



PROJECT REPORT
M3 Appalachia Gathering, LLC
Daybrook Compressor Station

G35-C Permit Application



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1. INTRODUCTION

M3 Appalachia Gathering, LLC (M3) is submitting this G35-C Permit modification application to the West Virginia Department of Environmental Protection (WVDEP) for its existing compressor station located in Marion County, West Virginia (Daybrook Compressor Station). Specifically, this application seeks to update formaldehyde limits for the existing compressor engines (CE-1 to CE-2), remove the Baldor generators, and update the storage tanks list in the permit. The Daybrook Compressor Station is currently permitted under General Permit No. G35-A064D.

1.1. FACILITY AND PROJECT DESCRIPTION

The Daybrook Compressor Station is an existing natural gas gathering facility covered under Standard Industrial Code (SIC) code 1311. Natural gas from nearby wells undergoes compression and then dehydration before it is transported to a gas gathering line for additional processing. Produced water separated from the gas stream are stored in storage vessels.

The station currently consists of the following equipment:

- > Two (2) Caterpillar G3516 LE compressor engines (CE-1 through CE-2), each rated at 1380 bhp;
- > One (1) Caterpillar G3512 LE compressor engines (CE-3), each rated at 3550 bhp;
- > Two (2) Caterpillar G3616 LE compressor engines (CE-4 through CE-5), each rated at 5000 bhp;
- > One (1) Caterpillar G3608 LE compressor engines (CE-6), each rated at 2370 bhp;
- One (1) triethylene glycol (TEG) dehydration unit (RBV/RSV-1), rated at 125 million standard cubic feet per day (MMscfd), equipped with an associated reboiler (rated at 2.0 MMBtu/hr);
- > Two (2) Baldor generators, one rated at 335 hp (GE-1) and one rated at 200 hp (GE-4); and
- > Miscellaneous storage tanks.

With this submittal, M3 specifically seeks to do the following:

- > Revise the formaldehyde emission limits for the two (2) compressor engines (CE-1 and CE-2) in Page 5 of the permit;
- > Remove the two (2) Baldor generators (GE-1 and GE-4) currently installed at the station;
- > Update produced water storage tanks emissions calculations using ProMax; and
- > Update the number, size, and contents of tanks currently listed in the permit. M3 has provided an updated storage tank list and description in Attachment R of this report.

A process flow diagram is included as Attachment D.

1.2. SOURCE STATUS

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

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

The current permit, G35-A064D, was issued with no sources aggregated with the Daybrook Compressor Station. No changes have been made with respect to nearby sources and/or wells feeding the station since that time. Therefore, the stationary source determination is the same for the facility.

1.3. G35-C APPLICATION ORGANIZATION

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

- > Section 2: Sample Emission Source Calculations;
- > Section 3: Regulatory Discussion;
- > Section 4: G35-C Application Form;
- > Attachment A: Single Source Determination Form
- > Attachment B: Siting Criteria Waiver
- > 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-C Section Applicability Form
- > Attachment I: Emission Units/ERD Table
- > Attachment J: Fugitive Emission Summary
- > Attachment K: Storage Vessel(s) Data Sheet
- > Attachment L: Natural Gas Fired Fuel Burning Unit(s) Data Sheet
- > 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 Controllers
- > Attachment R: Emission Calculations
- > Attachment S: Facility-wide Emission Summary Sheet(s)
- > Attachment T Class I Legal Advertisement

2. SAMPLE EMISSION SOURCE CALCULATIONS

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

Emissions from this project will result from combustion of natural gas in the compressor engines (CE-1 and CE-2), storage of produced water in storage tanks, and loading of produced water into tank trucks. The project will not result in any emissions increases from the existing units (i.e., the dehydration unit, reboiler, and fugitive emissions). 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), formaldehyde, and greenhouse gases (GHGs) are calculated using factors provided by the engine manufacturer and the oxidation catalyst manufacturer where available. Potential emissions of other criteria pollutants and all other hazardous air pollutants (HAPs) are calculated using U.S. EPA's AP-42 factors for natural gas-fired engines.¹ Calculations assume a heat content of 1050 Btu/scf for natural gas.
- > **Storage Tanks:** Working, breathing and flashing emissions of VOC and HAPs from the storage tanks at the facility are calculated using Bryan Research & Engineering ProMax® Software.
- > **Tank Truck Loading:** Uncontrolled emissions of VOC and HAPs from the loading of organic liquids from storage tanks to tank truck are calculated using Bryan Research Engineering ProMax® Software.

¹ U.S. EPA, AP 42, Fifth Edition, Volume I, Chapter 3.2, *Natural Gas-Fired Reciprocating Engine*, July 2000.

3. REGULATORY DISCUSSION

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-C 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 Daybrook Compressor Station. 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 Daybrook Compressor Station is considered an existing minor source with respect to PSD and will remain a minor source. No new sources are being installed as part of this application and as such, PSD is not triggered.

NNSR regulations only apply in areas designated as non-attainment. The Daybrook Compressor Station is located in Marion County, which is designated as attainment/unclassifiable for all criteria pollutants.² Therefore, NNSR regulations do not apply to the Daybrook Compressor Station.

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 G35-C operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any

² U.S. EPA Greenbook, http://www.epa.gov/airquality/greenbook/anayo_wv.html, as of January 30, 2015.

combination of HAP, and 100 tpy of all other regulated pollutants.³ The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility after the proposed project. Therefore, the Daybrook is not a major source for Title V purposes.

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.

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 m³ (~19,813 gallons). All of the tanks at the Daybrook Compressor Station 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 Daybrook Compressor Station.

3.3.3. NSPS Subparts IIII - Stationary Compression Ignition Internal Combustion Engines

This subpart applies to manufacturers, owners, and operators of stationary compression ignition internal combustion engines (CI ICE) that have been constructed, reconstructed, or modified after various dates, the earliest of which is July 11, 2005. The compressor engines at the Daybrook Compressor Station are spark-ignition internal combustion engines. Therefore the requirements of this subpart do not apply.

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

New Source Performance Standards 40 CFR Part 60 Subpart JJJJ affects owners and operators of stationary spark ignition internal combustion engines (SI ICE) that commence construction, reconstruction or modification after June 12, 2006. Applicability dates are based on the date the engine was ordered by the operator. The existing engines (CE-1 and CE-2) at the Daybrook Compressor Station are 4-stroke, lean burn spark ignition RICE (each rated at >500 hp) manufactured after July 1, 2007. The engines are equipped with oxidation catalysts which are guaranteed by the manufacturer to achieve a 97% reduction in CO, 92% reduction in formaldehyde emissions, and a 60% reduction in

³ On June 23, 2014, the U.S Supreme Court decision in the case of *Utility Air Regulatory Group v. EPA* effectively changed the permitting procedures for GHGs under the PSD and Title V programs.

VOC emissions. The engines are subject to the emission standards per Table 1 of NSPS JJJJ non-emergency use engines and will be in compliance with the NSPS JJJJ limits.

M3 will continue to demonstrate compliance with this subpart for certified engines at the Daybrook Compressor Station in accordance with 40 CFR 60.4243(a)(1).

3.3.5. 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. This NSPS was published in the Federal Register on August 16, 2012, and has been subsequently amended. The list of potentially affected facilities includes:

- > Gas wellheads
- > Centrifugal compressors located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment
- > Reciprocating compressors located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment
- > Continuous bleed natural gas-driven pneumatic controllers with a bleed rate of > 6 scfh located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment (excluding natural gas processing plants)
- > Continuous bleed natural gas-driven pneumatic controllers located at natural gas processing plants
- > Storage vessels in the production, processing, or transmission and storage segments
- > Sweetening units located onshore that process natural gas produced from either onshore or offshore wells

The Daybrook Compressor Station is not a gas wellhead, nor is it a natural gas processing plant. Therefore, the only potentially applicable requirements for the equipment at the station are those for storage vessels, reciprocating compressors where construction commenced after August 23, 2011.

The produced water storage vessels for the Daybrook Compressor Station commenced construction after the applicability date, and are potentially subject to requirements of Subpart OOOO. Subpart OOOO applies to storage vessels with VOC emissions equal to or greater than 6 tpy. The storage vessels at the facility have VOC emissions less than 6 tpy and, therefore, are not subject to Subpart OOOO.

The reciprocating compressors at the facility are subject to the requirements of NSPS OOOO, 40 CFR §60.5385, which requires owners and operators of affected reciprocating compressors to change the rod packing prior to each operating 26,000 hours or prior to 36 months of since start up or the last packing replacement. M3 will continue to comply with the requirements of this rule.

The potential applicability of Subpart OOOOa is discussed in the following section

3.3.6. NSPS Subpart OOOOa – Crude Oil and Natural Gas Facilities

Subpart OOOOa, *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. This regulation has yet to be finalized. The currently proposed version of the rule includes provisions for the following facilities:

- > Hydraulically fractured wells;
- > Centrifugal compressors located between the wellhead and the point of custody transfer to the natural gas distribution segment;

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

The proposed project does not meet the definition of construction, modification, or reconstruction for any of the affected facilities listed above, therefore the requirements of this subpart do not apply.

3.3.7. Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas processing plants (Subparts 0000) and associated equipment (Subpart K-Kb), the applicability of a particular NSPS to the Daybrook Compressor Station 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 Daybrook Compressor Station is an Area (minor) source of HAP since its potential emissions of HAP are less than the 10/25 major source thresholds. NESHAP apply to sources in specifically regulated industrial source categories (Clean Air Act Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type. 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 Daybrook Compressor Station:

- > 40 CFR Part 63 Subpart HH – Oil and Natural Gas Production Facilities
- > 40 CFT Part 63 HHH – Natural Gas Transmission and Storage Facilities
- > 40 CFR Part 63 Subpart ZZZZ- Stationary Reciprocating Internal Combustion Engines (RICE)
- > 40 CFR Part 63 Subpart JJJJJ – 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 existing glycol dehydrator vents are less than 0.90 megagrams per year (1 tpy) each, therefore, the Daybrook Compressor Station 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). M3 will continue to comply with the requirements of Subpart HH as outlined in the current permit.

3.4.2. NESHAP Subpart HHH - Natural Gas Transmission and Storage Facilities

Glycol dehydration units are potentially subject to Subpart HHH, NESHAP from Natural Gas Transmission and Storage Facilities. This standard applies to such units at natural gas transmission and storage facilities that are major sources of HAP emissions located downstream of the point of custody transfer (after processing and/or treatment in the

production sector), but upstream of the distribution sector. The Daybrook Compressor Station is a gathering station that is not a transmission or storage facility. As such, the requirements of this subpart do not apply to the station.

3.4.3. NESHAP Subpart ZZZZ - Stationary Reciprocating Internal Combustion Engines

This rule affects reciprocating internal combustion engines (RICE) located at a major and area sources of HAP. 40 CFR §63.6590(c) states that a new or reconstructed stationary reciprocating internal combustion engines (RICE) located at an area HAP source must meet the requirements of NESHAP Subpart ZZZZ by meeting the requirements of NSPS Subpart JJJJ. No further requirements apply for such engines under NESHAP Subpart ZZZZ. The Daybrook Compressor Station is a minor (area) source of hazardous air pollutants and the affected compressor engines (CE-1 and CE-2) are considered a new stationary RICE. Therefore, the requirements contained in §63.6590(c) are applicable. M3 will be in compliance with applicable requirements of 40 CFR 63 Subpart ZZZZ by meeting the applicable requirements of 40 CFR 60 Subpart JJJJ.

3.4.4. 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 natural gas-fired and is specifically exempt from this subpart. Therefore, no sources at the Daybrook Compressor Station are subject to any requirements under 40 CFR 63 Subpart JJJJJ.

3.5. WEST VIRGINIA SIP REGULATIONS

The Daybrook Compressor Station 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. Per 45 CSR 2-4, PM emissions from the units will not exceed a level measured in lb/hr of 0.09 multiplied by the heat design inputs in MMBtu/hr.

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 Daybrook Compressor Station is generally subject to this requirement. However, due to the nature of the process at the station, production of objectionable odor from the compressor station during normal operation is unlikely.

3.5.3. 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 SO₂ emission limitations and testing, monitoring,

recordkeeping, and reporting requirements of this rule. The reboiler is rated less than 10 MMBtu/hr and as such are exempt from this rule.

3.5.4. 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 CFR Part 60 by reference. As such, by complying with all applicable requirements of 40 CFR Part 60 at the Daybrook Compressor Station, M3 will be complying with 45 CSR 16.

3.5.5. 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 Daybrook Compressor Station, it is unlikely that fugitive particulate matter emissions will be emitted under normal operating conditions. However, M3 will take measures to ensure any fugitive particulate matter emissions will not cross the property boundary should any such emissions occur.

3.5.6. 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 Daybrook Compressor Station is less than 40,000 gallons and the facility is not located in a listed county. Therefore, 45 CSR 21-28 does not apply to the storage tanks at this station.

3.5.7. 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 CFR Parts 61 and 63 by reference. As such, by complying with all applicable requirements of 40 CFR Parts 61 and 63 at the Daybrook Compressor Station, M3 will be complying with 45 CSR 34.

3.5.8. Non-Applicability of Other SIP Rules

A thorough examination of the West Virginia SIP rules with respect to applicability at the Daybrook Compressor Station 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 Daybrook Compressor Station.

4. G35-C APPLICATION FORMS

The WVDEP permit application forms contained in this application include all applicable G35-C 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-C 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):

M3 Appalachia Gathering, LLC

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

Applicant's Mailing Address: 742 Fairmont Road Suite E

City: Westover

State: WV

ZIP Code: 26501

Facility Name: Daybrook Compressor Station

Operating Site Physical Address: Toothman Road

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: 39.620542

Longitude: -80.254792

SIC Code: 1311

NAICS Code:

DAQ Facility ID No. (For existing facilities)

049-00138

CERTIFICATION OF INFORMATION

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

I hereby certify that Joe Giles 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-C 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: Joe Giles - SVP of Operations

Phone: 713-243-3014

Fax: 713-783-3035

Email: j.giles@m3midstream.com

Date: 5/2/2016

If applicable:

Authorized Representative Signature: _____

Name and Title:


Phone:

Fax:

Email:

Date:

If applicable:

Environmental Contact: 

Name and Title: Eric Tennison - Environmental Health & Safety Director

Phone: 304-212-4403 ext 5506

Fax: 304-212-4366

Email: e.tennison@m3midstream.com

Date: 5/2/16

OPERATING SITE INFORMATION

Briefly describe the proposed new operation and/or any change(s) to the facility:

Removal of two (2) existing generators (GE-1 and GE-4); updates to formaldehyde emission limits for two (2) existing engines (CE-1 and CE-2), updates to identification numbers, size and contents for storage tanks.

