-2 (Jul-2000)
Acetaldehyde	8.36E-03	lb/MMBtu	2.3E-01	1.0E+00	AP-42, Table 3.2-2 (Jul-2000)
Acrolein	5.14E-03	lb/MMBtu	1.4E-01	6.3E-01	AP-42, Table 3.2-2 (Jul-2000)
Benzene	4.40E-04	lb/MMBtu	1.2E-02	5.4E-02	AP-42, Table 3.2-2 (Jul-2000)
Benzo(b)fluoranthene	1.66E-07	lb/MMBtu	4.6E-06	2.0E-05	AP-42, Table 3.2-2 (Jul-2000)
Benzo(e)pyrene	4.15E-07	lb/MMBtu	1.2E-05	5.1E-05	AP-42, Table 3.2-2 (Jul-2000)
Benzo(g,h,i)perylene	4.14E-07	lb/MMBtu	1.2E-05	5.1E-05	AP-42, Table 3.2-2 (Jul-2000)
Biphenyl	2.12E-04	lb/MMBtu	5.9E-03	2.6E-02	AP-42, Table 3.2-2 (Jul-2000)
Carbon Tetrachloride	3.67E-05	lb/MMBtu	1.0E-03	4.5E-03	AP-42, Table 3.2-2 (Jul-2000)
Chlorobenzene	3.04E-05	lb/MMBtu	8.5E-04	3.7E-03	AP-42, Table 3.2-2 (Jul-2000)
Chloroform	2.85E-05	lb/MMBtu	7.9E-04	3.5E-03	AP-42, Table 3.2-2 (Jul-2000)
Chrysene	6.93E-07	lb/MMBtu	1.9E-05	8.5E-05	AP-42, Table 3.2-2 (Jul-2000)
Ethylbenzene	3.97E-05	lb/MMBtu	1.1E-03	4.8E-03	AP-42, Table 3.2-2 (Jul-2000)
Ethylene Dibromide	4.43E-05	lb/MMBtu	1.2E-03	5.4E-03	AP-42, Table 3.2-2 (Jul-2000)
Fluoranthene	1.11E-06	lb/MMBtu	3.1E-05	1.4E-04	AP-42, Table 3.2-2 (Jul-2000)
Fluorene	5.67E-06	lb/MMBtu	1.6E-04	6.9E-04	AP-42, Table 3.2-2 (Jul-2000)
Methanol	2.50E-03	lb/MMBtu	7.0E-02	3.1E-01	AP-42, Table 3.2-2 (Jul-2000)
Methylene Chloride	2.00E-05	lb/MMBtu	5.6E-04	2.4E-03	AP-42, Table 3.2-2 (Jul-2000)
n-Hexane	1.11E-03	lb/MMBtu	3.1E-02	1.4E-01	AP-42, Table 3.2-2 (Jul-2000)
Naphthalene	7.44E-05	lb/MMBtu	2.1E-03	9.1E-03	AP-42, Table 3.2-2 (Jul-2000)
PAH	2.69E-05	lb/MMBtu	7.5E-04	3.3E-03	AP-42, Table 3.2-2 (Jul-2000)
Phenanthrene	1.04E-05	lb/MMBtu	2.9E-04	1.3E-03	AP-42, Table 3.2-2 (Jul-2000)
Phenol	2.40E-05	lb/MMBtu	6.7E-04	2.9E-03	AP-42, Table 3.2-2 (Jul-2000)
Pyrene	1.36E-06	lb/MMBtu	3.8E-05	1.7E-04	AP-42, Table 3.2-2 (Jul-2000)
Styrene	2.36E-05	lb/MMBtu	6.6E-04	2.9E-03	AP-42, Table 3.2-2 (Jul-2000)
Tetrachloroethane	2.48E-06	lb/MMBtu	6.9E-05	3.0E-04	AP-42, Table 3.2-2 (Jul-2000)
Toluene	4.08E-04	lb/MMBtu	1.1E-02	5.0E-02	AP-42, Table 3.2-2 (Jul-2000)
Vinyl Chloride	1.49E-05	lb/MMBtu	4.2E-04	1.8E-03	AP-42, Table 3.2-2 (Jul-2000)
Xylene	1.84E-04	lb/MMBtu	5.1E-03	2.2E-02	AP-42, Table 3.2-2 (Jul-2000)
Total HAP (including HCHO)			**0.87**	**3.82**	

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

Compressor Engines

Engine Information:

Source Designation:	**CE-4 and CE-5**
Manufacturer:	Caterpillar
Model No.:	G3616
Stroke Cycle:	4-stroke
Type of Burn:	Lean
Rated Horsepower (bhp):	5,000

Engine Fuel Information:

Fuel Type:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,072
Specific Fuel Consumption (Btu/bhp-hr):	7,511
Maximum Fuel Consumption at 100% Load (scf/hr):	35,025
Heat Input (MMBtu/hr):	37.56
Potential Fuel Consumption (MMBtu/yr):	328,982
Max. Fuel Consumption at 100% (MMscf/hr):	0.0350
Max. Fuel Consumption (MMscf/yr):	306.8
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	5.51	24.14	Manufacturer Specifications
VOC (excludes HCHO)	0.25	g/bhp-hr	2.76	12.07	Manufacturer Specifications
VOC (includes HCHO)	---	---	3.42	14.97	VOC + HCHO
CO	0.15	g/bhp-hr	1.65	7.24	Vendor Specifications
SO_X	0.001	lb/MMBtu	0.02	0.10	AP-42, Table 3.2-2 (Jul-2000)
PM_{10}	0.01	lb/MMBtu	0.38	1.64	AP-42, Table 3.2-2 (Jul-2000)
$PM_{2.5}$	0.01	lb/MMBtu	0.38	1.64	AP-42, Table 3.2-2 (Jul-2000)
Formaldehyde (HCHO)	0.06	g/bhp-hr	0.66	2.90	Vendor Specifications
GHG (CO_2e)	See Table Below		5,509	24,127	40 CFR 98, Tables C-1 & C-2
Other (Total HAP)	See Table Below		1.39	6.09	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: Daybrook 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	411	g/bhp-hr	4,530.52	19,843.69	Manufacturer Specifications
CH_4	3.54	g/bhp-hr	39.02	170.92	Manufacturer (THC - NMHC)
N_2O	0.0001	kg/MMBtu	0.01	0.04	40 CFR 98, Table C-2
GHG (CO_2e)			**5,509**	**24,127**	
Organic HAPs:					
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	1.5E-03	6.6E-03	AP-42, Table 3.2-2 (Jul-2000)
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	1.2E-03	5.2E-03	AP-42, Table 3.2-2 (Jul-2000)
1,3-Butadiene	2.67E-04	lb/MMBtu	1.0E-02	4.4E-02	AP-42, Table 3.2-2 (Jul-2000)
1,3-Dichloropropene	2.64E-05	lb/MMBtu	9.9E-04	4.3E-03	AP-42, Table 3.2-2 (Jul-2000)
2-Methylnapthalene	3.32E-05	lb/MMBtu	1.2E-03	5.5E-03	AP-42, Table 3.2-2 (Jul-2000)
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	9.4E-03	4.1E-02	AP-42, Table 3.2-2 (Jul-2000)
Acenaphthene	1.25E-06	lb/MMBtu	4.7E-05	2.1E-04	AP-42, Table 3.2-2 (Jul-2000)
Acenaphthylene	5.53E-06	lb/MMBtu	2.1E-04	9.1E-04	AP-42, Table 3.2-2 (Jul-2000)
Acetaldehyde	8.36E-03	lb/MMBtu	3.1E-01	1.4E+00	AP-42, Table 3.2-2 (Jul-2000)
Acrolein	5.14E-03	lb/MMBtu	1.9E-01	8.5E-01	AP-42, Table 3.2-2 (Jul-2000)
Benzene	4.40E-04	lb/MMBtu	1.7E-02	7.2E-02	AP-42, Table 3.2-2 (Jul-2000)
Benzo(b)fluoranthene	1.66E-07	lb/MMBtu	6.2E-06	2.7E-05	AP-42, Table 3.2-2 (Jul-2000)
Benzo(e)pyrene	4.15E-07	lb/MMBtu	1.6E-05	6.8E-05	AP-42, Table 3.2-2 (Jul-2000)
Benzo(g,h,i)perylene	4.14E-07	lb/MMBtu	1.6E-05	6.8E-05	AP-42, Table 3.2-2 (Jul-2000)
Biphenyl	2.12E-04	lb/MMBtu	8.0E-03	3.5E-02	AP-42, Table 3.2-2 (Jul-2000)
Carbon Tetrachloride	3.67E-05	lb/MMBtu	1.4E-03	6.0E-03	AP-42, Table 3.2-2 (Jul-2000)
Chlorobenzene	3.04E-05	lb/MMBtu	1.1E-03	5.0E-03	AP-42, Table 3.2-2 (Jul-2000)
Chloroform	2.85E-05	lb/MMBtu	1.1E-03	4.7E-03	AP-42, Table 3.2-2 (Jul-2000)
Chrysene	6.93E-07	lb/MMBtu	2.6E-05	1.1E-04	AP-42, Table 3.2-2 (Jul-2000)
Ethylbenzene	3.97E-05	lb/MMBtu	1.5E-03	6.5E-03	AP-42, Table 3.2-2 (Jul-2000)
Ethylene Dibromide	4.43E-05	lb/MMBtu	1.7E-03	7.3E-03	AP-42, Table 3.2-2 (Jul-2000)
Fluoranthene	1.11E-06	lb/MMBtu	4.2E-05	1.8E-04	AP-42, Table 3.2-2 (Jul-2000)
Fluorene	5.67E-06	lb/MMBtu	2.1E-04	9.3E-04	AP-42, Table 3.2-2 (Jul-2000)
Methanol	2.50E-03	lb/MMBtu	9.4E-02	4.1E-01	AP-42, Table 3.2-2 (Jul-2000)
Methylene Chloride	2.00E-05	lb/MMBtu	7.5E-04	3.3E-03	AP-42, Table 3.2-2 (Jul-2000)
n-Hexane	1.11E-03	lb/MMBtu	4.2E-02	1.8E-01	AP-42, Table 3.2-2 (Jul-2000)
Naphthalene	7.44E-05	lb/MMBtu	2.8E-03	1.2E-02	AP-42, Table 3.2-2 (Jul-2000)
PAH	2.69E-05	lb/MMBtu	1.0E-03	4.4E-03	AP-42, Table 3.2-2 (Jul-2000)
Phenanthrene	1.04E-05	lb/MMBtu	3.9E-04	1.7E-03	AP-42, Table 3.2-2 (Jul-2000)
Phenol	2.40E-05	lb/MMBtu	9.0E-04	3.9E-03	AP-42, Table 3.2-2 (Jul-2000)
Pyrene	1.36E-06	lb/MMBtu	5.1E-05	2.2E-04	AP-42, Table 3.2-2 (Jul-2000)
Styrene	2.36E-05	lb/MMBtu	8.9E-04	3.9E-03	AP-42, Table 3.2-2 (Jul-2000)
Tetrachloroethane	2.48E-06	lb/MMBtu	9.3E-05	4.1E-04	AP-42, Table 3.2-2 (Jul-2000)
Toluene	4.08E-04	lb/MMBtu	1.5E-02	6.7E-02	AP-42, Table 3.2-2 (Jul-2000)
Vinyl Chloride	1.49E-05	lb/MMBtu	5.6E-04	2.5E-03	AP-42, Table 3.2-2 (Jul-2000)
Xylene	1.84E-04	lb/MMBtu	6.9E-03	3.0E-02	AP-42, Table 3.2-2 (Jul-2000)
Total HAP (including HCHO)			**1.39**	**6.09**	