Directions to the facility:

From Morgantown, WV take U.S. Route 19 south to County Road (CR) 19/1. Turn right on CR19/1 and follow to CR 25/8. Turn left on CR 25/8 and follow CR 25 to CR 17. Bear right onto CR 17 and follow through Grant Town, WV to CR 17/6. Stay on CR which becomes Toothman Road. Site is on right in 1/4 mile after road becomes Toothman.

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): Wale Akintayo; WAKintayo@trinityconsultants.com
- \$500 (Construction, Modification, and Relocation) \$300 (Class II Administrative Update)
- \$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO 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-C Section Applicability Form – Attachment H Emission Units/ERD Table – Attachment I
- Fugitive Emissions Summary Sheet – Attachment J
- Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment K
- Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment L
- Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment M
- Tanker Truck Loading Data Sheet (if applicable) – Attachment N
- Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment O
- Pneumatic Controllers Data Sheet – Attachment P
- Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment Q
- Emission Calculations (please be specific and include all calculation methodologies used) – Attachment R
- Facility-wide Emission Summary Sheet(s) – Attachment S
- Class I Legal Advertisement – Attachment T
- 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).

Is there a facility owned by or associated with the natural gas industry located within one (1) mile of the proposed facility? Yes No

If Yes, please complete the questionnaire on the following page (Attachment A).

Please provide a source aggregation analysis for the proposed facility below:

ATTACHMENT A – SINGLE SOURCE DETERMINATION FORM

Answer each question with a detailed explanation to determine contiguous or adjacent properties which are under a common control and any support facilities. This section must be completed in its entirety. (N/A)

Provide a map of contiguous or adjacent facilities (production facilities, compressor stations, dehydration facilities, etc.) which are under common control and those facilities that are not under common control but are support facilities. Please indicate the SIC code, permit number (if applicable), and the distance between facilities in question on the map.

Are the facilities owned by the same parent company or a subsidiary of the parent company? Provide the owners identity and the percentage of ownership of each facility.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does an entity such as a corporation have decision making authority over the operation of a second entity through a contractual agreement or voting interest? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Is there a contract for service relationship between the two (2) companies or, a support/dependency relationship that exists between the two (2) companies? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do the facilities share common workforces, plant managers, security forces, corporate executive officers or board executives?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Will managers or other workers frequently shuttle back and forth to be involved actively at both facilities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do the facilities share common payroll activities, employee benefits, health plans, retirement funds, insurance coverage, or other administrative functions? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does one (1) facility operation support the operation of the other facility?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Is one (1) facility dependent on the other? If one (1) facility shuts down, what are the limitations on the other to pursue outside business? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Are there any financial arrangements between the two (2) entities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Are there any legal or lease agreements between the two (2) facilities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do the facilities share products, byproducts, equipment, or other manufacturing or air pollution control device equipment? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do all the pollutant-emitting activities at the facilities belong to the same SIC Code? Please provide the SIC Codes.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Was the location of the new facility chosen primarily because of its proximity to the existing facility to integrate the operation of the two (2) facilities? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Will materials be routinely transferred between the two (2) facilities? Please explain the amount of transfer and how often the transfers take place and what percentages go to the various entities.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does the facility influence production levels or compliance with environmental regulations at other facilities? Who accepts the responsibility for compliance with air quality requirements? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Siting Criteria Waiver

ATTACHMENT B – SITING CRITERIA WAIVER

If applicable, please complete this form and it must be notarized.

**G35-C 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

ATTACHMENT C – CURRENT BUSINESS CERTIFICATE

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

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

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

**WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION
CERTIFICATE**

ISSUED TO:
**M3 APPALACHIA GATHERING, LLC
600 TRAVIS ST 4910
HOUSTON, TX 77002-3025**

BUSINESS REGISTRATION ACCOUNT NUMBER: 2252-1954

This certificate is issued on: **06/28/2011**

*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.

State of West Virginia



Certificate

*I, Natalie E. Tennant, Secretary of State of the
State of West Virginia, hereby certify that*

M3 APPALACHIA GATHERING, LLC

Control Number: 99OCZ

a limited liability company, organized under the laws of the State of Delaware
has filed its "Application for Certificate of Authority" in my office according to the provisions
of West Virginia Code §31B-10-1002. I hereby declare the organization to be registered as a
foreign limited liability company from its effective date of March 22, 2011, until a certificate of
cancellation is filed with our office.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORITY OF A FOREIGN LIMITED LIABILITY COMPANY

to the limited liability company authorizing it to transact business in West Virginia



*Given under my hand and the
Great Seal of the State of
West Virginia on this day of
March 22, 2011*

Natalie E. Tennant

Secretary of State

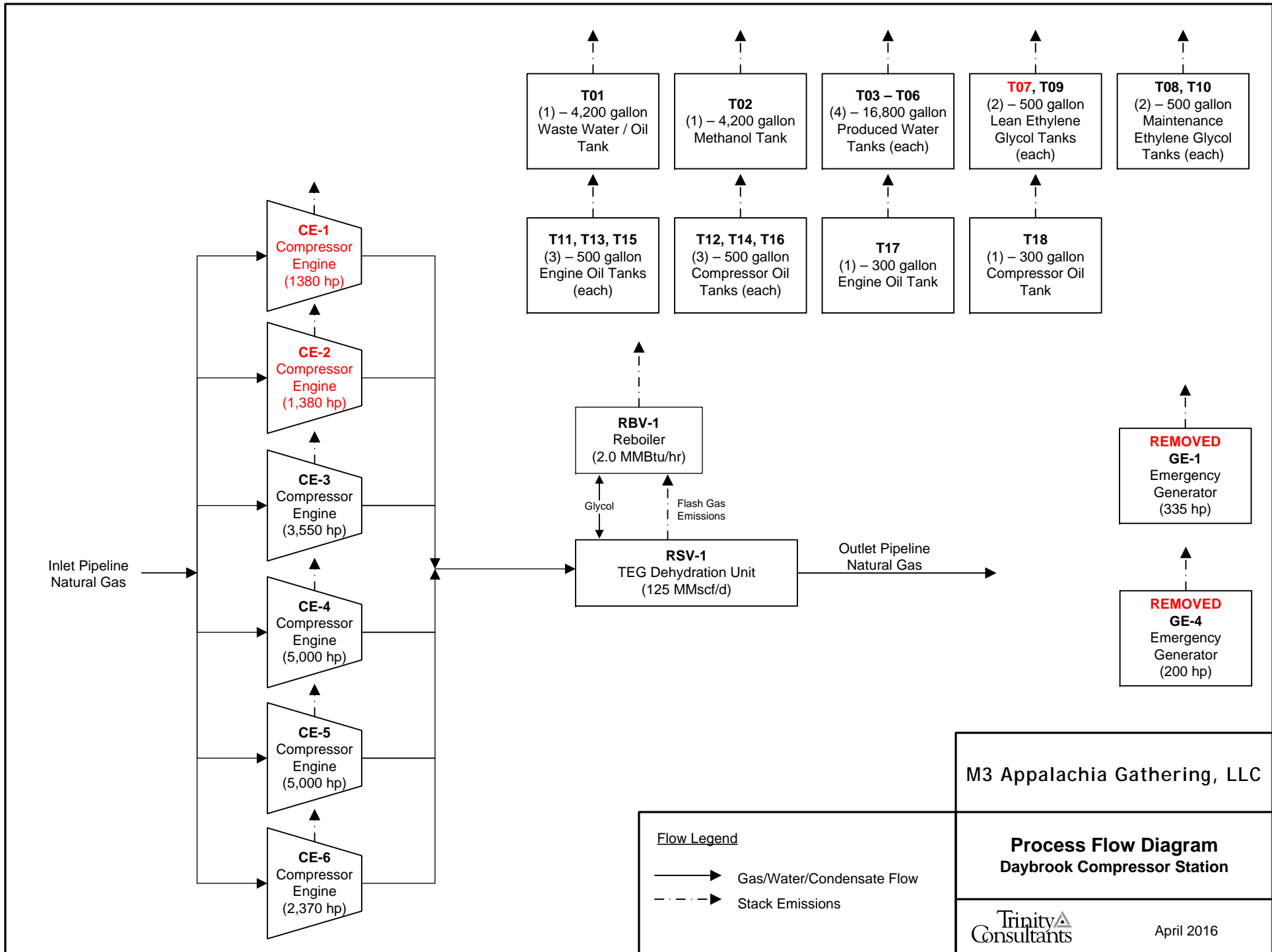
Process Flow Diagram

ATTACHMENT D – PROCESS FLOW DIAGRAM

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

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

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



Process Description

ATTACHMENT E – PROCESS DESCRIPTION

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

Use the following guidelines to ensure a complete Process Description:

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

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

ATTACHMENT E - PROCESS DESCRIPTION

M3 Appalachia Gathering, LLC (M3) is submitting this modification application to update the permit for the Daybrook Station. Specifically, M3 seeks to update the following:

- > Update formaldehyde emission limits for two (2) existing compressor engines (CE-1 and CE-2)
- > Remove the two (2) Baldor emergency generators (GE-1 and GE-4) from the station
- > Update produced water storage tanks emissions calculations using ProMax; and
- > Update the number, size, and contents of tanks currently located at the facility.

At the Daybrook Station, natural gas (wet and dry gas) enters the station via the gathering pipeline system and passes through a separator, which will separate the gas from produced water. The produced water is then transferred to the produced fluids tanks (T03-T06). The gas stream is compressed using one of the six (6) natural gas-fired compressor engines (identified as CE-1, CE-2, CE-3, CE-4, CE-5, CE-6). The compressed natural gas stream is then processed through the triethylene glycol (TEG) dehydration unit and associated reboiler (identified as RSV-1, RBV-1). The dehydration unit will introduce TEG to the gas stream in a contact tower to absorb water vapor from the gas to a level not exceeding 7 pounds per million standard cubic feet (lb/MMscf). The TEG is then sent to the natural gas-fired reboiler, rated at 2.0 MMBtu/hr heat input. The water is evaporated from the TEG in the reboiler and discharged, and the glycol is then sent back to the contact tower for reuse. Regenerator Still and Flash vent emissions are sent to the reboiler for use as fuel.

The natural gas stream from the contact tower flows into the pipeline to be transported further along the pipeline system.

A process flow diagram is included as Attachment D.

Plot Plan

ATTACHMENT F – PLOT PLAN

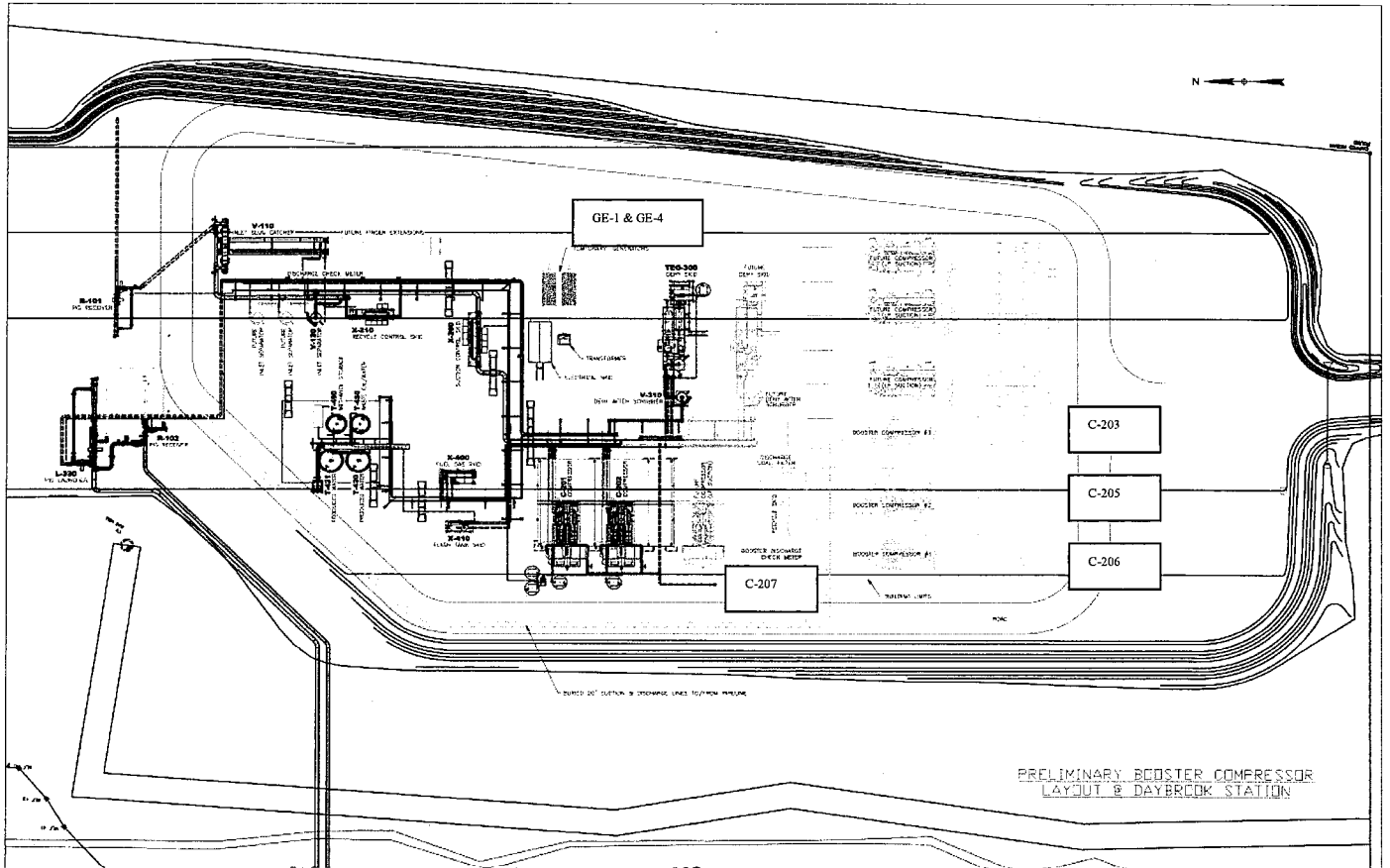
Provide an accurately scaled and detailed Plot Plan showing the locations of all emission units, emission points, and air pollution control devices. Show all emission units, affected facilities, enclosures, buildings and plant entrances and exits from the nearest public road(s) as appropriate. Note height,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