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

Compressor Engines

Engine Information:

Source Designation:	**CE-6**
Manufacturer:	Caterpillar
Model No.:	G3608
Stroke Cycle:	4-stroke
Type of Burn:	Lean
Rated Horsepower (bhp):	2,370

Engine Fuel Information:

Fuel Type:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,072
Specific Fuel Consumption (Btu/bhp-hr):	7,531
Maximum Fuel Consumption at 100% Load (scf/hr):	16,646
Heat Input (MMBtu/hr):	17.85
Potential Fuel Consumption (MMBtu/yr):	156,353
Max. Fuel Consumption at 100% (MMscf/hr):	0.0166
Max. Fuel Consumption (MMscf/yr):	145.8
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	2.61	11.44	Manufacturer Specifications
VOC (excludes HCHO)	0.26	g/bhp-hr	1.36	5.95	Total VOC minus HCHO
VOC (includes HCHO)	---	---	1.67	7.32	Permit Limit
CO	0.19	g/bhp-hr	0.99	4.34	Permit Limit
SO_X	0.001	lb/MMBtu	0.01	0.05	AP-42, Table 3.2-2 (Jul-2000)
PM_{10}	0.01	lb/MMBtu	0.18	0.78	AP-42, Table 3.2-2 (Jul-2000)
$PM_{2.5}$	0.01	lb/MMBtu	0.18	0.78	AP-42, Table 3.2-2 (Jul-2000)
Formaldehyde (HCHO)	0.06	g/bhp-hr	0.31	1.37	Permit Limit
GHG (CO_2e)	See Table Below		3,000	13,141	40 CFR 98, Tables C-1 & C-2
Other (Total HAP)	See Table Below		0.66	2.88	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: Daybrook 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	440	g/bhp-hr	2,298.99	10,069.59	Manufacturer Specifications
CH_4	5.36	g/bhp-hr	28.01	122.67	Manufacturer (THC - NMHC)
N_2O	0.0001	kg/MMBtu	0.00	0.02	40 CFR 98, Table C-2
GHG (CO_2e)			**3,000**	**13,141**	
Organic HAPs:					
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	7.1E-04	3.1E-03	AP-42, Table 3.2-2 (Jul-2000)
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	5.7E-04	2.5E-03	AP-42, Table 3.2-2 (Jul-2000)
1,3-Butadiene	2.67E-04	lb/MMBtu	4.8E-03	2.1E-02	AP-42, Table 3.2-2 (Jul-2000)
1,3-Dichloropropene	2.64E-05	lb/MMBtu	4.7E-04	2.1E-03	AP-42, Table 3.2-2 (Jul-2000)
2-Methylnapthalene	3.32E-05	lb/MMBtu	5.9E-04	2.6E-03	AP-42, Table 3.2-2 (Jul-2000)
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	4.5E-03	2.0E-02	AP-42, Table 3.2-2 (Jul-2000)
Acenaphthene	1.25E-06	lb/MMBtu	2.2E-05	9.8E-05	AP-42, Table 3.2-2 (Jul-2000)
Acenaphthylene	5.53E-06	lb/MMBtu	9.9E-05	4.3E-04	AP-42, Table 3.2-2 (Jul-2000)
Acetaldehyde	8.36E-03	lb/MMBtu	1.5E-01	6.5E-01	AP-42, Table 3.2-2 (Jul-2000)
Acrolein	5.14E-03	lb/MMBtu	9.2E-02	4.0E-01	AP-42, Table 3.2-2 (Jul-2000)
Benzene	4.40E-04	lb/MMBtu	7.9E-03	3.4E-02	AP-42, Table 3.2-2 (Jul-2000)
Benzo(b)fluoranthene	1.66E-07	lb/MMBtu	3.0E-06	1.3E-05	AP-42, Table 3.2-2 (Jul-2000)
Benzo(e)pyrene	4.15E-07	lb/MMBtu	7.4E-06	3.2E-05	AP-42, Table 3.2-2 (Jul-2000)
Benzo(g,h,i)perylene	4.14E-07	lb/MMBtu	7.4E-06	3.2E-05	AP-42, Table 3.2-2 (Jul-2000)
Biphenyl	2.12E-04	lb/MMBtu	3.8E-03	1.7E-02	AP-42, Table 3.2-2 (Jul-2000)
Carbon Tetrachloride	3.67E-05	lb/MMBtu	6.6E-04	2.9E-03	AP-42, Table 3.2-2 (Jul-2000)
Chlorobenzene	3.04E-05	lb/MMBtu	5.4E-04	2.4E-03	AP-42, Table 3.2-2 (Jul-2000)
Chloroform	2.85E-05	lb/MMBtu	5.1E-04	2.2E-03	AP-42, Table 3.2-2 (Jul-2000)
Chrysene	6.93E-07	lb/MMBtu	1.2E-05	5.4E-05	AP-42, Table 3.2-2 (Jul-2000)
Ethylbenzene	3.97E-05	lb/MMBtu	7.1E-04	3.1E-03	AP-42, Table 3.2-2 (Jul-2000)
Ethylene Dibromide	4.43E-05	lb/MMBtu	7.9E-04	3.5E-03	AP-42, Table 3.2-2 (Jul-2000)
Fluoranthene	1.11E-06	lb/MMBtu	2.0E-05	8.7E-05	AP-42, Table 3.2-2 (Jul-2000)
Fluorene	5.67E-06	lb/MMBtu	1.0E-04	4.4E-04	AP-42, Table 3.2-2 (Jul-2000)
Methanol	2.50E-03	lb/MMBtu	4.5E-02	2.0E-01	AP-42, Table 3.2-2 (Jul-2000)
Methylene Chloride	2.00E-05	lb/MMBtu	3.6E-04	1.6E-03	AP-42, Table 3.2-2 (Jul-2000)
n-Hexane	1.11E-03	lb/MMBtu	2.0E-02	8.7E-02	AP-42, Table 3.2-2 (Jul-2000)
Naphthalene	7.44E-05	lb/MMBtu	1.3E-03	5.8E-03	AP-42, Table 3.2-2 (Jul-2000)
PAH	2.69E-05	lb/MMBtu	4.8E-04	2.1E-03	AP-42, Table 3.2-2 (Jul-2000)
Phenanthrene	1.04E-05	lb/MMBtu	1.9E-04	8.1E-04	AP-42, Table 3.2-2 (Jul-2000)
Phenol	2.40E-05	lb/MMBtu	4.3E-04	1.9E-03	AP-42, Table 3.2-2 (Jul-2000)
Pyrene	1.36E-06	lb/MMBtu	2.4E-05	1.1E-04	AP-42, Table 3.2-2 (Jul-2000)
Styrene	2.36E-05	lb/MMBtu	4.2E-04	1.8E-03	AP-42, Table 3.2-2 (Jul-2000)
Tetrachloroethane	2.48E-06	lb/MMBtu	4.4E-05	1.9E-04	AP-42, Table 3.2-2 (Jul-2000)
Toluene	4.08E-04	lb/MMBtu	7.3E-03	3.2E-02	AP-42, Table 3.2-2 (Jul-2000)
Vinyl Chloride	1.49E-05	lb/MMBtu	2.7E-04	1.2E-03	AP-42, Table 3.2-2 (Jul-2000)
Xylene	1.84E-04	lb/MMBtu	3.3E-03	1.4E-02	AP-42, Table 3.2-2 (Jul-2000)
Total HAP (including HCHO)			**0.66**	**2.88**	

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

Glycol Dehydrator

Source Designation:	RSV-1
Throughput Rating (MMSCFD):	125
Tower Temperature (deg F):	100
Tower Pressure (psig):	1,250
Glycol Pump Rate (gpm):	15
Flash Tank Temperature (deg F):	110
Flash Tank Pressure (psig):	35
Potential Annual Hours of Operation (hr/yr):	8,760

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY [1]
Controlled Regenerator Emissions

Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Methane	0.6752	16.206	2.9576
Ethane	0.3572	8.572	1.5644
Propane	0.1594	3.827	0.6984
Isobutane	0.0350	0.841	0.1534
n-Butane	0.0580	1.393	0.2543
Isopentane	0.0177	0.424	0.0774
n-Pentane	0.0121	0.291	0.0531
n-Hexane*	0.0620	1.480	0.2700
Other Hexanes	0.0149	0.357	0.0652
Heptanes	0.0115	0.276	0.0504
Total Emissions	1.3473	32.335	5.9012
Total Hydrocarbon Emissions	1.3473	32.335	5.9012
Total VOC Emissions	0.3149	7.557	1.3792
Total HAP Emissions	0.0620	1.480	0.2700

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY [1]
Flash Gas Emissions

Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Methane	146.1101	3,506.643	639.9624
Ethane	20.9998	503.996	91.9793
Propane	3.9875	95.700	17.4653
Isobutane	0.5544	13.305	2.4282
n-Butane	0.6865	16.477	3.0070
Isopentane	0.1794	4.307	0.7860
n-Pentane	0.0964	2.314	0.4222
n-Hexane*	0.2580	6.190	1.1300
Other Hexanes	0.0846	2.030	0.3704
Heptanes	0.0223	0.536	0.0979
Total Emissions	172.7469	4,145.927	756.6316
Total Hydrocarbon Emissions	172.7469	4,145.927	756.6316
Total VOC Emissions	5.6370	135.287	24.6900
Total HAP Emissions	0.2580	6.190	1.1300

Total Emission Rate [2]
Regenerator + Flash Tank

Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Methane	161.4638	3,875.134	707.2120
Ethane	23.4927	563.825	102.8981
Propane	4.5616	109.480	19.9801
Isobutane	0.6483	15.561	2.8398
n-Butane	0.8190	19.657	3.5874
Isopentane	0.2168	5.204	0.9497
n-Pentane	0.1194	2.866	0.5228
n-Hexane*	0.3520	8.437	1.5400
Other Hexanes	0.1095	2.626	0.4792
Heptanes	0.0372	0.893	0.1631
Total Emissions	191.5036	4,596.088	838.7861
Total Hydrocarbon Emissions	191.5036	4,596.088	838.7861
Total VOC Emissions	6.5471	157.128	28.6761
Total HAP Emissions	0.3520	8.437	1.5400

* HAPs (the total emissions rate values for these constituents include a compliance margin to account for the periodic variability of the inlet natural gas)

1. Based on GRI-GLYCalc 4.0 run. The unit utilizes energy-exchange glycol pumps.
2. Totals conservatively include a 10% compliance margin to account for minor variations in inlet gas composition that may occur periodically.

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

Reboiler

Source Designation:	**RBV-1**
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,072
Heat Input (MMBtu/hr):	1.50
Fuel Consumption (MMscf/hr):	1.40E-03
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
NO_x	100	0.14	0.61
CO	84	0.12	0.51
VOC	5.5	0.01	0.03
SO_2	0.6	8.4E-04	3.7E-03
PM Total	7.6	0.01	0.05
PM Condensable	5.7	8.0E-03	0.03
PM_{10} (Filterable)	1.9	2.7E-03	0.01
$PM_{2.5}$ (Filterable)	1.9	2.7E-03	0.01
Lead	5.00E-04	7.0E-07	3.1E-06
CO_2[4]	117.0	175.50	768.67
CH_4[4]	2.21E-03	3.3E-03	1.4E-02
N_2O[4]	2.21E-04	3.3E-04	1.4E-03

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

Reboiler

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
HAPs:			
Methylnaphthalene (2-)	2.4E-05	3.4E-08	1.5E-07
3-Methylchloranthrene	1.8E-06	2.5E-09	1.1E-08
7,12-Dimethylbenz(a)anthracene	1.6E-05	2.2E-08	9.8E-08
Acenaphthene	1.8E-06	2.5E-09	1.1E-08
Acenaphthylene	1.8E-06	2.5E-09	1.1E-08
Anthracene	2.4E-06	3.4E-09	1.5E-08
Benz(a)anthracene	1.8E-06	2.5E-09	1.1E-08
Benzene	2.1E-03	2.9E-06	1.3E-05
Benzo(a)pyrene	1.2E-06	1.7E-09	7.4E-09
Benzo(b)fluoranthene	1.8E-06	2.5E-09	1.1E-08
Benzo(g,h,i)perylene	1.2E-06	1.7E-09	7.4E-09
Benzo(k)fluoranthene	1.8E-06	2.5E-09	1.1E-08
Chrysene	1.8E-06	2.5E-09	1.1E-08
Dibenzo(a,h) anthracene	1.2E-06	1.7E-09	7.4E-09
Dichlorobenzene	1.2E-03	1.7E-06	7.4E-06
Fluoranthene	3.0E-06	4.2E-09	1.8E-08
Fluorene	2.8E-06	3.9E-09	1.7E-08
Formaldehyde	7.5E-02	1.0E-04	4.6E-04
Hexane	1.8E+00	2.5E-03	1.1E-02
Indo(1,2,3-cd)pyrene	1.8E-06	2.5E-09	1.1E-08
Naphthalene	6.1E-04	8.5E-07	3.7E-06
Phenanthrene	1.7E-05	2.4E-08	1.0E-07
Pyrene	5.0E-06	7.0E-09	3.1E-08
Toluene	3.4E-03	4.8E-06	2.1E-05
Arsenic	2.0E-04	2.8E-07	1.2E-06
Beryllium	1.2E-05	1.7E-08	7.4E-08
Cadmium	1.1E-03	1.5E-06	6.7E-06
Chromium	1.4E-03	2.0E-06	8.6E-06
Cobalt	8.4E-05	1.2E-07	5.1E-07
Manganese	3.8E-04	5.3E-07	2.3E-06
Mercury	2.6E-04	3.6E-07	1.6E-06
Nickel	2.1E-03	2.9E-06	1.3E-05
Selenium	2.4E-05	3.4E-08	1.5E-07
Total HAP		**2.6E-03**	**1.2E-02**

[1] Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3

[2] Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).