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

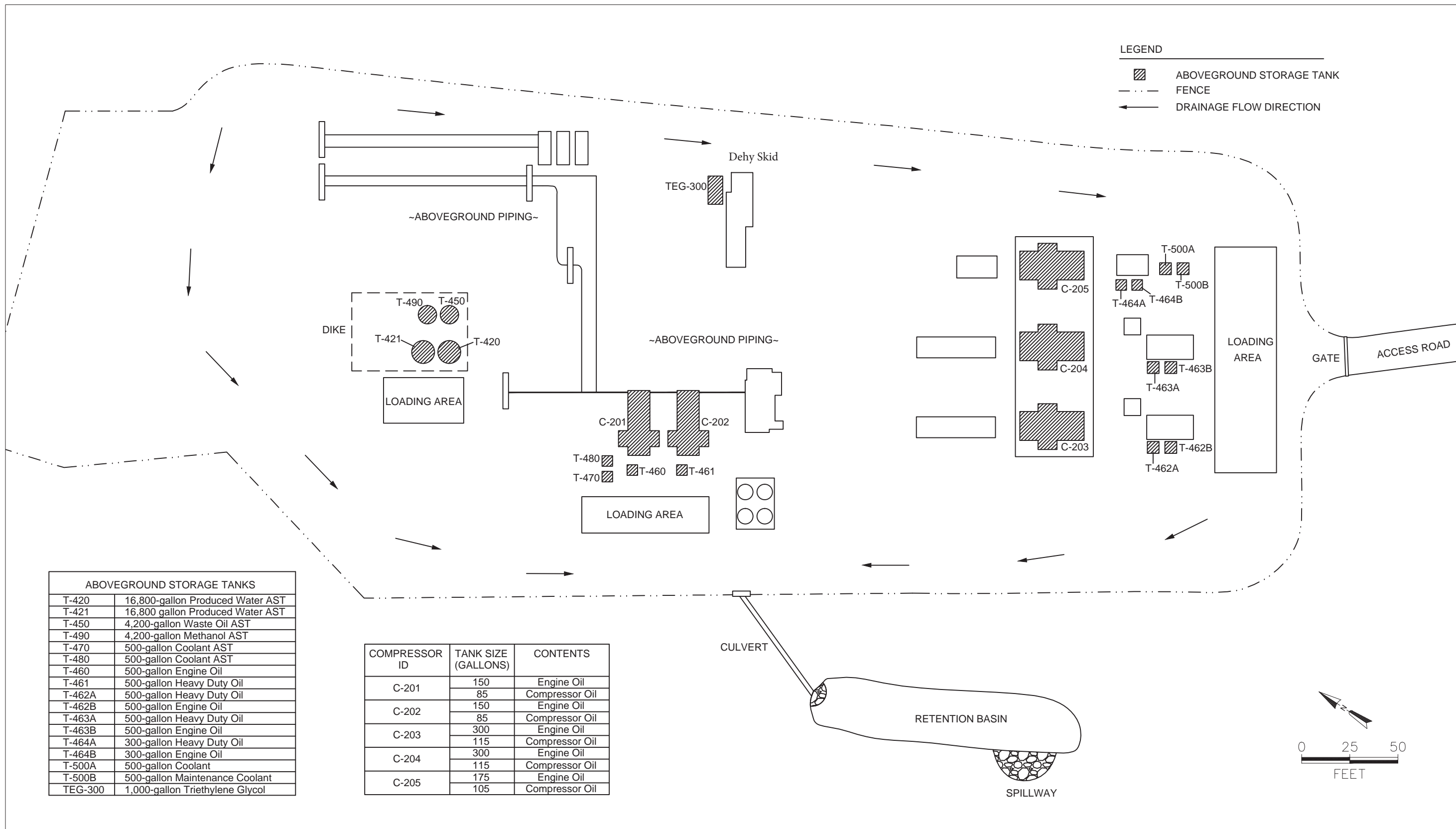
Use the following guidelines to ensure a complete Plot Plan:

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

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



ATTACHMENT E- DAYBROOK STATION PLOT PLAN

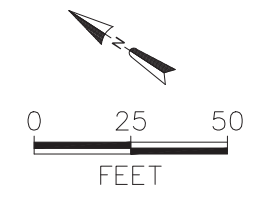


LEGEND

- ABOVEGROUND STORAGE TANK
- FENCE
- DRAINAGE FLOW DIRECTION

ABOVEGROUND STORAGE TANKS	
T-420	16,800-gallon Produced Water AST
T-421	16,800 gallon Produced Water AST
T-450	4,200-gallon Waste Oil AST
T-490	4,200-gallon Methanol AST
T-470	500-gallon Coolant AST
T-480	500-gallon Coolant AST
T-460	500-gallon Engine Oil
T-461	500-gallon Heavy Duty Oil
T-462A	500-gallon Heavy Duty Oil
T-462B	500-gallon Engine Oil
T-463A	500-gallon Heavy Duty Oil
T-463B	500-gallon Engine Oil
T-464A	300-gallon Heavy Duty Oil
T-464B	300-gallon Engine Oil
T-500A	500-gallon Coolant
T-500B	500-gallon Maintenance Coolant
TEG-300	1,000-gallon Triethylene Glycol

COMPRESSOR ID	TANK SIZE (GALLONS)	CONTENTS
C-201	150	Engine Oil
	85	Compressor Oil
C-202	150	Engine Oil
	85	Compressor Oil
C-203	300	Engine Oil
	115	Compressor Oil
C-204	300	Engine Oil
	115	Compressor Oil
C-205	175	Engine Oil
	105	Compressor Oil



TITLE:
 SITE LAYOUT MAP
 DAYBROOK COMPRESSOR STATION
 MARION COUNTY, WEST VIRGINIA

DWN: RP
 CHKD:
 DATE: 12/2/14

DES.:
 APPD.:
 REV.:

PROJECT NO.:
 M3A-2014-393
 FIGURE NO.:
 2

Area Map

ATTACHMENT G – AREA MAP

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

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

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

ATTACHMENT G - AREA MAP

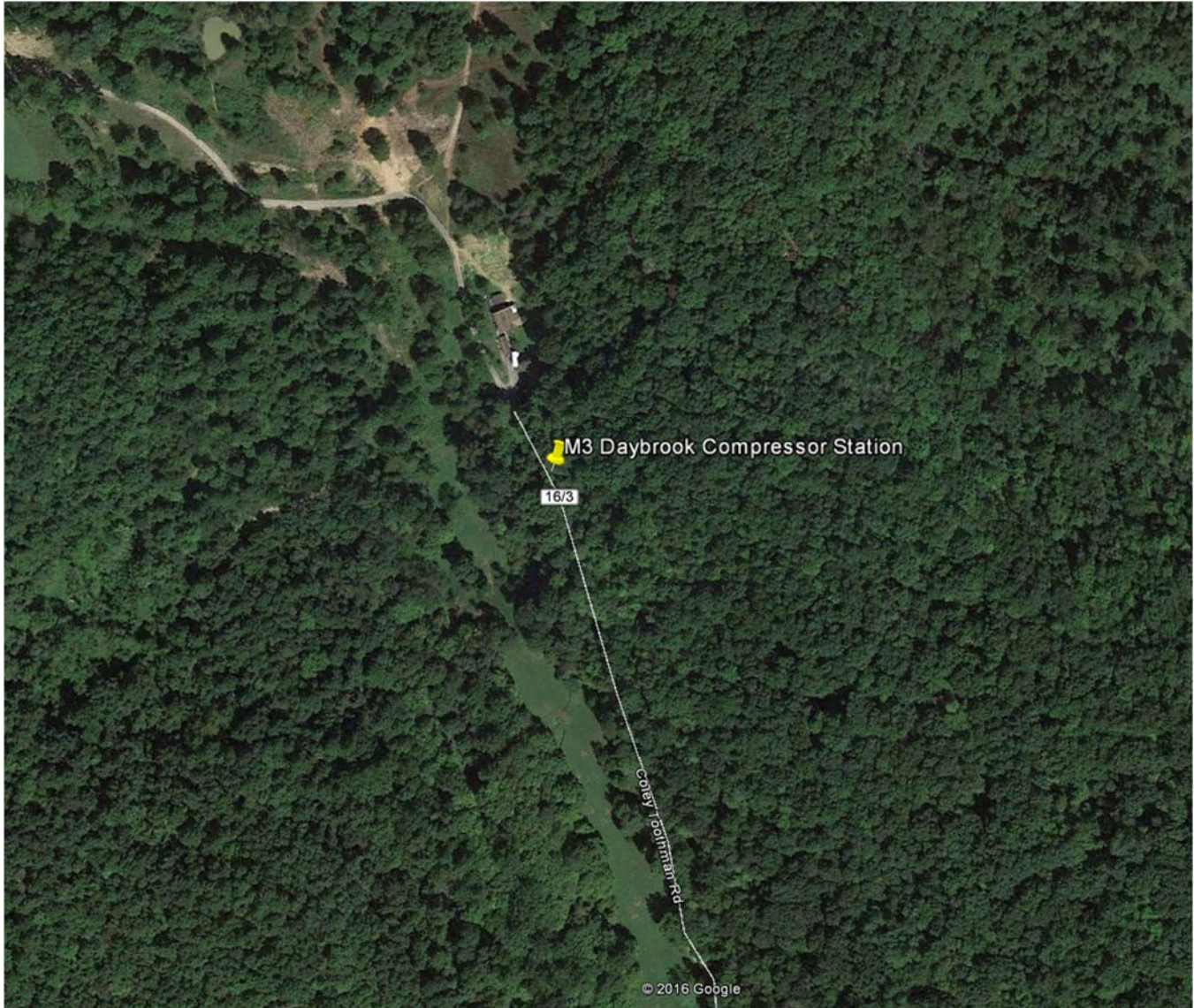


Figure 1 - Map of Daybrook Station Location

UTM Northing (KM): 4,381.149

UTM Easting (KM): 568.433

Elevation: ~2,895 ft

G35-C Section Applicability Form

ATTACHMENT H – G35-C SECTION APPLICABILITY FORM

**General Permit G35-C Registration
Section Applicability Form**

General Permit G35-C 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-C 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-C APPLICABLE SECTIONS	
<input checked="" type="checkbox"/> Section 5.0	Storage Vessels Containing Condensate and/or Produced Water ¹
<input type="checkbox"/> Section 6.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO)
<input type="checkbox"/> Section 7.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO and/or NESHAP Subpart HH
<input checked="" type="checkbox"/> Section 8.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
<input type="checkbox"/> Section 9.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO)
<input type="checkbox"/> Section 10.0	Centrifugal Compressor Affected Facility (NSPS, Subpart OOOO) ²
<input checked="" type="checkbox"/> Section 11.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO) ²
<input checked="" type="checkbox"/> Section 12.0	Reciprocating Internal Combustion Engines, Generator Engines. Microturbine Generators
<input checked="" type="checkbox"/> Section 13.0	Tanker Truck Loading ³
<input checked="" type="checkbox"/> Section 14.0	Glycol Dehydration Units ⁴

- 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 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 G3516LE Compressor Engine	2012	TBD	1,380 hp	Modification – Upon Approval		
CE-2	CE-2	Caterpillar G3516LE Compressor Engine	2012	TBD	1,380 hp	Modification – Upon Approval		
CE-3	CE-3	Caterpillar G3612LE Compressor Engine	2012	TBD	3,550 hp	Existing		
CE-4	CE-4	Caterpillar G3616LE Compressor Engine	2014	TBD	5,000 hp	Existing		
CE-5	CE-5	Caterpillar G3616LE Compressor Engine	2014	TBD	5,000 hp	Existing		
CE-6	CE-6	Caterpillar G3608LE Compressor Engine	2014	TBD	2,370 hp	Existing		
RBV-1	RBV-1	Reboiler	2012	TBD	2.0 mmBtu/hr	Existing		
RSV-1	RSV-1	Dehydration Unit Still Vent	2012	TBD	125 mmscf/day	Existing		
T01	T01	Waste Water / Oil	2012	TBD	4,200 gallons	Existing		
T02	T02	Methanol	2012	TBD	4,200 gallons	Existing		
T03	T03	Produced Water	2012	TBD	16,800 gallons	Existing		
T04	T04	Produced Water	2012	TBD	16,800 gallons	Existing		
T05	T05	Produced Water	2012	TBD	16,800 gallons	Existing		
T06	T06	Produced Water	2012	TBD	16,800 gallons	Existing		
T07	T07	Lean Ethylene Glycol	2014	TBD	500 gallons	Modification – Upon Approval		
T08	T08	Maintenance Ethylene Glycol	2014	TBD	500 gallons	Existing		
T09	T09	Lean Ethylene Glycol	2014	TBD	500 gallons	Existing		
T10	T10	Maintenance Ethylene Glycol	2014	TBD	500 gallons	Existing		
T11	T11	Engine Oil	2012	TBD	500 gallons	Existing		
T12	T12	Compressor Oil	2012	TBD	500 gallons	Existing		
T13	T13	Engine Oil	2014	TBD	500 gallons	Existing		
T14	T14	Compressor Oil	2014	TBD	500 gallons	Existing		
T15	T15	Engine Oil	2014	TBD	500 gallons	Existing		
T16	T16	Compressor Oil	2014	TBD	500 gallons	Existing		
T17	T17	Engine Oil	2014	TBD	300 gallons	Existing		

T18	T18	Compressor Oil	2014	TBD	300 gallons	Existing		
GE-1	GE-1	Baldor GN0250GASCAN, G79	2014	TBD	335 hp	Removal		
GE-4	GE-4	Baldor GN0150GASCAN, G48	2014	TBD	200 hp	Removal		
L1	L1	Liquid Loading		TBD	403,200 gal/year	Modification		

¹ For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.

² For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.

³ When required by rule

⁴ New, modification, removal, existing

⁵ For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

⁶ For ERDs use the following numbering system: 1D, 2D, 3D,... or other appropriate designation.