[3] Annual Emissions $(tons/yr)_{Potential}$ = $(lb/hr)_{Emissions}$ × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

[4] GHG Emission factors from Tables C-1 and C-2, 40 CFR 98, Subpart C.

Company Name: DTE Appalachia Gathering, LLC
Facility Name: Daybrook 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 T08**		**T09 to T18**		**T19 & T20**		**T21**	
Contents:	Waste Water/Oil		Methanol		Produced Water		Coolant (Glycol)		Engine/Compressor Oil		Triethylene Glycol		Coolant/Oil	
Number:	1 tank(s)		1 tank(s)		2 tank(s)		4 tank(s)		10 tank(s)		2 tank(s)		1 tank(s)	
Capacity:	4,200 gal (each)		4,200 gal (each)		16,800 gal (each)		500 gal (each)		500 gal (each)		1,000 gal (each)		1,000 gal (each)	
Throughput:	50,400 gal (each)		50,400 gal (each)		201,600 gal (each)		6,000 gal (each)		6,000 gal (each)		12,000 gal (each)		12,000 gal (each)	
Condensate Throughput:	0.1 bbl/day (each		---		0.2 bbl/day (each		---		---		---		---	
Emissions (per tank)	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**
VOC	0.052	0.229	0.016	0.069	0.105	0.459	6.8E-06	3.0E-05	9.6E-05	4.2E-04	6.8E-06	3.0E-05	9.6E-05	4.2E-04
HAP	0.005	0.020	0.016	0.069	0.007	0.030	6.8E-06	3.0E-05	9.6E-05	4.2E-04	6.8E-06	3.0E-05	9.6E-05	4.2E-04
Benzene	<0.001	0.002	---	---	0.001	0.003	---	---	---	---	---	---	---	---
Toluene	<0.001	0.001	---	---	<0.001	0.002	---	---	---	---	---	---	---	---
Ethylbenzene	<0.001	<0.001	---	---	<0.001	<0.001	---	---	---	---	---	---	---	---
Xylene	<0.001	<0.001	---	---	<0.001	<0.001	---	---	---	---	---	---	---	---
n-Hexane	0.002	0.008	---	---	0.006	0.026	---	---	---	---	---	---	---	---
Methane	0.001	0.006	---	---	0.003	0.013	---	---	---	---	---	---	---	---

[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.
[4] Emissions from tanks with the capacity to store more than one fluid are represented with the most conservative pollutant (largest emissions).

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

Liquid Loading

Throughput 453,600 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	453,600	0.02	0.08	0.00	0.01

[1] Total estimated maximum annual throughput for the waste fluid tanks.
[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: Daybrook 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 Equipment and Onshore Petroleum and Natural Gas Gathering and Boosting Equipment

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	1	0.19	1.00	3.5E-03	0.19	6.8E-04
Compressor	Gas	0.22800	6	13	0.03	9.0E-05	0.34	1.2E-03
Valves	Gas	0.00597	168	9.68	0.03	9.0E-05	0.25	8.7E-04
Pressure Relief Valves	Gas	0.10400	11	11.05	0.03	9.0E-05	0.28	9.9E-04
Open-Ended Lines	All	0.00170	3	0.05	0.03	9.0E-05	1.3E-03	4.4E-06
Connectors	All	0.00183	752	13.28	0.03	9.0E-05	0.34	1.2E-03
Continuous Pneumatic Devices[4]	Gas	1.39	25	6.92	0.03	9.0E-05	0.18	6.2E-04
Intermittent Pneumatic Devices[4]	Gas	13.5	16	43.04	0.03	9.0E-05	1.09	3.9E-03
			Emission Totals:	**47.46**	**---**	**---**	**2.66**	**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 extraction. The pneumatic controller values are from 40 CFR 98 Subpart W, Table W-1A (units of scf/hr-component).

[2] Pressure relief valves count includes two for each storage tank. 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: Daybrook 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	1	0.19	<0.01	<0.01	<0.01	<0.01	1.7E-05
Compressor	Gas	0.22800	6	13.21	<0.01	<0.01	<0.01	<0.01	1.2E-03
Valves	Gas	0.00597	168	9.68	<0.01	<0.01	<0.01	<0.01	8.7E-04
Pressure Relief Valves	Gas	0.10400	11	11.05	<0.01	<0.01	<0.01	<0.01	9.9E-04
Open-Ended Lines	All	0.00170	3	0.05	<0.01	<0.01	<0.01	<0.01	4.4E-06
Connectors	All	0.00183	752	13.28	<0.01	<0.01	<0.01	<0.01	1.2E-03
Continuous Pneumatic Devices[4]	Gas	1.39	25	6.92	<0.01	<0.01	<0.01	<0.01	6.2E-04
Intermittent Pneumatic Devices[4]	Gas	13.5	16	43.04	<0.01	<0.01	<0.01	<0.01	3.9E-03
			Emission Totals:	**47.46**	**<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 extraction. The pneumatic controller values are from 40 CFR 98 Subpart W, Table W-1A (units of scf/hr-component).

[2] Pressure relief valves count includes one Emergency Pressure Relief valve and one hatch for each storage tank. 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	1	0.01	1.7E-03	5.8E-06	0.04
Compressor	6	4.17	4.30	0.01	107.46
Valves	168	0.027	0.78	2.6E-03	19.48
Pressure Relief Devices	11	0.04	0.08	2.5E-04	1.89
Open-Ended Lines	3	0.061	0.03	1.1E-04	0.79
Connectors	752	0.003	0.39	1.3E-03	9.68
Continuous Pneumatic Devices	25	1.39	5.97	0.02	149.25
Intermittent Pneumatic Devices	16	13.5	37.10	0.12	927.74
Total			**48.65**	**0.16**	**1216.35**

[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: 93% CO_2: 0.11%

[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: Daybrook 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	---	2,216,280	2,216,280	50.41	1.28	<0.01	<0.01	<0.01	<0.01	4.5E-03	4.5E-03	43.46	0.15	1,087
Compressor Blowdown	360	4,500	1,620,000	36.85	0.94	<0.01	<0.01	<0.01	<0.01	3.3E-03	3.3E-03	31.77	0.11	794
Compressor Startup	360	1,000	360,000	8.19	0.21	<0.01	<0.01	<0.01	<0.01	7.4E-04	7.4E-04	7.06	0.02	177
Plant Shutdown	1	900,000	900,000	20.47	0.52	<0.01	<0.01	<0.01	<0.01	1.8E-03	1.8E-03	17.65	0.06	441
Low Pressure Pig Venting	52	1,000	52,000	1.18	0.03	<0.01	<0.01	<0.01	<0.01	1.1E-04	1.1E-04	1.02	0.00	25
High Pressure Pig Venting	104	1,000	104,000	2.37	0.06	<0.01	<0.01	<0.01	<0.01	2.1E-04	2.1E-04	2.04	0.01	51
Total	**---**	**---**	5,252,280	119.47	**3.03**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.01**	**0.01**	**103.00**	**0.35**	**2,575**

[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] Total gas volume emitted includes blowdowns and other venting activities, such as pigging.
[6] 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)
[7] 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: Daybrook 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	0.15	113	34	0	0.07	0.02	0.00
Employee Vehicles	3	3	3	0.15	200	61	0	0.05	0.01	0.00
Total Potential Emissions								**0.12**	**0.03**	**0.00**

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

Gas Analysis

Sample Location: Daybrook Compressor Station
HHV (Btu/scf): 1,072

Constituent	Natural Gas Stream Speciation (Mole %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.1133	44.01	0.05	0.00	0.289
Nitrogen	0.2900	28.01	0.08	0.00	0.471
Methane	92.6560	16.04	14.86	0.86	86.196
Ethane	6.0239	30.07	1.81	0.11	10.506
Propane	0.7259	44.10	0.32	0.02	1.857
Isobutane	0.0720	58.12	0.04	0.00	0.243
n-Butane	0.0822	58.12	0.05	0.00	0.277
Isopentane	0.0183	72.15	0.01	0.00	0.077
n-Pentane	0.0090	72.15	0.01	0.00	0.038
Cyclopentane	<0.001	70.10	0.00	0.00	0.000
n-Hexane	0.0018	86.18	0.00	0.00	0.009
Cyclohexane	<0.001	84.16	0.00	0.00	0.000
Other Hexanes	0.0064	86.18	0.01	0.00	0.032
Heptanes	0.0012	100.21	0.00	0.00	0.007
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		17.24	1.00	100

TOC (Total)	99.60				99.24
VOC (Total)	0.92				2.54
HAP (Total)	0.00				0.01

J-W Measurement Company

Canonsburg, PA

724-749-5180

Good

Customer	: 2239 - M3 APPALACHIA GATHERING LLC	**Date Sampled**	: 08/14/2013
Station ID	: 12919300	**Date Analyzed**	: 08/23/2013
Cylinder ID	: 5834	**Effective Date**	: 09/01/2013
Producer	:	**Cyl Pressure**	: 879
Lease	: ETC BOBCAT	**Temp**	: 74
Area	: 100 - AGS WV	**Cylinder Type**	: Spot
State	: WV	**Sample By**	: JC

COMPONENT	MOL%	GPM@14.73(PSIA)
Methane	92.6560	0.000
Ethane	6.0239	1.614
Propane	0.7259	0.200
Iso-Butane	0.0720	0.024
Normal-Butane	0.0822	0.026
Iso-Pentane	0.0183	0.007
Normal-Pentane	0.0090	0.003
Nitrogen	0.2900	0.000
Carbon-Dioxide	0.1133	0.000
Oxygen	0.0000	0.000
BENZENE	0.0000	0.000
TOLUENE	0.0000	0.000
ETHYLBENZENE	0.0000	0.000
2,2-Dimethylbutane	0.0011	0.000
2,3-Dimethylbutane/CycloC5	0.0009	0.000
2-methylpentane	0.0027	0.001
3-methylpentane	0.0017	0.001
Normal-Hexane	0.0018	0.001
2,2-Dimethylpentane	0.0000	0.000
Methylcyclopentane	0.0000	0.000
3,3-Dimethylpentane	0.0000	0.000
CYCLOHEXANE	0.0000	0.000
2-Methylhexane	0.0006	0.000
2,3-Dimethylpentane	0.0000	0.000
3-Methylhexane	0.0006	0.000
1,t3-Dimethylcyclopentane	0.0000	0.000
1,t2-DMCYC5 / 2,2,4-TMC5	0.0000	0.000
N-Heptane	0.0000	0.000
METHYLCYCLOHEXANE	0.0000	0.000
2,5-Dimethylhexane	0.0000	0.000
2,3-Dimethylhexane	0.0000	0.000
2-Methylheptane	0.0000	0.000
4-Methylheptane	0.0000	0.000
3-Methylheptane	0.0000	0.000
1,t4-Dimethylcyclohexane	0.0000	0.000
N-OCTANE / 1,T2-DMCYC6	0.0000	0.000
1,t3-DMCYC6/1,C4-DMCYC6/1,C2,C3-TMCYC5	0.0000	0.000
2,4,4 TMC6	0.0000	0.000

2,6-Dimethylheptane / 1,C2-DMCYC6	0.0000	0.000
Ethylcyclohexane	0.0000	0.000
M-Xylene/P-Xylene	0.0000	0.000
O-XYLENE	0.0000	0.000
NONANE	0.0000	0.000
N-DECANE	0.0000	0.000
N-UNDECANE	0.0000	0.000
TOTAL	**100.0000**	**1.877**

Compressibility Factor (Z) @ 14.73 @ 60 Deg. F = 0.9977 **C5+ GPM** : 0.00998

Ideal Gravity: 0.5954 **Real Gravity:** 0.5965 **C5+ Mole %** : 0.0273

BTU @ (PSIA)	**@14.65**	**@14.696**	**@14.73**	**@15.025**
Ideal GPM	1.864	1.870	1.874	1.911
Ideal BTU Dry	1,063.92	1,067.26	1,069.73	1,091.15
Ideal BTU Sat	1,045.30	1,048.64	1,051.11	1,072.53
Real GPM	1.868	1.874	1.878	1.916
Real BTU Dry	1,066.39	1,069.74	1,072.22	1,093.75
Real BTU Sat	1,048.09	1,051.45	1,053.93	1,075.46
Ideal BTU as Delivered	1,063.23	1,066.57	1,069.04	1,090.45
Real BTU as Delivered	1,065.69	1,069.05	1,071.53	1,093.04

Comments:

Gas Analysis performed in accordance with GPA 2261 **Sample Count** : 210000002

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

Lab Technician: _____ **DEBORAH J MURPHY**

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Daybrook Compressor Station
File Name: P:\Client\DTE\West Virginia\Daybrook\Projects\173901.0120 Daybrook G35-D Application\04 Draft\2017-0818 Revised G35D Application\Attach U - Emission Calcs\04 GRI-GLYCalc\2017-0825 DTE Daybrook_G35D_DehyEmissions.ddf
Date: August 25, 2017

DESCRIPTION:

Description: Potential-to-emit calculations

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.6752	16.206	2.9576
Ethane	0.3572	8.572	1.5644
Propane	0.1594	3.827	0.6984
Isobutane	0.0350	0.841	0.1534
n-Butane	0.0580	1.393	0.2543
Isopentane	0.0177	0.424	0.0774
n-Pentane	0.0121	0.291	0.0531
n-Hexane	0.0062	0.148	0.0270
Other Hexanes	0.0149	0.357	0.0652
Heptanes	0.0115	0.276	0.0504
Total Emissions	1.3473	32.335	5.9012
Total Hydrocarbon Emissions	1.3473	32.335	5.9012
Total VOC Emissions	0.3149	7.557	1.3792
Total HAP Emissions	0.0062	0.148	0.0270

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	1.3505	32.412	5.9152
Ethane	0.7143	17.144	3.1288
Propane	0.3189	7.653	1.3967
Isobutane	0.0701	1.681	0.3068
n-Butane	0.1161	2.786	0.5085
Isopentane	0.0354	0.849	0.1549
n-Pentane	0.0243	0.582	0.1063
n-Hexane	0.0123	0.296	0.0541
Other Hexanes	0.0298	0.714	0.1304
Heptanes	0.0230	0.552	0.1007
Total Emissions	2.6946	64.671	11.8024
Total Hydrocarbon Emissions	2.6946	64.671	11.8024
Total VOC Emissions	0.6298	15.115	2.7584
Total HAP Emissions	0.0123	0.296	0.0541

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	146.1101	3506.643	639.9624
Ethane	20.9998	503.996	91.9793
Propane	3.9875	95.700	17.4653
Isobutane	0.5544	13.305	2.4282
n-Butane	0.6865	16.477	3.0070
Isopentane	0.1794	4.307	0.7860
n-Pentane	0.0964	2.314	0.4222
n-Hexane	0.0258	0.619	0.1130
Other Hexanes	0.0846	2.030	0.3704
Heptanes	0.0223	0.536	0.0979
Total Emissions	172.7469	4145.927	756.6316
Total Hydrocarbon Emissions	172.7469	4145.927	756.6316
Total VOC Emissions	5.6370	135.287	24.6900
Total HAP Emissions	0.0258	0.619	0.1130

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	292.2203	7013.286	1279.9247
Ethane	41.9997	1007.992	183.9586
Propane	7.9750	191.400	34.9305
Isobutane	1.1088	26.610	4.8563
n-Butane	1.3731	32.954	6.0141
Isopentane	0.3589	8.613	1.5719
n-Pentane	0.1928	4.627	0.8444
n-Hexane	0.0516	1.239	0.2260
Other Hexanes	0.1691	4.059	0.7408
Heptanes	0.0447	1.072	0.1957
Total Emissions	345.4939	8291.853	1513.2632
Total Hydrocarbon Emissions	345.4939	8291.853	1513.2632
Total VOC Emissions	11.2740	270.575	49.3799
Total HAP Emissions	0.0516	1.239	0.2260