Fugitive Emission Summary Sheet

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:		<input type="checkbox"/> Audible, visual, and olfactory (AVO) inspections	<input type="checkbox"/> Infrared (FLIR) cameras	<input checked="" type="checkbox"/> Other (please describe) Will satisfy condition 4.1.4 of the G35C	<input type="checkbox"/> None required		
Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)		
					VOC	HAP	GHG (CO _{2e})
Pumps	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	18	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).	<input type="checkbox"/> Gas <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Both	3.46	0.01	0.72
Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	327	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).	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	0.48	1.7E-3	35.29
Safety Relief Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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).	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	0.08	2.7E-4	0.48
Open Ended Lines	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	1.7E-3	5.9E-6	0.98
Sampling Connections	<input type="checkbox"/> Yes <input type="checkbox"/> No	0	N/A	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	---	---	---
Connections (Not sampling)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1,313	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).	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	0.59	2.1E-3	15.74
Compressors	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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).	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	0.34	1.2E-3	100.00
Flanges	<input type="checkbox"/> Yes <input type="checkbox"/> No	---	(included in connections)	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	---	---	---
Other ¹	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	50	40 CFR 98 Subpart W	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	0.10	4.0E-3	399.66

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

Please provide an explanation of the sources of fugitive emissions (e.g. pigging operations, equipment blowdowns, pneumatic controllers, etc.):

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

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

Storage Vessel(s) Data Sheet

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: Produced Water
3. Emission Unit ID number: T03-T06	4. Emission Point ID number: T03-T06
5. Date Installed , Modified or Relocated (<i>for existing tanks</i>) 2012 Was the tank manufactured after August 23, 2011? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Type of change: <input type="checkbox"/> New construction <input type="checkbox"/> New stored material <input checked="" type="checkbox"/> Other <input type="checkbox"/> Relocation
7A. Description of Tank Modification (<i>if applicable</i>) Updated Storage tank calculations	
7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Was USEPA Tanks simulation software utilized? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<i>If Yes, please provide the appropriate documentation and items 8-42 below are not required.</i>	

TANK INFORMATION

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 16,800 gallons (each)	
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) 403,200 (total)	13B. Maximum daily throughput (gal/day) 1,105 (total)
14. Number of tank turnovers per year: 6 per tank	15. Maximum tank fill rate (gal/min)
16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Is the tank system a variable vapor space system? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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): <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input checked="" type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Other (describe)	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply: <input type="checkbox"/> Does Not Apply <input type="checkbox"/> Rupture Disc (psig) <input type="checkbox"/> Inert Gas Blanket of _____ <input type="checkbox"/> Carbon Adsorption ¹ <input type="checkbox"/> Vent to Vapor Combustion Device ¹ (vapor combustors, flares, thermal oxidizers, enclosed combustors) <input checked="" type="checkbox"/> Conservation Vent (psig) <input type="checkbox"/> Condenser ¹ 0.7 Vacuum Setting 0.3 Pressure Setting <input type="checkbox"/> Emergency Relief Valve (psig) Vacuum Setting Pressure Setting <input type="checkbox"/> Thief Hatch Weighted <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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		
			See Promax Report							

¹ EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)
Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

TANK CONSTRUCTION AND OPERATION INFORMATION			
21. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunit lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) Welded			
21A. Shell Color: Green	21B. Roof Color: Green	21C. Year Last Painted: 2012	
22. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable			
22A. Is the tank heated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?	
23. Operating Pressure Range (psig): Must be listed for tanks using VRUs with closed vent system.			
24. Is the tank a Vertical Fixed Roof Tank ? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft): 0.625	
25. Complete item 25 for Floating Roof Tanks <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/>			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type (<i>check one</i>): <input type="checkbox"/> Metallic (mechanical) shoe seal <input type="checkbox"/> Liquid mounted resilient seal <input type="checkbox"/> Vapor mounted resilient seal <input type="checkbox"/> Other (describe):			
25C. Is the Floating Roof equipped with a secondary seal? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25D. If yes, how is the secondary seal mounted? (<i>check one</i>) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):			
25E. Is the floating roof equipped with a weather shield? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25F. Describe deck fittings:			
26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does not apply			
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	26B. For bolted decks, provide deck construction:		
26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> 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? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
28. Closed Vent System with Enclosed Combustor? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
SITE INFORMATION See Promax Report			
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 See Promax Report			
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
T01	EXIST	Waste Water / Oil	4,200 gallons
T02	EXIST	Methanol	4,200 gallons
T07	EXIST	Lean Ethylene Glycol	500 gallons
T08	EXIST	Maintenance Ethylene Glycol	500 gallons
T09	EXIST	Lean Ethylene Glycol	500 gallons
T10	EXIST	Maintenance Ethylene Glycol	500 gallons
T11	EXIST	Engine Oil	500 gallons
T12	EXIST	Compressor Oil	500 gallons
T13	EXIST	Engine Oil	500 gallons
T14	EXIST	Compressor Oil	500 gallons
T15	EXIST	Engine Oil	500 gallons
T16	EXIST	Compressor Oil	500 gallons
T17	EXIST	Engine Oil	300 gallons
T18	EXIST	Compressor Oil	300 gallons

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

Natural Gas Fired Fuel Burning Unit(s) Data Sheet

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

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

Emission Unit ID# ¹	Emission Point ID# ²	Emission Unit Description (manufacturer, model #)	Year Installed/Modified	Type ³ and Date of Change	Maximum Design Heat Input (MMBTU/hr) ⁴	Fuel Heating Value (BTU/scf) ⁵
RBV-1	RBV-1	Reboiler	2012	Existing	2.0	1,050

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		CE-2		CE-3	
Engine Manufacturer/Model		Caterpillar G3516LE		Caterpillar G3516LE		Caterpillar G3612LE	
Manufacturers Rated bhp/rpm		1,380 hp / 1,400 rpm		1,380 hp / 1,400 rpm		3,550 hp / 1,000 rpm	
Source Status ²		MS		MS		ES	
Date Installed/ Modified/Removed/Relocated ³		2012 (Installed) 2016 (Modified)		2012 (Installed) 2016 (Modified)		2012	
Engine Manufactured /Reconstruction Date ⁴		After 7/1/2010		After 7/1/2010		After 7/1/2010	
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable) ⁵		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input checked="" type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input checked="" type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input checked="" type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources	
Engine Type ⁶		4SLB		4SLB		4SLB	
APCD Type ⁷		OxCat		OxCat		OxCat	
Fuel Type ⁸		PQ		PQ		PQ	
H ₂ S (gr/100 scf)		0		0		0	
Operating bhp/rpm		1,380 hp / 1,400 rpm		1,380 hp / 1,400 rpm		3,550 hp / 1,000 rpm	
BSFC (BTU/bhp-hr)		7442		7442		6629	
Hourly Fuel Throughput		9,781	ft ³ /hr gal/hr	9,781	ft ³ /hr gal/hr	8,890	ft ³ /hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)		85.7	MMft ³ /yr gal/yr	85.7	MMft ³ /yr gal/yr	77.8	MMft ³ /yr gal/yr
Fuel Usage or Hours of Operation Metered		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Calculation Methodology ⁹	Pollutant ¹⁰	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ¹¹	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ¹¹	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ¹¹
MD	NO _x	1.52	6.66	1.52	6.66	3.91	17.14
OT	CO	0.22	0.97	0.22	0.97	1.07	4.70
OT	VOC	0.58	2.56	0.58	2.56	2.51	10.97
AP	SO ₂	0.01	0.01	0.01	0.01	0.005	0.02
AP	PM ₁₀	0.10	0.45	0.10	0.45	0.09	0.39
OT	Formaldehyde	0.12	0.53	0.12	0.53	0.20	0.89
AP	Total HAPs	0.32	1.41	0.32	1.41	0.37	1.62
OT	GHG (CO ₂ e)	1,761.46	7,715.20	1,761.46	7,715.20	4,586.89	20,090.59

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-4		CE-5		CE-6	
Engine Manufacturer/Model		Caterpillar G3616LE		Caterpillar G3616LE		Caterpillar G3608LE	
Manufacturers Rated bhp/rpm		5,000 hp / 1,000 rpm		5,000 hp / 1,000 rpm		2,370 hp / 1,000 rpm	
Source Status ²		ES		ES		ES	
Date Installed/ Modified/Removed/Relocated ³		2014		2014		2014	
Engine Manufactured /Reconstruction Date ⁴		After 7/1/2010		After 7/1/2010		After 7/1/2010	
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable) ⁵		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input checked="" type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input checked="" type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input checked="" type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources	
Engine Type ⁶		4SLB		4SLB		4SLB	
APCD Type ⁷		OxCat		OxCat		OxCat	
Fuel Type ⁸		PQ		PQ		PQ	
H ₂ S (gr/100 scf)		0		0		0	
Operating bhp/rpm		5,000 hp / 1,000 rpm		5,000 hp / 1,000 rpm		2,370 hp / 1,000 rpm	
BSFC (BTU/bhp-hr)		7,511		7,511			
Hourly Fuel Throughput		12,473	ft ³ /hr gal/hr	12,473	ft ³ /hr gal/hr		ft ³ /hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)		109.26	MMft ³ /yr gal/yr	109.26	MMft ³ /yr gal/yr		MMft ³ /yr gal/yr
Fuel Usage or Hours of Operation Metered		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Calculation Methodology ⁹	Pollutant ¹⁰	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) _{ii}	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) _{ii}	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) _{ii}
MD	NO _x	5.51	24.14	5.51	24.14	2.61	11.44
OT	CO	1.65	7.24	1.65	7.24	0.99	4.35
OT	VOC	3.52	15.45	3.52	15.45	1.67	7.32
AP	SO ₂	0.01	0.03	0.01	0.03	0.004	0.02
AP	PM ₁₀	0.13	0.56	0.13	0.56	0.07	0.30
OT	Formaldehyde	0.66	2.90	0.66	2.90	0.31	1.37
AP	Total HAPs	0.91	3.98	0.91	3.98	0.32	1.41
OT	GHG (CO ₂ e)	1,350.62	5,914.93	1,350.62	5,914.93	796.40	3,488.25

ATTACHMENT M – INTERNAL COMBUSTION ENGINE DATA SHEET

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

Emission Unit ID# ¹		GE-1		GE-4			
Engine Manufacturer/Model		Baldor GN0250GASCAN, G79		Baldor GN0150GASCAN, G48			
Manufacturers Rated bhp/rpm		335 hp / 1,800 rpm		200 hp / 1,800 rpm			
Source Status ²		REM		REM			
Date Installed/Modified/Removed/Relocated ³		2014		2014			
Engine Manufactured /Reconstruction Date ⁴							
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable) ⁵		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJJ <input type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources		<input type="checkbox"/> 40CFR60 Subpart JJJJ <input type="checkbox"/> JJJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources	
Engine Type ⁶		4SRB		4SRB			
APCD Type ⁷		NSCR & A/F		NSCR & A/F			
Fuel Type ⁸		PQ		PQ			
H ₂ S (gr/100 scf)		0		0			
Operating bhp/rpm		335 hp / 1,800 rpm		200 hp / 1,800 rpm			
BSFC (BTU/bhp-hr)		0.18		0.18			
Hourly Fuel Throughput		2782	ft ³ /hr gal/hr	2532	ft ³ /hr gal/hr		ft ³ /hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)		1.39	MMft ³ /yr gal/yr	1.26	MMft ³ /yr gal/yr		MMft ³ /yr gal/yr
Fuel Usage or Hours of Operation Metered		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Calculation Methodology ⁹	Pollutant ¹⁰	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ¹¹	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ¹¹	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ¹¹
MD	NO _x	0.03	0.24	0.01	0.04		
OT	CO	0.04	0.19	0.12	0.51		
OT	VOC	0.03	0.15	0.11	0.49		
AP	SO ₂	<0.01	<0.01	<0.01	<0.01		
AP	PM ₁₀	<0.01	<0.01	<0.01	<0.01		
	Formaldehyde						
	Total HAPs						
	GHG (CO ₂ e)						

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 TM	OT Other (please list):
	Catalyst Vendor (CO, VOC, HCHO)
	40 CFR 98, Tables C-1 & C-2 (CO ₂ e)
- 10 Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the *Emissions Summary Sheet*.
- 11 PTE for engines shall be calculated from manufacturer's data unless unavailable.

**Engine Air Pollution Control Device
(Emission Unit ID# CE-1 & 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:

Manufacturer: EMIT Technologies	Model #: RT-2415-H
Design Operating Temperature: 992 °F	Design gas volume: scfm
Service life of catalyst: 8760	Provide manufacturer data? <input type="checkbox"/> Yes <input type="checkbox"/> No
Volume of gas handled: 9126 acfm at 992 °F	Operating temperature range for NSCR/Ox Cat: From 600 °F to 1250 °F
Reducing agent used, if any:	Ammonia slip (ppm): N/A

Pressure drop against catalyst bed (delta P): 7 inches of H₂O

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

Engine will shut-down if exhaust temperatures get too high

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)?
8,760

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, Per 40 CFR §60.4243(a)(1), M3 must maintain the certified engine and control device according to the manufacturer's emission related written instructions and keep records of conducted maintenance to demonstrate compliance, but no performance testing is required.