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	146.7854	3522.849	642.9199
Ethane	21.3570	512.568	93.5437
Propane	4.1470	99.527	18.1636
Isobutane	0.5894	14.146	2.5816
n-Butane	0.7446	17.870	3.2613
Isopentane	0.1971	4.731	0.8634
n-Pentane	0.1085	2.605	0.4754
n-Hexane	0.0320	0.767	0.1401
Other Hexanes	0.0995	2.387	0.4356
Heptanes	0.0338	0.812	0.1482
Total Emissions	174.0942	4178.262	762.5328
Total Hydrocarbon Emissions	174.0942	4178.262	762.5328
Total VOC Emissions	5.9519	142.845	26.0692
Total HAP Emissions	0.0320	0.767	0.1401

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction
Methane	1285.8399	642.9199	50.00
Ethane	187.0874	93.5437	50.00
Propane	36.3273	18.1636	50.00
Isobutane	5.1632	2.5816	50.00
n-Butane	6.5226	3.2613	50.00
Isopentane	1.7268	0.8634	50.00
n-Pentane	0.9507	0.4754	50.00
n-Hexane	0.2801	0.1401	50.00
Other Hexanes	0.8712	0.4356	50.00
Heptanes	0.2964	0.1482	50.00
Total Emissions	1525.0656	762.5328	50.00
Total Hydrocarbon Emissions	1525.0656	762.5328	50.00
Total VOC Emissions	52.1383	26.0692	50.00
Total HAP Emissions	0.2801	0.1401	50.00

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature:	70.00 deg. F
Excess Oxygen:	5.00 %
Combustion Efficiency:	50.00 %
Supplemental Fuel Requirement:	9.96e-002 MM BTU/hr

Component	Emitted	Destroyed
Methane	50.00%	50.00%
Ethane	50.00%	50.00%
Propane	50.00%	50.00%
Isobutane	50.00%	50.00%
n-Butane	50.00%	50.00%
Isopentane	50.00%	50.00%
n-Pentane	50.00%	50.00%
n-Hexane	50.00%	50.00%
Other Hexanes	50.00%	50.00%
Heptanes	50.00%	50.00%

ABSORBER

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

Calculated Absorber Stages:	1.25
Calculated Dry Gas Dew Point:	3.21 lbs. H2O/MMSCF
Temperature:	100.0 deg. F

Pressure: 1250.0 psig
Dry Gas Flow Rate: 125.0000 MMSCF/day
Glycol Losses with Dry Gas: 3.0998 lb/hr
Wet Gas Water Content: Saturated
Calculated Wet Gas Water Content: 49.92 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio: 3.70 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	6.41%	93.59%
Carbon Dioxide	99.80%	0.20%
Nitrogen	99.98%	0.02%
Methane	99.98%	0.02%
Ethane	99.96%	0.04%
Propane	99.94%	0.06%
Isobutane	99.92%	0.08%
n-Butane	99.90%	0.10%
Isopentane	99.91%	0.09%
n-Pentane	99.89%	0.11%
n-Hexane	99.83%	0.17%
Other Hexanes	99.87%	0.13%
Heptanes	99.72%	0.28%

FLASH TANK

Flash Control: Combustion device
Flash Control Efficiency: 50.00 %
Flash Temperature: 110.0 deg. F
Flash Pressure: 35.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.75%	0.25%
Carbon Dioxide	6.01%	93.99%
Nitrogen	0.44%	99.56%
Methane	0.46%	99.54%
Ethane	1.67%	98.33%
Propane	3.84%	96.16%
Isobutane	5.94%	94.06%
n-Butane	7.80%	92.20%
Isopentane	9.15%	90.85%
n-Pentane	11.39%	88.61%
n-Hexane	19.53%	80.47%
Other Hexanes	15.40%	84.60%
Heptanes	34.21%	65.79%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	34.26%	65.74%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%

Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	2.24%	97.76%
n-Pentane	2.08%	97.92%
n-Hexane	1.47%	98.53%
Other Hexanes	3.33%	96.67%
Heptanes	1.01%	98.99%

STREAM REPORTS:

WET GAS STREAM

Temperature: 100.00 deg. F
Pressure: 1264.70 psia
Flow Rate: 5.21e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.05e-001	2.60e+002
Carbon Dioxide	1.13e-001	6.85e+002
Nitrogen	2.90e-001	1.12e+003
Methane	9.26e+001	2.04e+005
Ethane	6.02e+000	2.49e+004
Propane	7.25e-001	4.39e+003
Isobutane	7.19e-002	5.74e+002
n-Butane	8.21e-002	6.56e+002
Isopentane	1.83e-002	1.81e+002
n-Pentane	8.99e-003	8.91e+001
n-Hexane	1.80e-003	2.13e+001
Other Hexanes	6.39e-003	7.57e+001
Heptanes	1.20e-003	1.65e+001
Total Components	100.00	2.37e+005

DRY GAS STREAM

Temperature: 100.00 deg. F
Pressure: 1264.70 psia
Flow Rate: 5.21e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.75e-003	1.67e+001
Carbon Dioxide	1.13e-001	6.83e+002
Nitrogen	2.90e-001	1.11e+003
Methane	9.27e+001	2.04e+005
Ethane	6.02e+000	2.49e+004
Propane	7.26e-001	4.39e+003
Isobutane	7.20e-002	5.74e+002
n-Butane	8.21e-002	6.55e+002
Isopentane	1.83e-002	1.81e+002
n-Pentane	8.99e-003	8.90e+001
n-Hexane	1.80e-003	2.13e+001

Other Hexanes	6.39e-003	7.56e+001
Heptanes	1.20e-003	1.65e+001
Total Components	100.00	2.37e+005

LEAN GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 1.50e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	8.32e+003
Water	1.50e+000	1.27e+002
Carbon Dioxide	1.59e-012	1.34e-010
Nitrogen	2.37e-013	2.00e-011
Methane	1.23e-017	1.04e-015
Ethane	5.98e-008	5.05e-006
Propane	1.27e-009	1.07e-007
Isobutane	1.56e-010	1.32e-008
n-Butane	1.90e-010	1.60e-008
Isopentane	9.58e-006	8.09e-004
n-Pentane	6.09e-006	5.15e-004
n-Hexane	2.18e-006	1.84e-004
Other Hexanes	1.21e-005	1.03e-003
Heptanes	2.77e-006	2.34e-004
Total Components	100.00	8.45e+003

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 100.00 deg. F
Pressure: 1264.70 psia
Flow Rate: 1.63e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.20e+001	8.32e+003
Water	4.10e+000	3.71e+002
Carbon Dioxide	2.46e-002	2.22e+000
Nitrogen	1.81e-002	1.63e+000
Methane	3.25e+000	2.94e+002
Ethane	4.73e-001	4.27e+001
Propane	9.18e-002	8.29e+000
Isobutane	1.30e-002	1.18e+000
n-Butane	1.65e-002	1.49e+000
Isopentane	4.37e-003	3.95e-001
n-Pentane	2.41e-003	2.18e-001
n-Hexane	7.10e-004	6.41e-002
Other Hexanes	2.21e-003	2.00e-001
Heptanes	7.51e-004	6.79e-002
Total Components	100.00	9.04e+003

FLASH TANK OFF GAS STREAM

Temperature: 110.00 deg. F

Pressure: 49.70 psia
Flow Rate: 7.59e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.56e-001	9.22e-001
Carbon Dioxide	2.37e-001	2.09e+000
Nitrogen	2.90e-001	1.63e+000
Methane	9.11e+001	2.92e+002
Ethane	6.98e+000	4.20e+001
Propane	9.04e-001	7.98e+000
Isobutane	9.54e-002	1.11e+000
n-Butane	1.18e-001	1.37e+000
Isopentane	2.49e-002	3.59e-001
n-Pentane	1.34e-002	1.93e-001
n-Hexane	2.99e-003	5.16e-002
Other Hexanes	9.81e-003	1.69e-001
Heptanes	2.23e-003	4.47e-002
Total Components	100.00	3.50e+002

FLASH TANK GLYCOL STREAM

Temperature: 110.00 deg. F
Flow Rate: 1.55e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.57e+001	8.32e+003
Water	4.26e+000	3.70e+002
Carbon Dioxide	1.54e-003	1.34e-001
Nitrogen	8.23e-005	7.15e-003
Methane	1.55e-002	1.35e+000
Ethane	8.22e-003	7.14e-001
Propane	3.67e-003	3.19e-001
Isobutane	8.06e-004	7.01e-002
n-Butane	1.34e-003	1.16e-001
Isopentane	4.16e-004	3.62e-002
n-Pentane	2.85e-004	2.48e-002
n-Hexane	1.44e-004	1.25e-002
Other Hexanes	3.54e-004	3.08e-002
Heptanes	2.67e-004	2.32e-002
Total Components	100.00	8.69e+003

FLASH GAS EMISSIONS

Flow Rate: 1.59e+004 scfh
Control Method: Combustion Device
Control Efficiency: 50.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	4.99e+001	3.76e+002
Carbon Dioxide	2.62e+001	4.81e+002
Nitrogen	1.39e-001	1.63e+000
Methane	2.18e+001	1.46e+002
Ethane	1.67e+000	2.10e+001

Propane	2.16e-001	3.99e+000
Isobutane	2.28e-002	5.54e-001
n-Butane	2.83e-002	6.87e-001
Isopentane	5.95e-003	1.79e-001
n-Pentane	3.20e-003	9.64e-002
n-Hexane	7.17e-004	2.58e-002
Other Hexanes	2.35e-003	8.46e-002
Heptanes	5.34e-004	2.23e-002
Total Components	100.00	1.03e+003

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 5.17e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.91e+001	2.43e+002
Carbon Dioxide	2.23e-002	1.34e-001
Nitrogen	1.87e-003	7.15e-003
Methane	6.18e-001	1.35e+000
Ethane	1.74e-001	7.14e-001
Propane	5.31e-002	3.19e-001
Isobutane	8.85e-003	7.01e-002
n-Butane	1.47e-002	1.16e-001
Isopentane	3.60e-003	3.54e-002
n-Pentane	2.47e-003	2.43e-002
n-Hexane	1.05e-003	1.23e-002
Other Hexanes	2.54e-003	2.98e-002
Heptanes	1.69e-003	2.30e-002
Total Components	100.00	2.46e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 2.28e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	7.02e+001	6.75e-001
Ethane	1.98e+001	3.57e-001
Propane	6.03e+000	1.59e-001
Isobutane	1.01e+000	3.50e-002
n-Butane	1.67e+000	5.80e-002
Isopentane	4.09e-001	1.77e-002
n-Pentane	2.80e-001	1.21e-002
n-Hexane	1.19e-001	6.17e-003
Other Hexanes	2.88e-001	1.49e-002
Heptanes	1.91e-001	1.15e-002
Total Components	100.00	1.35e+000

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

Project File : P:\Client\DTE\West Virginia\Daybrook\Projects\173901.0120 Daybrook G35-D Application
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 : Daybrook Compressor Station
Well Name : Waste Water Tanks (T01)
Date : 2017.08.04

****
* 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:	Daybrook Station (Methanol Tank)
City:	
State:	West Virginia
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	Storage of Methanol

Tank Dimensions

Shell Height (ft):	8.00
Diameter (ft):	9.50
Liquid Height (ft) :	8.00
Avg. Liquid Height (ft):	4.00
Volume (gallons):	4,200.00
Turnovers:	12.00
Net Throughput(gal/yr):	50,400.00
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

Daybrook Station (Methanol 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
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)

Daybrook Station (Methanol Tank) - Vertical Fixed Roof Tank

Annual Emission Calcaulations	
Standing Losses (lb):	87.2815
Vapor Space Volume (cu ft):	283.5287
Vapor Density (lb/cu ft):	0.0076
Vapor Space Expansion Factor:	0.1416
Vented Vapor Saturation Factor:	0.7814
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	283.5287
Tank Diameter (ft):	9.5000
Vapor Space Outage (ft):	4.0000
Tank Shell Height (ft):	8.0000
Average Liquid Height (ft):	4.0000
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):	4.7500
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
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:	0.1416
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:	0.7814
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	1.3195
Vapor Space Outage (ft):	4.0000
Working Losses (lb):	50.7323
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.3195
Annual Net Throughput (gal/yr.):	50,400.0000
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	4,200.0000
Maximum Liquid Height (ft):	8.0000
Tank Diameter (ft):	9.5000
Working Loss Product Factor:	1.0000
Total Losses (lb):	138.0138

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

Emissions Report for: Annual

Daybrook Station (Methanol Tank) - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Methyl alcohol	50.73	87.28	138.01

```
*****************************************************************************************
*     Project Setup Information                                                         *
*****************************************************************************************
Project File              : P:\Client\DTE\West Virginia\Daybrook\Projects\173901.0120 Daybrook G35-D Application
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                : Daybrook Compressor Station
Well Name                 : Produced Water Tanks (T03 - T04)
Date                      : 8/4/2017


*****************************************************************************************
*     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           : 0.2[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   Uncontrolled
                   [ton/yr]       [lb/hr]
```

Total HAPs	0.030	0.007
Total HC	0.508	0.116
VOCs, C2+	0.495	0.113
VOCs, C3+	0.459	0.105

Uncontrolled Recovery Info.

Vapor	21.3200 x1E-3	[MSCFD]
HC Vapor	19.8100 x1E-3	[MSCFD]
GOR	106.60	[SCF/bbl]

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

No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
1	H2S	0.024	0.005
2	O2	0.000	0.000
3	CO2	0.001	0.000
4	N2	0.000	0.000
5	C1	0.013	0.003
6	C2	0.036	0.008
7	C3	0.098	0.022
8	i-C4	0.040	0.009
9	n-C4	0.119	0.027
10	i-C5	0.051	0.012
11	n-C5	0.077	0.018
12	C6	0.015	0.003
13	C7	0.016	0.004
14	C8	0.008	0.002
15	C9	0.003	0.001
16	C10+	0.000	0.000
17	Benzene	0.003	0.001
18	Toluene	0.002	0.000
19	E-Benzene	0.000	0.000
20	Xylenes	0.000	0.000
21	n-C6	0.026	0.006
22	224Trimethylp	0.000	0.000
	Total	0.532	0.121

-- 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:	Daybrook Station (Glycol Tanks)
City:	
State:	West Virginia
Company:	
Type of Tank:	Horizontal Tank
Description:	Coolant (EG) and TEG Tanks

Tank Dimensions

Shell Length (ft):	8.00
Diameter (ft):	6.00
Volume (gallons):	1,000.00
Turnovers:	12.00
Net Throughput(gal/yr):	12,000.00
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

Daybrook Station (Glycol 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
Propylene glycol	All	57.20	47.16	67.23	52.14	0.0008	0.0005	0.0014	76.1100			76.11	Option 2: A=8.2082, B=2085.9, C=203.54

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

Daybrook Station (Glycol Tanks) - Horizontal Tank

Annual Emission Calcaulations	
Standing Losses (lb):	0.0426
Vapor Space Volume (cu ft):	144.0730
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0734
Vented Vapor Saturation Factor:	0.9999
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	144.0730
Tank Diameter (ft):	6.0000
Effective Diameter (ft):	7.8196
Vapor Space Outage (ft):	3.0000
Tank Shell Length (ft):	8.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	76.1100
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0008
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:	0.0734
Daily Vapor Temperature Range (deg. R):	40.1436
Daily Vapor Pressure Range (psia):	0.0009
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0008
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0005
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0014
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:	0.9999
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0008
Vapor Space Outage (ft):	3.0000
Working Losses (lb):	0.0175
Vapor Molecular Weight (lb/lb-mole):	76.1100
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0008
Annual Net Throughput (gal/yr.):	12,000.0000
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	6.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.0601

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

Emissions Report for: Annual

Daybrook Station (Glycol Tanks) - Horizontal Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Propylene glycol	0.02	0.04	0.06

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

Identification

User Identification:	Daybrook 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):	8.00
Diameter (ft):	6.00
Volume (gallons):	1,000.00
Turnovers:	12.00
Net Throughput(gal/yr):	12,000.00
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

Daybrook 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)

Daybrook Station (Oil Tanks) - Horizontal Tank

Annual Emission Calcaulations	
Standing Losses (lb):	0.5971
Vapor Space Volume (cu ft):	144.0730
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0736
Vented Vapor Saturation Factor:	0.9990
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	144.0730
Tank Diameter (ft):	6.0000
Effective Diameter (ft):	7.8196
Vapor Space Outage (ft):	3.0000
Tank Shell Length (ft):	8.0000
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:	0.9990
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0066
Vapor Space Outage (ft):	3.0000
Working Losses (lb):	0.2447
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0066
Annual Net Throughput (gal/yr.):	12,000.0000
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	6.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.8417