Tanker Truck Loading Data Sheet

ATTACHMENT N – TANKER TRUCK LOADING DATA SHEET

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

Truck Loadout Collection Efficiencies

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

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

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

Emission Unit ID#: L1	Emission Point ID#: L1	Year Installed/Modified: 2012		
Emission Unit Description: Loading losses from loading of produced fluids into tanker trucks				
Loading Area Data				
Number of Pumps: 1	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? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> 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? <input type="checkbox"/> Closed System to tanker truck passing a MACT level annual leak test? <input type="checkbox"/> Closed System to tanker truck passing a NSPS level annual leak test? <input checked="" type="checkbox"/> 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	Varies	Varies	Varies	Varies
Days/week	Varies	Varies	Varies	Varies
Bulk Liquid Data (use extra pages as necessary)				
Liquid Name	Produced Water			
Max. Daily Throughput (1000 gal/day)	1.10			
Max. Annual Throughput(1000 gal/yr)	403			
Loading Method ¹	SP			
Max. Fill Rate (gal/min)	Varies			
Average Fill Time (min/loading)	Varies			
Max. Bulk Liquid Temperature (°F)	See ProMax results			
True Vapor Pressure ²	See ProMax results			
Cargo Vessel Condition ³	U			
Control Equipment or Method ⁴	None			
Max. Collection Efficiency (%)	100			
Max. Control Efficiency (%)	0			
Max.VOC Emission Rate	Loading (lb/hr)	See ProMax results		
	Annual(ton/yr)	See ProMax results		
Max.HAP Emission Rate	Loading (lb/hr)	See ProMax results		
	Annual(ton/yr)	See ProMax results		

Estimation Method ⁵	AP-42 Section 5.2 Methodology (via ProMax)		
--------------------------------	--	--	--

- | | | | | | |
|---|---|----|---|-----|-------------------------------|
| 1 | BF Bottom Fill | SP | Splash Fill | SUB | Submerged Fill |
| 2 | At maximum bulk liquid temperature | | | | |
| 3 | B Ballasted Vessel | C | Cleaned | U | Uncleaned (dedicated service) |
| | O Other (describe) | | | | |
| 4 | List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets) | | | | |
| | CA Carbon Adsorption | VB | Dedicated Vapor Balance (closed system) | | |
| | ECD Enclosed Combustion Device | F | Flare | | |
| | TO Thermal Oxidization or Incineration | | | | |
| 5 | EPA EPA Emission Factor in AP-42 | MB | Material Balance | | |
| | TM Test Measurement based upon test data submittal | O | Other (describe) | | |

Glycol Dehydration Unit Data Sheet(s)

		Subpart C	GHG (CO ₂ e)	234.24	1,025.95
RSV-1	Glycol Regenerator Still Vent	GRI-GlyCalc™	VOC	0.06	0.27
		GRI-GlyCalc™	Benzene	0.02	0.10
		GRI-GlyCalc™	Toluene	0.02	0.10
		GRI-GlyCalc™	Ethylbenzene	<0.01	0.01
		GRI-GlyCalc™	Xylenes	0.01	0.05
		GRI-GlyCalc™	n-Hexane	0.02	0.10
	Glycol Flash Tank	GRI-GlyCalc™	VOC		
		GRI-GlyCalc™	Benzene		
		GRI-GlyCalc™	Toluene		
		GRI-GlyCalc™	Ethylbenzene		
		GRI-GlyCalc™	Xylenes		
		GRI-GlyCalc™	n-Hexane		

- 1 Enter the Source Status using the following codes:
NS Construction of New Source ES Existing Source
MS Modification of Existing Source
- 2 Enter the date (or anticipated date) of the glycol dehydration unit's installation (construction of source), modification or removal.
- 3 Enter the Air Pollution Control Device (APCD)/Emission Reduction Device (ERD) type designation using the following codes and the device ID number:
NA None CD Condenser FL Flare
CC Condenser/Combustion Combination TO Thermal Oxidizer O Other (please list)
- 4 Enter the appropriate Emission Unit ID Numbers and Emission Point ID Numbers for the glycol dehydration unit reboiler vent and glycol regenerator still vent. The glycol dehydration unit reboiler vent and glycol regenerator still vent should be designated RBV-1 and RSV-1, respectively. If the 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 Controllers

**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?

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?

Yes No

Please list approximate number.

Emission Calculations

ATTACHMENT R – EMISSIONS CALCULATIONS

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

Use the following guidelines to ensure complete emission calculations:

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

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

Company Name: **M3 Appalachia Gathering LLC**

Facility Name: **Daybrook Station**

Project Description: **G35C Application**

Facility-Wide Emission Summary

Carbon equivalent emissions (CO₂e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:

Storage Tanks	#	CO ₂	1
Dehy Reboiler	1	CH ₄	25
Glycol Dehydrator	1	N ₂ O	298
Compressors	6		

Emission Source ID#s	Emission Source Description	NO _x		CO		VOC		SO ₂		PM ₁₀		PM _{2.5}		CO ₂ e	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	Caterpillar G3516LE Engine - 1,380 HP	1.52	6.66	0.22	0.97	0.71	3.09	0.01	0.03	0.10	0.45	0.10	0.45	1,761.46	7,715.20
CE-2	Caterpillar G3516LE Engine - 1,380 HP	1.52	6.66	0.22	0.97	0.71	3.09	0.01	0.03	0.10	0.45	0.10	0.45	1,761.46	7,715.20
CE-3	Caterpillar G3612LE Engine - 3,550 HP	3.91	17.14	1.07	4.70	2.51	10.97	0.01	0.02	0.09	0.39	0.09	0.39	4,586.89	20,090.59
CE-4	Caterpillar G3616LE Engine - 5,000 HP	5.51	24.14	1.65	7.24	3.52	15.45	0.01	0.03	0.13	0.56	0.13	0.56	1,350.62	5,914.93
CE-5	Caterpillar G3616LE Engine - 5,000 HP	5.51	24.14	1.65	7.24	3.52	15.45	0.01	0.03	0.13	0.56	0.13	0.56	1,350.62	5,914.93
CE-6	Caterpillar G3608LE Engine - 2,370 HP	2.61	11.44	0.99	4.35	1.67	7.32	4.0E-03	0.02	0.07	0.30	0.07	0.30	796.40	3,488.25
RBV-1	Reboiler	0.19	0.83	0.16	0.70	0.01	0.05	1.1E-03	0.01	0.01	0.06	0.01	0.06	234.24	1,025.95
RSV-1	Glycol Dehydration Still Vent	---	---	---	---	0.06	0.27	---	---	---	---	---	---	---	---
T01-T02, T07-T18	Miscellaneous Storage Vessels	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T03-T06	Produced Water Storage Vessels	---	---	---	---	4.8E-03	0.02	---	---	---	---	---	---	0.54	2.37
L1	Liquid Loading	---	---	---	---	3.3E-03	8.7E-04	---	---	---	---	---	---	---	---
FUG	Fugitive	---	---	---	---	---	6.08	---	---	---	---	---	---	---	1,436.93
Facility Total		20.77	91.02	5.96	26.18	12.71	61.79	0.04	0.16	0.63	2.77	0.63	2.77	11,842.23	53,304.35

Emission Source ID#s	Emission Source Description	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		n-Hexane		Total HAP	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	Caterpillar G3516LE Engine - 1,380 HP	0.12	0.53	4.5E-03	0.02	4.2E-03	0.02	4.1E-04	1.8E-03	1.9E-03	8.3E-03	0.01	0.05	0.32	1.41
CE-2	Caterpillar G3516LE Engine - 1,380 HP	0.12	0.53	4.5E-03	0.02	4.2E-03	0.02	4.1E-04	1.8E-03	1.9E-03	8.3E-03	0.01	0.05	0.32	1.41
CE-3	Caterpillar G3612LE Engine - 3,550 HP	0.20	0.89	4.0E-03	0.02	4.0E-03	0.02	3.6E-04	1.6E-03	3.6E-04	1.6E-03	1.0E-02	0.04	0.37	1.62
CE-4	Caterpillar G3616LE Engine - 5,000 HP	0.66	2.90	6.0E-03	2.5E-02	0.01	0.02	1.0E-03	2.0E-03	2.0E-03	0.01	1.4E-02	0.06	0.91	3.98
CE-5	Caterpillar G3616LE Engine - 5,000 HP	0.66	2.90	0.01	0.03	0.01	0.02	1.0E-03	2.0E-03	2.0E-03	0.01	1.4E-02	0.06	0.91	3.98
CE-6	Caterpillar G3608LE Engine - 2,370 HP	0.31	1.37	3.0E-03	0.01	2.0E-03	0.01	2.7E-04	1.2E-03	1.0E-03	4.4E-03	3.0E-03	0.01	0.32	1.41
RBV-1	Reboiler	1.4E-04	6.3E-04	4.0E-06	1.8E-05	6.5E-06	2.8E-05	---	---	---	---	3.4E-03	0.02	3.6E-03	0.02
RSV-1	Glycol Dehydration Still Vent	---	---	0.02	0.10	0.02	0.10	2.3E-03	0.01	0.01	0.05	2.0E-02	0.10	0.07	0.36
T01-T02, T07-T18	Miscellaneous Storage Vessels	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T03-T06	Produced Water Storage Vessels	---	---	---	---	---	---	---	---	---	---	2.8E-06	1.2E-05	2.8E-06	1.2E-05
L1	Liquid Loading	---	---	---	---	---	---	---	---	---	---	4.2E-07	4.6E-08	4.2E-07	1.1E-07
FUG	Fugitive	---	---	---	<0.01	---	<0.01	---	<0.01	---	<0.01	---	0.01	---	0.02
Facility Total		2.08	9.12	0.05	0.22	0.04	0.21	0.01	0.02	0.02	0.09	0.09	0.40	3.22	14.19

Company Name:
 Facility Name:
 Project Description:

M3 Appalachia Gathering LLC
Daybrook Station
G35C Application

Compressor Engine

Engine Information:

Manufacturer:	Caterpillar
Model No.:	G3516LE
Engine ID	CE-1 to CE-2
Stroke Cycle:	4-Stroke
Type of Burn:	Lean Burn
Rated Horsepower (bhp):	1,380

Engine Fuel Information:

Fuel Type:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,050
Specific Fuel Consumption (Btu/bhp-hr):	7,442
Maximum Fuel Consumption at 100% Load (scf/hr):	9,781
Heat Input (MMBtu/hr):	10.27
Potential Fuel Consumption (MMBtu/yr):	89,965
Max. Fuel Consumption at 100%(MMscf/hr):	0.0098
Max. Fuel Consumption (MMscf/yr):	85.7
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	1.52	6.66	Manufacturer
VOC (excludes HCHO)	0.19	g/bhp-hr	0.58	2.56	Catalyst Vendor
VOC (includes HCHO)	---	---	0.71	3.09	VOC + HCHO
CO	0.07	g/bhp-hr	0.22	0.97	Catalyst Vendor
SO _x	0.001	lb/MMBtu	<0.01	<0.01	AP-42, Table 3.2-2 (Aug-2000)
PM ₁₀	0.01	lb/MMBtu	0.10	0.45	AP-42, Table 3.2-2 (Aug-2000)
PM _{2.5}	0.01	lb/MMBtu	0.10	0.45	AP-42, Table 3.2-2 (Aug-2000)
Formaldehyde (HCHO)	0.04	g/bhp-hr	0.12	0.53	Catalyst Vendor
GHG (CO ₂ e)	See Table Below		1,761	7,715	40 CFR 98, Tables C-1 & C-2
Other (Total HAP)	See Table Below		0.32	1.41	AP-42, Table 3.2-3 (Aug-2000)

Notes:

1. PM₁₀ and PM_{2.5} are total values (filterable + condensable).
2. GHG (CO₂e) is carbon dioxide equivalent, which is the summation of CO₂ (GWP = 1) + CH₄ (GWP = 25) + N₂O (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:
 Facility Name:
 Project Description:

M3 Appalachia Gathering LLC
 Daybrook Station
 G35C Application

Compressor Engine

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

Pollutant	Emission Factor	Units	Maximum Potential Emissions		Estimation Basis / Emission Factor Source
			lbs/hr	tpy	
GHGs:					
CO ₂	472.00	g/bhp-hr	1436.01	6289.73	Manufacturer
CH ₄	4.270	g/bhp-hr	12.99	56.90	Manufacturer
N ₂ O	0.0001	kg/MMBtu	2.3E-03	9.9E-03	40 CFR 98, Table C-2
GHG (CO₂e)			1,761	7,715	
Organic HAPs:					
Acenaphthene	1.25E-06	lb/MMBtu	1.3E-05	5.6E-05	AP-42, Table 3.2-2 (Aug-2000)
Acenaphthylene	5.53E-06	lb/MMBtu	5.7E-05	2.5E-04	AP-42, Table 3.2-2 (Aug-2000)
Acetaldehyde	8.36E-03	lb/MMBtu	8.6E-02	3.8E-01	AP-42, Table 3.2-2 (Aug-2000)
Acrolein	5.14E-03	lb/MMBtu	5.3E-02	2.3E-01	AP-42, Table 3.2-2 (Aug-2000)
Benzene	4.40E-04	lb/MMBtu	4.5E-03	2.0E-02	AP-42, Table 3.2-2 (Aug-2000)
Benzo(b)fluoranthene	1.66E-07	lb/MMBtu	1.7E-06	7.5E-06	AP-42, Table 3.2-2 (Aug-2000)
Benzo(e)pyrene	4.15E-07	lb/MMBtu	4.3E-06	1.9E-05	AP-42, Table 3.2-2 (Aug-2000)
Benzo(g,h,i)perlyene	4.14E-07	lb/MMBtu	4.3E-06	1.9E-05	AP-42, Table 3.2-2 (Aug-2000)
Biphenyl	2.12E-04	lb/MMBtu	2.2E-03	9.5E-03	AP-42, Table 3.2-2 (Aug-2000)
1,3-Butadiene	2.67E-04	lb/MMBtu	2.7E-03	1.2E-02	AP-42, Table 3.2-2 (Aug-2000)
Carbon Tetrachloride	3.67E-05	lb/MMBtu	3.8E-04	1.7E-03	AP-42, Table 3.2-2 (Aug-2000)
Chlorobenzene	3.04E-05	lb/MMBtu	3.1E-04	1.4E-03	AP-42, Table 3.2-2 (Aug-2000)
Chloroform	2.85E-05	lb/MMBtu	2.9E-04	1.3E-03	AP-42, Table 3.2-2 (Aug-2000)
Chrysene	6.93E-07	lb/MMBtu	7.1E-06	3.1E-05	AP-42, Table 3.2-2 (Aug-2000)
1,3-Dichloropropene	2.64E-05	lb/MMBtu	2.7E-04	1.2E-03	AP-42, Table 3.2-2 (Aug-2000)
Ethylbenzene	3.97E-05	lb/MMBtu	4.1E-04	1.8E-03	AP-42, Table 3.2-2 (Aug-2000)
Ethylene Dibromide	4.43E-05	lb/MMBtu	4.5E-04	2.0E-03	AP-42, Table 3.2-2 (Aug-2000)
Fluoranthene	1.11E-06	lb/MMBtu	1.1E-05	5.0E-05	AP-42, Table 3.2-2 (Aug-2000)
Fluorene	5.67E-06	lb/MMBtu	5.8E-05	2.6E-04	AP-42, Table 3.2-2 (Aug-2000)
Methanol	2.50E-03	lb/MMBtu	2.6E-02	1.1E-01	AP-42, Table 3.2-2 (Aug-2000)
Methylene Chloride	2.00E-05	lb/MMBtu	2.1E-04	9.0E-04	AP-42, Table 3.2-2 (Aug-2000)
n-Hexane	1.11E-03	lb/MMBtu	1.1E-02	5.0E-02	AP-42, Table 3.2-2 (Aug-2000)
Phenanthrene	1.04E-05	lb/MMBtu	1.1E-04	4.7E-04	AP-42, Table 3.2-2 (Aug-2000)
Phenol	2.40E-05	lb/MMBtu	2.5E-04	1.1E-03	AP-42, Table 3.2-2 (Aug-2000)
Pyrene	1.36E-06	lb/MMBtu	1.4E-05	6.1E-05	AP-42, Table 3.2-2 (Aug-2000)
Styrene	2.36E-05	lb/MMBtu	2.4E-04	1.1E-03	AP-42, Table 3.2-2 (Aug-2000)
Toluene	4.08E-04	lb/MMBtu	4.2E-03	1.8E-02	AP-42, Table 3.2-2 (Aug-2000)
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	4.1E-04	1.8E-03	AP-42, Table 3.2-2 (Aug-2000)
Tetrachloroethane	2.48E-06	lb/MMBtu	2.5E-05	1.1E-04	AP-42, Table 3.2-2 (Aug-2000)
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	3.3E-04	1.4E-03	AP-42, Table 3.2-2 (Aug-2000)
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	2.6E-03	1.1E-02	AP-42, Table 3.2-2 (Aug-2000)
Vinyl Chloride	1.49E-05	lb/MMBtu	1.5E-04	6.7E-04	AP-42, Table 3.2-2 (Aug-2000)
Xylene	1.84E-04	lb/MMBtu	1.9E-03	8.3E-03	AP-42, Table 3.2-2 (Aug-2000)
Naphthalene	7.44E-05	lb/MMBtu	7.6E-04	3.3E-03	AP-42, Table 3.2-2 (Aug-2000)
2-Methylnaphthalene	3.32E-05	lb/MMBtu	3.4E-04	1.5E-03	AP-42, Table 3.2-2 (Aug-2000)
PAH	2.69E-05	lb/MMBtu	2.8E-04	1.2E-03	AP-42, Table 3.2-3 (Aug-2000)
Total HAP			0.32	1.41	

Company Name: M3 Appalachia Gathering LLC
Facility Name: Daybrook Station
Project Description: G35C Application

Produced Water Storage Vessels

Potential Throughput

Operational Hours 8,760 hrs/yr
Maximum Produced Water Throughput¹ 26 bbl/day

¹ Based on Engineering Estimate. MSDS Sheet Indicates that Produced Water is 99% Water and 1% Condensate

Storage Tanks - Uncontrolled

	Breathing		Working		Flashing		Total Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Methane	<0.001	<0.001	<0.001	<0.001	0.022	0.095	0.022	0.095
Ethane	<0.001	<0.001	<0.001	<0.001	1.7E-04	0.001	1.7E-04	0.001
Propane	<0.001	<0.001	1.2E-04	0.001	0.004	0.017	0.004	0.018
Isobutane	<0.001	<0.001	1.8E-06	7.9E-06	1.7E-04	0.001	1.7E-04	0.001
n-Butane	<0.001	<0.001	9.5E-06	4.2E-05	4.0E-04	0.002	4.1E-04	0.002
Isopentane	<0.001	<0.001	1.1E-06	5.0E-06	6.9E-05	3.0E-04	7.0E-05	3.1E-04
n-Pentane	<0.001	<0.001	5.4E-07	2.4E-06	3.4E-05	1.5E-04	3.4E-05	1.5E-04
2,2-Dimethylbutane	<0.001	<0.001	9.3E-09	4.1E-08	1.7E-06	7.4E-06	1.7E-06	7.4E-06
Cyclopentane	<0.001	<0.001	1.9E-06	8.1E-06	1.9E-05	8.2E-05	2.1E-05	9.0E-05
2-Methylpentane	<0.001	<0.001	4.2E-08	1.8E-07	5.4E-06	2.4E-05	5.5E-06	2.4E-05
3-Methylpentane	<0.001	<0.001	1.9E-07	8.4E-07	9.1E-06	4.0E-05	9.3E-06	4.1E-05
n-Hexane	<0.001	<0.001	1.7E-08	7.6E-08	2.8E-06	1.2E-05	2.8E-06	1.2E-05
2-Methylhexane	<0.001	<0.001	7.3E-09	3.2E-08	1.1E-06	4.9E-06	1.1E-06	4.9E-06
3-Methylhexane	<0.001	<0.001	8.0E-09	3.5E-08	1.2E-06	5.1E-06	1.2E-06	5.2E-06
Total VOC Emissions:	0.00E+00	0.00E+00	1.37E-04	6.00E-04	4.62E-03	2.03E-02	4.76E-03	2.09E-02
Total HAP Emissions:	0.00E+00	0.00E+00	1.72E-08	7.55E-08	2.81E-06	1.23E-05	2.83E-06	1.24E-05

¹ Uncontrolled emissions calculation using Promax. Non-methane emissions are taken from the tank emissions stencil. Methane emissions are taken from the flash stream composition.

Company Name: M3 Appalachia Gathering LLC
Facility Name: Daybrook Station
Project Description: G35C Application

Storage Tank List

Tank Contents	Tank Capacity (gallons)	Emission Unit ID	VOC	
			(lb/hr)	(tons/yr)
Wastewater/Oil	4200	T01	---	---
Methanol	4200	T02	---	---
Produced Water	16800	T03	1.19E-03	5.21E-03
Produced Water	16800	T04	1.19E-03	5.21E-03
Produced Water	16800	T05	1.19E-03	5.21E-03
Produced Water	16800	T06	1.19E-03	5.21E-03
Lean Ethylene Glycol	500	T07	---	---
Maintenance Ethylene Glycol	500	T08	---	---
Lean Ethylene Glycol	500	T09	---	---
Maintenance Ethylene Glycol	500	T10	---	---
Engine Oil	500	T11	---	---
Compressor Oil	500	T12	---	---
Engine Oil	500	T13	---	---
Compressor Oil	500	T14	---	---
Engine Oil	500	T15	---	---
Compressor Oil	500	T16	---	---
Engine Oil	300	T17	---	---
Compressor Oil	300	T18	---	---

Company Name: M3 Appalachia Gathering LLC
Facility Name: Daybrook Station
Project Description: G35C Application

Liquid Loading

Throughput 403,200 gal/yr

Liquid Loading Emissions

	Uncontrolled Emissions	
	lb/hr	tpy
Propane	0.003	0.001
Isobutane	4.4E-05	1.1E-05
n-Butane	2.3E-04	6.0E-05
Isopentane	2.8E-05	7.2E-06
n-Pentane	1.3E-05	3.4E-06
2,2-Dimethylbutane	2.3E-07	5.9E-08
Cyclopentane	4.5E-05	1.2E-05
2-Methylpentane	1.0E-06	2.6E-07
3-Methylpentane	4.7E-06	1.2E-06
n-Hexane	4.2E-07	1.1E-07
2-Methylhexane	1.8E-07	4.6E-08
3-Methylhexane	1.9E-07	5.1E-08
Total VOC Emissions:	0.003	0.001
Total HAP Emissions:	0.000	0.000

¹ Uncontrolled emissions calculation using Promax.

² Hourly emissions assume two hours of loading per day, five days per week.

Company Name: **M3 Appalachia Gathering LLC**
 Facility Name: **Daybrook Station**
 Project Description: **G35C Application**

Fugitive Emissions

Fugitive Emissions from Component Leaks

Facility Equipment Type ¹	Valves	Connectors	Open-Ended Lines	Pressure Relief Devices
Wellhead	8	38	0.5	0
Separators	1	6	0	0
Meters/Piping	12	45	0	0
Compressors	12	57	0	0
In-line heaters	14	65	2	1
Dehydrators	24	90	2	2

1. Table W-1B to Subpart W of Part 98 — Default Average Component Counts for Major Onshore Natural Gas Production

Fugitive VOC/Total Emissions from Component Leaks

Equipment Type	Service	Emission Factors ¹ (kg/hr/source)	Facility Equipment Count ² (units)	TOC Annual Fugitive Emissions (tpy)	Weight Fraction VOC	Weight Fraction HAP	VOC Emissions ³ (tpy)	HAP Emissions ³ (tpy)
Pumps	Light Liquid	0.01990	18	3.46	1.00	3.5E-03	3.46	0.01
Compressor	Gas	0.22800	6	13.21	0.03	9.0E-05	0.34	1.2E-03
Valves	Gas	0.00597	327	18.85	0.03	9.0E-05	0.48	1.7E-03
Pressure Relief Valves	Gas	0.10400	3	3.01	0.03	9.0E-05	0.08	2.7E-04
Open-Ended Lines	All	0.00170	4	0.07	0.03	9.0E-05	1.7E-03	5.9E-06
Connectors	All	0.00183	1,313	23.20	0.03	9.0E-05	0.59	2.1E-03
Intermittent Pneumatic Devices ⁴	Gas	13.5	50	---	---	---	0.10	4.0E-03
Emission Totals:				61.80	---	---	5.04	0.02

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). SOCMF factors were used as it was representative of natural gas liquids extraction. The pneumatic controller value is from 40 CFR 98 Subpart W, Table W-1A. Pneumatic assumes operation 1/3 of the year.

2. Assumes one pump for each tank. Pneumatic devices assume 2 per dehydrator, 1 per storage tank, and 2 per compressor

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: M3 Appalachia Gathering LLC
Facility Name: Daybrook Station
Project Description: G35C Application

Fugitive Emissions

VOC/GHG Venting: Emissions from Component Leaks

Event Type	Estimated Maximum Number of Events	Gas Volume (scf/event)	VOC Emissions (tpy)	HAP Emissions (tpy)	CH ₄ Emissions (tpy)	CO ₂ Emissions (tpy)	CO ₂ e Emissions (tpy)
Rod Packing		1,208,880	0.73	0.00	23.71	0.08	592.72
Compressor Blowdowns	36	5,000	0.11	0.00	3.53	0.01	88.26
Engine Startup/Shutdown	36	5,000	0.11	0.00	3.53	0.01	88.26
Pigging	10	15,000	0.09	0.00	2.94	0.01	73.55
Emission Totals:			1.04	0.00	33.71	0.11	842.78

1. VOC, HAP, CH₄ and CO₂ emissions are based on fractions of these pollutants in the site-specific gas analysis shown below
2. Emissions are calculated in accordance with Equations W-35 and W-36 in Subpart W of 40 CFR 98. Density of VOC is assumed to be 0.06 kg/scf, density of HAP is assumed to be 0.07 kg/scf.
3. GHG (CO₂e) is carbon dioxide equivalent, which is the summation of CO₂ (GWP = 1) + CH₄ (GWP = 25) + N₂O (GWP = 298).
4. Pigging volumes are based on engineering estimates.
5. The total number of compressor blowdowns assumes a maximum of 6 blowdowns events per compressor per year and 6 startup and shutdown events per compressor per year.
6. Rod Packing venting volume was calculated using the following parameters. Emission factors were obtained from http://www.epa.gov/gasstar/documents/II_rodpack.pdf.

Number of Compressors	Number of Throws (Cylinders) per Compressor	Leak Factor (scf/hr/throw)	Total Gas Volume Emitted (scf/yr)
6	2	11.5	1,208,880

Company Name: **M3 Appalachia Gathering LLC**
 Facility Name: **Daybrook Station**
 Project Description: **G35C 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	18	3.46	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.1E-04
Compressor	Gas	0.22800	6	13.21	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.2E-03
Valves	Gas	0.00597	327	18.85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.7E-03
Pressure Relief Valves	Gas	0.10400	3	3.01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.7E-04
Open-Ended Lines	All	0.00170	4	0.07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.9E-06
Connectors	All	0.00183	1,313	23.20	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.1E-03
Intermittent Pneumatic Devices ⁴	Gas	13.5	50	---	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.0E-03
Emission Totals:				61.80	0.0E+00	0.0E+00	0.0E+00	0.0E+00	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). SOCMF factors were used as it was representative of natural gas liquids extraction. The pneumatic controller value is from 40 CFR 98 Subpart W, Table W-1A. Pneumatic assumes operation 1/3 of the year.

2. Assumes one pump for each tank. Pneumatic devices assume 2 per dehydrator, 1 per storage tank, and 2 per compressor.

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)

Company Name: M3 Applachia Gathering LLC
Facility Name: Daybrook Station
Project Description: G35C Application

Fugitive Emissions

GHG Fugitive Emissions from Component Leaks

Component	Component Count	GHG Emission Factor ¹ (scf/hr/component)	CH ₄ Emissions ^{2,3} (tpy)	CO ₂ Emissions ^{2,3} (tpy)	CO ₂ e Emissions ⁴ (tpy)
Pumps	18	0.01	0.03	1.0E-04	0.77
Compressor	6	4.17	4.30	0.01	107.46
Valves	327	0.027	1.52	0.01	37.92
Pressure Relief Devices	3	0.04	0.02	6.9E-05	0.52
Open-Ended Lines	4	0.061	0.04	1.4E-04	1.05
Connectors	1,313	0.003	0.68	2.3E-03	16.92
Intermittent Pneumatic Devices	50	6	17.18	0.06	429.51
Total			23.76	0.08	594.15

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). Pneumatic assumes operation 1/3 of the year.

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 CH₄, VOC, HAP, and CO₂ based on gas analysis:

CH ₄ :	93%	CO ₂ :	0.11%	HAP	0.00%	VOC	1%
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4. Carbon equivalent emissions (CO₂e) 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: M3 Appalachia Gathering LLC
Facility Name: Daybrook Station
Project Description: G35C Application

Gas Analysis

Sample Location: 12919300
Sample Date: 8/14/2013
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	0.113	44.01	0.05	0.00	0.289
Nitrogen	0.290	28.01	0.08	0.00	0.471
Methane	92.656	16.04	14.86	0.86	86.197
Ethane	6.024	30.07	1.81	0.11	10.506
Propane	0.726	44.10	0.32	0.02	1.857
Isobutane	0.072	58.12	0.04	0.00	0.243
n-Butane	0.082	58.12	0.05	0.00	0.277
Isopentane	0.018	72.15	0.01	0.00	0.077
n-Pentane	0.009	72.15	0.01	0.00	0.038
Cyclopentane	0.001	70.1	0.0	0.0	0.004
n-Hexane	0.002	86.18	0.00	0.00	0.009
Cyclohexane	<0.001	84.16	0.00	0.00	0.000
Other Hexanes	0.007	86.18	0.01	0.00	0.033
Heptanes	<0.001	100.21	0.00	0.00	0.000
Methylcyclohexane	<0.001	98.19	0.00	0.00	0.000
2,2,4-Trimethylpentane	<0.001	114.23	0.00	0.00	0.000
Benzene*	<0.001	78.11	0.00	0.00	0.000
Toluene*	<0.001	92.14	0.00	0.00	0.000
Ethylbenzene*	<0.001	106.17	0.00	0.00	0.000
Xylenes*	<0.001	106.16	0.00	0.00	0.000
C8 + Heavies	<0.001	130.80	0.00	0.00	0.000
Totals	100.000		17.24	1.00	100

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



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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

	<u>g/bhp-hr</u>	<u>Lb/Hr</u>	<u>Tons/Year</u>
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

	<u>% Reduction</u>	<u>g/bhp-hr</u>	<u>Lb/Hr</u>	<u>Tons/Year</u>
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



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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 50 hours prior to catalyst installation, otherwise the warranty is void.