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

Emissions Report for: Annual

Daybrook Station (Oil Tanks) - Horizontal Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.24	0.60	0.84

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

Identification

User Identification:	Daybrook 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):	20.00
Diameter (ft):	12.00
Liquid Height (ft) :	20.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	16,800.00
Turnovers:	27.00
Net Throughput(gal/yr):	453,600.00
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

Daybrook 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)

Daybrook Station (Liquid Loading) - Vertical Fixed Roof Tank

Annual Emission Calcaulations	
Standing Losses (lb):	25.6115
Vapor Space Volume (cu ft):	1,130.9734
Vapor Density (lb/cu ft):	0.0008
Vapor Space Expansion Factor:	0.0846
Vented Vapor Saturation Factor:	0.8886
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,130.9734
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	10.0000
Tank Shell Height (ft):	20.0000
Average Liquid Height (ft):	10.0000
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):	6.0000
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:	0.8886
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2365
Vapor Space Outage (ft):	10.0000
Working Losses (lb):	49.4545
Vapor Molecular Weight (lb/lb-mole):	19.3610
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2365
Annual Net Throughput (gal/yr.):	453,600.0000
Annual Turnovers:	27.0000
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	16,800.0000
Maximum Liquid Height (ft):	20.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	75.0661

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

Emissions Report for: Annual

Daybrook Station (Liquid Loading) - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Produced Water	49.45	25.61	75.07
Decane (-n)	0.03	0.01	0.04
Nonane (-n)	0.01	0.01	0.02
Ethylbenzene	0.00	0.00	0.00
Octane (-n)	0.02	0.01	0.04
Toluene	0.01	0.00	0.01
Heptane (-n)	0.09	0.04	0.13
Benzene	0.02	0.01	0.03

Hexane (-n)	0.35	0.18	0.53
Isopentane	0.61	0.32	0.92
Pentane (-n)	0.81	0.42	1.22
Water	44.22	22.90	67.12
Propane (-n)	3.25	1.68	4.93
Butane (-n)	0.05	0.02	0.07
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	1.52	6.66	6.08	26.65	1.58	6.93	0.01	0.03	0.11	0.50	0.11	0.50	1,744.04	7,638.90
CE-2	1.52	6.66	6.08	26.65	1.58	6.93	0.01	0.03	0.11	0.50	0.11	0.50	1,744.04	7,638.90
CE-3	4.13	18.11	1.50	6.55	2.40	10.50	0.02	0.07	0.28	1.22	0.28	1.22	4,197.53	18,385.16
CE-4	5.51	24.14	1.65	7.24	3.42	14.97	0.02	0.10	0.38	1.64	0.38	1.64	5,508.54	24,127.41
CE-5	5.51	24.14	1.65	7.24	3.42	14.97	0.02	0.10	0.38	1.64	0.38	1.64	5,508.54	24,127.41
CE-6	2.61	11.44	0.99	4.34	1.67	7.32	0.01	0.05	0.18	0.78	0.18	0.78	3,000.31	13,141.37
RSV-1	---	---	---	---	6.55	28.68	---	---	---	---	---	---	4,036.60	17,680.30
RBV-1	0.14	0.61	0.12	0.51	0.01	0.03	8.4E-04	3.7E-03	0.01	0.05	0.01	0.05	175.68	769.47
T01	---	---	---	---	0.05	0.23	---	---	---	---	---	---	0.03	0.15
T02	---	---	---	---	0.02	0.07	---	---	---	---	---	---	---	---
T03	---	---	---	---	0.11	0.46	---	---	---	---	---	---	0.08	0.33
T04	---	---	---	---	0.11	0.46	---	---	---	---	---	---	0.08	0.33
T05 to T21	---	---	---	---	0.21	0.92	---	---	---	---	---	---	---	---
L1	---	---	---	---	0.08	0.02	---	---	---	---	---	---	---	---
Fugitives	---	---	---	---	---	7.42	---	---	---	---	---	---	---	3,791.47
Haul Roads	---	---	---	---	---	---	---	---	---	0.03	---	3.0E-03	---	---
FACILITY TOTAL	20.95	91.77	18.08	79.19	21.19	98.17	0.09	0.37	1.44	6.36	1.44	6.33	25,915.45	117,300.80
FACILITY TOTAL (Excluding fugitives)	20.95	91.77	18.08	79.19	21.19	92.48	0.09	0.37	1.44	6.33	1.44	6.33	25,915.45	113,509.72

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	0.12	0.53	5.0E-03	2.2E-02	4.6E-03	2.0E-02	4.5E-04	2.0E-03	2.1E-03	9.2E-03	0.01	0.06	0.34	1.50
CE-2	0.12	0.53	5.0E-03	2.2E-02	4.6E-03	2.0E-02	4.5E-04	2.0E-03	2.1E-03	9.2E-03	0.01	0.06	0.34	1.50
CE-3	0.33	1.45	1.2E-02	5.4E-02	1.1E-02	5.0E-02	1.1E-03	4.8E-03	5.1E-03	2.2E-02	0.03	0.14	0.87	3.82
CE-4	0.66	2.90	1.7E-02	7.2E-02	1.5E-02	6.7E-02	1.5E-03	6.5E-03	6.9E-03	3.0E-02	0.04	0.18	1.39	6.09
CE-5	0.66	2.90	1.7E-02	7.2E-02	1.5E-02	6.7E-02	1.5E-03	6.5E-03	6.9E-03	3.0E-02	0.04	0.18	1.39	6.09
CE-6	0.31	1.37	7.9E-03	3.4E-02	7.3E-03	3.2E-02	7.1E-04	3.1E-03	3.3E-03	1.4E-02	0.02	0.09	0.66	2.88
RSV-1	---	---	---	---	---	---	---	---	---	---	0.35	1.54	0.35	1.54
RBV-1	1.0E-04	4.6E-04	2.9E-06	1.3E-05	4.8E-06	2.1E-05	---	---	---	---	2.5E-03	0.01	2.6E-03	0.01
T01	---	---	<0.01	2.0E-03	<0.01	1.0E-03	<0.01	<0.01	<0.01	<0.01	2.0E-03	0.01	0.01	0.02
T02	---	---	---	---	---	---	---	---	---	---	---	---	0.02	0.07
T03	---	---	1.0E-03	3.0E-03	<0.01	2.0E-03	<0.01	<0.01	<0.01	<0.01	6.0E-03	2.6E-02	0.01	0.03
T04	---	---	1.0E-03	3.0E-03	<0.01	2.0E-03	<0.01	<0.01	<0.01	<0.01	6.0E-03	2.6E-02	0.01	0.03
T05 to T21	---	---	---	---	---	---	---	---	---	---	---	---	0.04	0.15
L1	---	---	---	---	---	---	---	---	---	---	---	---	0.01	2.0E-03
Fugitives	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FACILITY TOTAL	2.21	9.68	0.07	0.28	0.06	0.26	5.7E-03	0.02	0.03	0.12	0.53	2.31	5.43	23.73
FACILITY TOTAL (Excluding fugitives)	2.21	9.68	0.07	0.28	0.06	0.26	5.7E-03	0.02	0.03	0.12	0.53	2.31	5.43	23.73

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 an existing natural gas compressor station (Daybrook Compressor Station) located off 8 Tooth Hollow Road and 2.5 miles southeast of Fairview, WV and is in Marion County, West Virginia. Site Latitude and Longitude Coordinates are: 39.57751, -80.20288.

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	91.77	91.77
Carbon Monoxide	79.19	79.19
Particulate Matter-10	6.36	6.33
Particulate Matter-2.5	6.33	6.33
Volatile Organic Compounds	98.17	92.48
Sulfur Dioxide	0.37	0.37
Formaldehyde	9.68	9.68
Benzene	0.28	0.28
Toluene	0.26	0.26
Ethylbenzene	0.02	0.02
Xylenes	0.12	0.12
Hexane	2.31	2.31
Total Hazardous Air Pollutants	23.73	23.73
Carbon Dioxide Equivalents (CO2e)	117,300.80	113,509.72

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 September, 2017.

By: DTE Appalachia Gathering, LLC
Ian Connelly, Gas Pipeline Engineer
333 Technology Drive, Suite 109
Canonsburg, PA 15317