The catalyst must not be exposed to the following known 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.

G3516B

GAS ENGINE SITE SPECIFIC TECHNICAL DATA Exterran M3 Midstream, LLC

GAS COMPRESSION APPLICATION

ENGINE SPEED (rpm): 1400
 COMPRESSION RATIO: 8:1
 AFTERCOOLER - STAGE 2 INLET (°F): 130
 AFTERCOOLER - STAGE 1 INLET (°F): 201
 JACKET WATER OUTLET (°F): 210
 COOLING SYSTEM: JW+OC+1AC, 2AC
 IGNITION SYSTEM: ADEM3
 EXHAUST MANIFOLD: DRY
 COMBUSTION: Ultra Lean Burn
 NOx EMISSION LEVEL (g/bhp-hr NOx): 0.5
 SET POINT TIMING: 31.6

FUEL SYSTEM:

CAT WIDE RANGE
WITH AIR FUEL RATIO CONTROL

SITE CONDITIONS:

FUEL:
 FUEL PRESSURE RANGE (psig):
 FUEL METHANE NUMBER:
 FUEL LHV (Btu/scf):
 ALTITUDE (ft):
 MAXIMUM INLET AIR TEMPERATURE (°F):
 NAMEPLATE RATING:

Gas Analysis
 7.0-50.0
 89.4
 929
 1400
 100
 1380 bhp@1400rpm

RATING	NOTES	LOAD	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE			
			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)	ft ³ /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.			

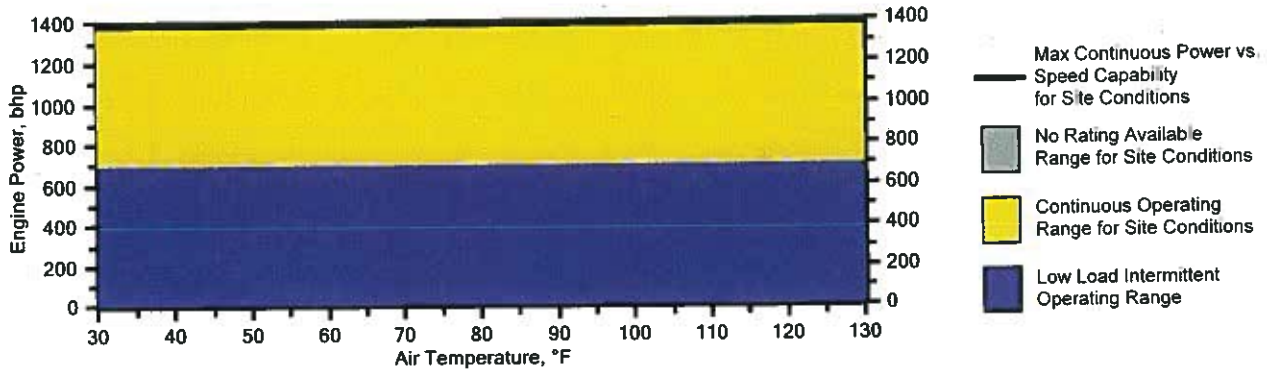
CONDITIONS AND DEFINITIONS

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

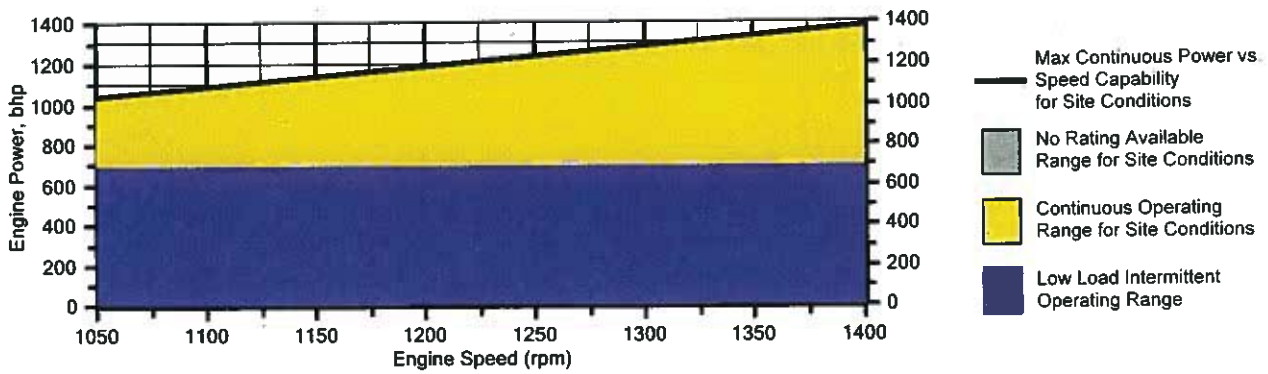
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1400 ft and 1400 rpm



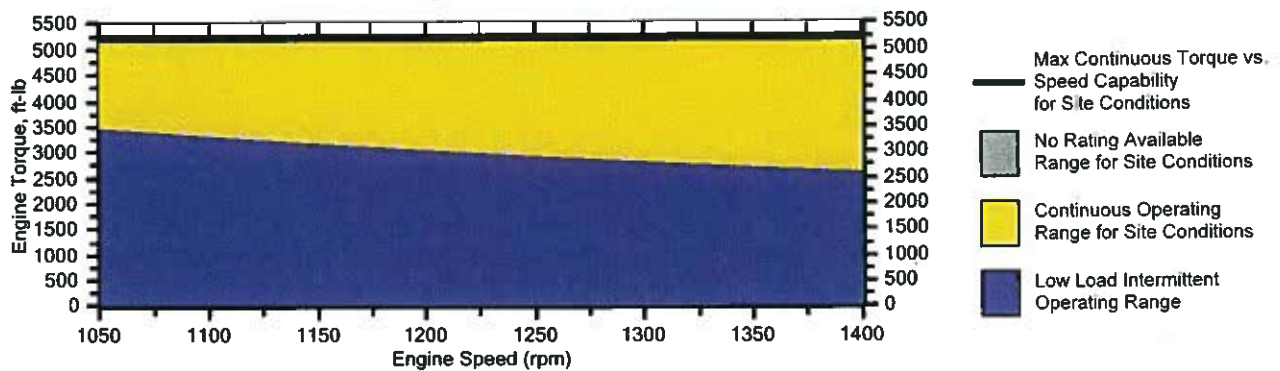
Engine Power vs. Engine Speed

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.

NOTES

1. Engine rating is with two engine driven water pumps. Tolerance is $\pm 3\%$ of full load.
2. Fuel consumption tolerance is $\pm 3.0\%$ of full load data.
3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of $\pm 5\%$.
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 $\pm 5\%$.
6. Exhaust stack temperature is a nominal value with a tolerance of $(+)63^{\circ}\text{F}$, $(-)54^{\circ}\text{F}$.
7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of $\pm 6\%$.
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 NO_x 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 NO_x level. Tolerance is ± 0.5 .
11. Heat rejection values are nominal. Tolerances, based on treated water, are $\pm 10\%$ for jacket water circuit, $\pm 50\%$ for radiation, $\pm 20\%$ for lube oil circuit, and $\pm 5\%$ 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.

J-W Measurement Company

Good

Canonsburg, PA

724-749-5180

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

<u>COMPONENT</u>	<u>MOL%</u>	<u>GPM@14.73(Psia)</u>
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**

Section 1 Identification

Manufacturer Information:

Appalachia Gas Gathering, LLC
1099 Main Ave, Suite 210
Durango, CO. 81301
(970) 247-4423
www.m3midstream.com

Emergency Phone #:

Chemtrec (800) 424-9300
Appalachia Gas Gathering (800) 873-0647

Product Identification:

PRODUCED WATER

Trade Name/Synonyms:

Produced Water, Process Water, Salt Water, Oily Water

Chemical Family:

Water

Recommended Use/Restrictions:

Industrial

Section 2 Hazard(s) Identification

GHS Classification:

Flammable: Category 1, Health: Category 2, Reactivity: Category 0

GHS Label Elements:



Signal Word:

Warning

Hazard Statement:

May be flammable due to presence of natural gas condensate. Keep away from heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, mechanical/electrical equipment). Stable under normal conditions. Avoid all sources of ignition.

Precautionary Statement:

May contain natural gas condensate, amines, and glycols. Overexposure may cause damage to the peripheral nervous system. Use ventilation adequate to keep exposures below recommended limits. Avoid breathing vapor or mist. Avoid contact with eyes, skin or clothing. Do not taste or swallow. Wash thoroughly after handling.

Section 3 Composition/ Info on Ingredients

Component	Cas No.	Typical%
Produced Water	None	90-99
Natural Gas Condensate	68919-39-1	0-2
Ethylene Glycol	107-21-1	0-2
Triethylene Glycol	112-27-6	0-2
Methanol	67-56-1	0-2

Section 4 First Aid Measures

Inhalation:

If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.

Skin:

Wipe material from skin and remove contaminated clothing. Cleanse affected areas thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops, seek medical attention.

Eyes:

If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water for 15 minutes, with eyelids held open. If symptoms persist, seek medical attention.

Ingestion:

Aspiration hazard. Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe damage. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration

Immediate Symptoms:

Effects of overexposure may include irritation of the nose, throat and digestive tract, nausea, vomiting, diarrhea, transient excitation followed by signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination and fatigue).

Delayed Symptoms:

Conditions aggravated by exposure may include skin, respiratory (asthma-like), male reproductive and peripheral nerve disorders. Exposure to high concentrations of this material may increase the sensitivity of the heart to certain drugs. Persons with pre-existing heart disorders may be more susceptible to this effect.

Section 5 Fire Fighting Measures

Extinguishing Equipment:

Any extinguisher capable of handling Class B fires is recommended, including extinguishing media such as CO₂, dry chemical or foam. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Unsuitable Extinguishing Equipment:

Avoid spreading burning liquid with water used for cooling purposes. Any extinguisher capable of handling Class B fires is recommended, including extinguishing media such as CO₂, dry chemical or foam. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Specific Hazards:

This material contains flammable components and may be ignited by heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback or explode.

Protective Equipment:

Firefighters must wear MSHA/NIOSH approved positive pressure breathing apparatus (SCBA) with full-face mask and full protective equipment.

Basic Fire Fighting Procedure:

Although minimal amounts of natural gas condensates are in the produced water, any fires should be treated with extreme caution. The contents of the tank may be expelled beyond the containment dikes or ditches. All personnel should be kept back a safe distance when a boil over is anticipated (reference NFPA 11). For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant. Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

Explosion Hazard(s):

May create vapor/air explosion hazard indoors, outdoors or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

Section 6 Accidental Release Measures

Personal Precautions:

Caution should be exercised regarding personnel safety and exposure to the released product. Notify local authorities and the National Response Center, if required.

Emergency Procedures:

Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of spill/release, isolate immediate hazard area and keep unauthorized personnel out. Product may release large amounts of flammable vapors (e.g., methane, ethane and propane) at or below ambient temperature depending on source and process conditions. Stop spill/release if it can be done with minimal risk.

Methods/Materials for Containment:

Wear appropriate protective equipment including respiratory equipment as conditions warrant. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors. Spilled material may be absorbed into an appropriate absorbent material.

Cleanup Procedures:

Isolate area and deny entry. Remove sources of ignition. Ventilate closed in areas. Notify fire authorities and

appropriate federal, state and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount into navigable waters, notify the National Response Center (800-424-8802).

Section 7 Handling and Storage

Handling Procedures:

The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits. Use good personal hygiene practice. Depending on the source of the produced water, there could be some amount of NORM (naturally occurring radioactive materials) in the scale, deposit and sludge associated with this material. Proper measurements should be taken prior to handling this material or any equipment contaminated with this material. If NORM is indicated, refer to API Bulletin E2, "Bulletin on Management of Naturally Occurring Radioactive Materials in Oil and Gas Production," for additional information.

Safe Storage Procedures:

Keep containers tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area "No Smoking or Open Flame". Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

Empty Containers:

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1 and other governmental and industrial references pertaining to cleaning, repairing, welding or other contemplated operations.

Section 8 Exposure Controls/PPE

Exposure Limits:

ACGIH: 15 ppm (based on hydrocarbon vapors)

OSHA: 25 ppm (based on hydrocarbon vapors)

Appropriate Engineering Controls:

If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

Personal Protective Equipment:

Eyes/Face: Safety glasses or goggles are recommended when there is a possibility of splashing or spraying.

Skin: The use of gloves (nitrile or neoprene) is advised to prevent skin contact and possible irritation.

Depending on conditions, the use of an apron or chemical protective clothing may be necessary.

Respiratory: A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations of hydrocarbons are expected to exceed exposure limits.

Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed when workplace conditions warrant a respirator's use.

Clothing/Gloves: Wear approved FRC clothing and gloves when required.

Section 9 Physical and Chemical Properties

Boiling Point:	100-500°F
Specific Gravity:	~1.0 (Water = 1)
Melting Point:	ND
% Volatile:	Approximately 1%
Vapor Pressure:	ND
Vapor Density (Air = 1):	>1
Viscosity:	ND
% Solubility in Water:	95% estimated
Density(lb/gal):	Varies, but estimated at 8 lb/gal
Physical State:	Liquid
pH:	7-11
Appearance/Odor:	Clear to dark amber in color/ Petroleum smell

Section 10 Stability and Reactivity

Reactivity:

Stable under normal conditions of storage and handling. Flammable liquid and vapor potential. Vapor can cause flash fire.

Chemical Stability:

Stable under normal conditions.

Possibility of Hazardous Reaction:

Combustion can yield carbon dioxide, carbon monoxide, other organic compounds and non-combusted hydrocarbons.

Conditions to Avoid:

Avoid heat, flames, sparks, and other ignition sources.

Incompatible Materials:

Avoid contact with strong oxidizers.

Hazardous Decomposition:

Combustion can yield carbon dioxide, carbon monoxide, other organic compounds and non-combusted hydrocarbons.

Section 11 Toxicological Information

Routes of Exposure:

Skin: Prolonged contact may cause mild skin irritation including redness, burning and drying and cracking of the skin. No harmful effects from skin absorption are expected.

Eyes: Contact may cause mild to severe eye irritation, including stinging, watering, redness and swelling.

Inhalation: Low to moderate degree of toxicity by inhalation. Prolonged or excessive exposure may cause irritation to the nose, throat, lungs and respiratory tract.

Ingestion: Low to moderate degree of toxicity by ingestion. Major health threat occurs from danger of breathing (aspiration) liquid drops into lungs, especially during vomiting. Ingestion may cause nausea, vomiting, diarrhea and central nervous system effects similar to alcohol intoxication.

Immediate Effects:

Headache, drowsiness, dizziness, loss of coordination and fatigue.

Note to Physician:

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for development of cardiac arrhythmias.

Chronic Effects:

Conditions aggravated by exposure may include skin, respiratory (asthma-like), male reproductive and peripheral nerve disorders. Exposure to high concentrations of this material may increase the sensitivity of the heart to certain drugs. Persons with pre-existing heart disorders may be more susceptible to this effect.

Measure of Toxicity:

Classification for Health: 2

Description of Symptoms:

Effects of overexposure may include irritation of the nose, throat and digestive tract, nausea, vomiting, diarrhea, transient excitation followed by signs of nervous system depression.

Special Toxic Effects: (Potential Constituents of Natural Gas Condensate)

n-Hexane (CAS 110-54-3)

Target Organs – Excess exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesia of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Benzene (CAS 71-43-2)

Carcinogenicity: Benzene is a known animal carcinogen and is known to produce leukemia in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

Target Organs:

Overexposure to a component (toluene) may cause injury to the peripheral nervous system. There is limited evidence from animal studies that overexposure may cause injury to the male reproductive system.

Carcinogenicity:

A component of the natural gas condensate (benzene) is a known human cancer hazard (see Special Toxic Effects below). Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure.

Section 12 Ecological Information

Aquatic Toxicity:

Not expected to be harmful to aquatic organisms.

Persistence and Degradability:

No Data Available

Mobility/Absorption:

No Data Available

Bioaccumulative Potential:

No Data Available

Section 13 Disposal Considerations

Disposal Methods:

Consult federal, state and local waste regulations to determine appropriate disposal options.

Section 14 Transport Information

General Transportation Information:	
DOT Proper Shipping Name (49 CFR 172.101):	Water, liquid, DOT N/A
DOT Hazard Classes (49 CFR 172.101):	N/A
UN/NA Code (49 CFR 172.101):	N/A
Packing Group (49 CFR 172.101):	N/A
Bill of Lading Description (49 CFR 172.202):	Produced Water, n.o.s.
DOT Labels Required (49 CFR 172.101):	None (see below note)
DOT Placards Required (49 CFR 172.504):	

Section 15 Regulatory Information

The estimated reportable quantity (RQ) for this material is based on the weight % shown below:

RQ based on benzene – The RQ for benzene is 10 pounds, which equals 3,333 pounds of natural gas condensate (556 gallons). The RQ is based on 0.3 wt. % benzene. Large spills of produced water may necessitate the reporting of the Benzene RQ.

RQ based on n-Hexane – The RQ for n-Hexane is 5000 pounds. It is not expected that there will be large enough amounts of condensate in the produced water to necessitate the reporting of the n-Hexane RQ.

RQ based on toluene – The RQ for toluene is 1000 pounds. It is not expected that there will be large enough amounts of condensate in the produced water to necessitate the reporting of the n-Hexane RQ.

RQ based on ethylene glycol – The RQ for ethylene glycol is 5000 pounds. It is not expected that there will be large enough amounts of ethylene glycol in the produced water to necessitate the reporting of the ethylene glycol RQ.

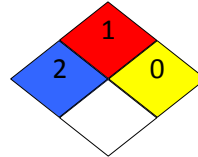
RQ based on methanol – The RQ for methanol is 5000 pounds. It is not expected that there will be large enough amounts of methanol in the produced water to necessitate the reporting of the ethylene glycol RQ.

Sara Title III Information: This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Toluene	CAS – 108-88-3	Weight % - <1.0
n-Hexane	CAS – 110-54-3	Weight % - <1.0
Benzene	CAS – 71-43-2	Weight % - 0 – 0.3
Ethylene Glycol	CAS – 107-21-1	Weight % - 0 – 1
Methanol	CAS – 67-56-1	Weight % - 0 – 2

Section 16 Other Information

NFPA Rating:	Health: 2
	Fire: 1
	Reactivity: 0

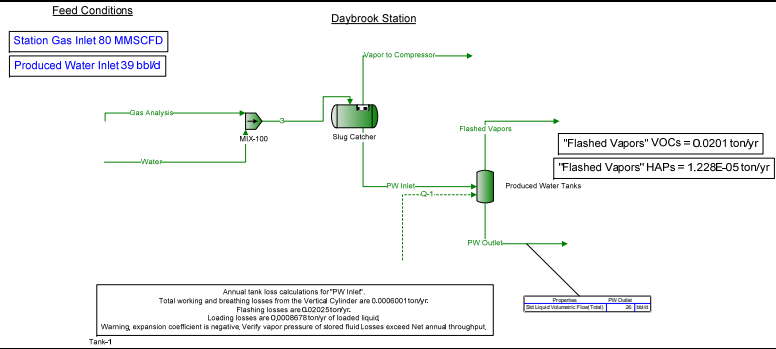


Manufacturer assumes no responsibility for injury to third party proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, manufacturer assumes no responsibility for injury to third party proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, third party assumes the risk in their use of the material

Revised Feb, 2015

Daybrook Station Plant Schematic

Client Name:	M3 Appalachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		
Flowsheet:	Daybrook Station	



* User Specified Values
 ? Extrapolated or Approximate Values

Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	M3 Appalachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		
Flowsheet:	Daybrook Station	

Connections

	Flashed Vapors	Gas Analysis	PW Inlet	PW Outlet	Vapor to Compressor
From Block	Produced Water Tanks	--	Slug Catcher	Produced Water Tanks	Slug Catcher
To Block	--	MIX-100	Produced Water Tanks	--	--

Stream Composition

Mole Fraction	Flashed Vapors %	Gas Analysis %	PW Inlet %	PW Outlet %	Vapor to Compressor %
Methane	89.3957	92.656 *	0.0526462	0.00223711	92.5477
Ethane	5.98322	6.0239 *	0.00355113	0.000177289	6.01686
Propane	0.73343	0.7259 *	0.000438602	2.50338E-05	0.725051
Isobutane	0.023758	0.072 *	1.36754E-05	2.7837E-07	0.0719159
n-Butane	0.0569191	0.0822 *	3.35466E-05	1.45061E-06	0.0821039
Isopentane	0.00794977	0.0183 *	4.62504E-06	1.42235E-07	0.0182786
n-Pentane	0.00385797	0.009 *	2.24252E-06	6.70484E-08	0.00898948
Nitrogen	0.149148	0.29 *	8.59195E-05	1.81565E-06	0.289661
Carbon Dioxide	1.16099	0.1133 *	0.00125675	0.000602408	0.113165
2,2-Dimethylbutane	0.000161796	0.0011 *	9.22244E-08	9.8774E-10	0.00109872
Cyclopentane	0.00216189	0.0009 *	1.46175E-06	2.42799E-07	0.000898945
2-Methylpentane	0.000521425	0.0027 *	2.98321E-07	4.2917E-09	0.00269685
3-Methylpentane	0.000878232	0.0017 *	5.15168E-07	1.99433E-08	0.00169801
n-Hexane	0.000270689	0.0018 *	1.54422E-07	1.7805E-09	0.0017979
2-Methylhexane	9.2745E-05	0.0006 *	5.29992E-08	7.00601E-10	0.000599299
3-Methylhexane	9.70488E-05	0.0006 *	5.54887E-08	7.63199E-10	0.000599299
Water	2.48085	0 *	99.942	99.997	0.116921

Molar Flow	Flashed Vapors lbmol/h	Gas Analysis lbmol/h	PW Inlet lbmol/h	PW Outlet lbmol/h	Vapor to Compressor lbmol/h
Methane	0.0107451	8138.76 *	0.0112217	0.000476579	8138.75
Ethane	0.000719167	529.13 *	0.000756935	3.77685E-05	529.129
Propane	8.81563E-05	63.7619 *	9.34893E-05	5.33303E-06	63.7618
Isobutane	2.85565E-06	6.32437 *	2.91495E-06	5.93021E-08	6.32437
n-Butane	6.84153E-06	7.22032 *	7.15056E-06	3.09028E-07	7.22031
Isopentane	9.55541E-07	1.60744 *	9.85842E-07	3.03006E-08	1.60744
n-Pentane	4.63717E-07	0.790546 *	4.78001E-07	1.42835E-08	0.790546
Nitrogen	1.79272E-05	25.4732 *	1.8314E-05	3.86793E-07	25.4731
Carbon Dioxide	0.000139548	9.9521 *	0.000267881	0.000128333	9.95183
2,2-Dimethylbutane	1.94475E-08	0.0966223 *	1.96579E-08	2.10421E-10	0.0966223
Cyclopentane	2.59853E-07	0.0790546 *	3.11578E-07	5.17242E-08	0.0790543
2-Methylpentane	6.26739E-08	0.237164 *	6.35882E-08	9.14273E-10	0.237164
3-Methylpentane	1.05561E-07	0.149325 *	1.0981E-07	4.24857E-09	0.149325
n-Hexane	3.25361E-08	0.158109 *	3.29154E-08	3.79306E-10	0.158109
2-Methylhexane	1.11477E-08	0.0527031 *	1.1297E-08	1.49251E-10	0.0527031
3-Methylhexane	1.1665E-08	0.0527031 *	1.18276E-08	1.62587E-10	0.0527031
Water	0.000298191	0 *	21.3029	21.3026	10.2821

Mass Flow	Flashed Vapors lb/h	Gas Analysis lb/h	PW Inlet lb/h	PW Outlet lb/h	Vapor to Compressor lb/h
Methane	0.172378	130566 *	0.180024	0.00764549	130566
Ethane	0.0216247	15910.4 *	0.0227603	0.00113566	15910.4
Propane	0.00388731	2811.62 *	0.00412247	0.000235163	2811.62
Isobutane	0.000165977	367.586 *	0.000169423	3.44677E-06	367.586
n-Butane	0.000397645	419.661 *	0.000415606	1.79614E-05	419.661
Isopentane	6.89411E-05	115.975 *	7.11273E-05	2.18615E-06	115.975
n-Pentane	3.34566E-05	57.0369 *	3.44872E-05	1.03054E-06	57.0369

* User Specified Values
 ? Extrapolated or Approximate Values

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Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	M3 Appalachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		
Flowsheet:	Daybrook Station	

Mass Flow	Flashed Vapors lb/h	Gas Analysis lb/h	PW Inlet lb/h	PW Outlet lb/h	Vapor to Compressor lb/h
Nitrogen	0.000502203	713.59 *	0.000513038	1.08354E-05	713.589
Carbon Dioxide	0.00614145	437.987 *	0.0117893	0.00564786	437.975
2,2-Dimethylbutane	1.67589E-06	8.32646 *	1.69403E-06	1.81331E-08	8.32646
Cyclopentane	1.82243E-05	5.54433 *	2.18518E-05	3.62757E-06	5.54431
2-Methylpentane	5.40094E-06	20.4377 *	5.47973E-06	7.87878E-08	20.4377
3-Methylpentane	9.09677E-06	12.8682 *	9.46289E-06	3.66122E-07	12.8682
n-Hexane	2.80381E-06	13.6251 *	2.8365E-06	3.26869E-08	13.6251
2-Methylhexane	1.11702E-06	5.28095 *	1.13198E-06	1.49553E-08	5.28095
3-Methylhexane	1.16886E-06	5.28095 *	1.18515E-06	1.62915E-08	5.28095
Water	0.005372	0 *	383.779	383.773	185.235

Stream Properties

Property	Units	Flashed Vapors	Gas Analysis	PW Inlet	PW Outlet	Vapor to Compressor
Temperature	°F	70	74 *	71.7309	70 *	71.7309
Pressure	psia	14.6959	364.696 *	364.696	14.6959 *	364.696
Mole Fraction Vapor	%	100	100	0	0	100
Mole Fraction Light Liquid	%	0	0	100	100	0
Mole Fraction Heavy Liquid	%	0	0	0	0	0
Molecular Weight	lb/lbmol	17.5221	17.2443	18.0151	18.0154	17.2452
Mass Density	lb/ft ³	0.0454221	1.16896	62.2345	62.2744	1.17523
Molar Flow	lbmol/h	0.0120197	8783.85	21.3153	21.3033	8794.12
Mass Flow	lb/h	0.210611	151471	383.998	383.788	151656
Vapor Volumetric Flow	ft ³ /h	4.63676	129578	6.17019	6.16285	129043
Liquid Volumetric Flow	gpm	0.57809	16155.2	0.76927	0.768355	16088.5
Std Vapor Volumetric Flow	MMSCFD	0.000109471	80 *	0.194132	0.194023	80.0935
Std Liquid Volumetric Flow	sgpm	0.00131524	977.137	0.768578	0.767263	977.506
Compressibility		0.997351	0.939378	0.0185119	0.000747934	0.9384
Specific Gravity		0.604992	0.595398	0.997843	0.998483	0.595429
API Gravity				10.0692	10.0157	
Enthalpy	Btu/h	-430.679	-2.87944E+08	-2.62007E+06	-2.62062E+06	-2.89207E+08
Net Ideal Gas Heating Value	Btu/ft ³	929.841	963.004	0.548189	0.0238637	961.879
Net Liquid Heating Value	Btu/lb	20089.9	21172.3	-1047.62	-1059.22	21145.1

Remarks

Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	M3 Appalachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		
Flowsheet:	Daybrook Station	

Connections

	Water	3
From Block	--	MIX-100
To Block	MIX-100	Slug Catcher

Stream Composition

Mole Fraction	Water %	3 %
Methane	0 *	92.324
Ethane	0 *	6.00232
Propane	0 *	0.723299
Isobutane	0 *	0.071742
n-Butane	0 *	0.0819055
Isopentane	0 *	0.0182344
n-Pentane	0 *	0.00896775
Nitrogen	0 *	0.288961
Carbon Dioxide	0 *	0.112894
2,2-Dimethylbutane	0 *	0.00109606
Cyclopentane	0 *	0.000896775
2-Methylpentane	0 *	0.00269033
3-Methylpentane	0 *	0.00169391
n-Hexane	0 *	0.00179355
2-Methylhexane	0 *	0.00059785
3-Methylhexane	0 *	0.00059785
Water	100 *	0.358293

Molar Flow	Water lbmol/h	3 lbmol/h
Methane	0 *	8138.76
Ethane	0 *	529.13
Propane	0 *	63.7619
Isobutane	0 *	6.32437
n-Butane	0 *	7.22032
Isopentane	0 *	1.60744
n-Pentane	0 *	0.790546
Nitrogen	0 *	25.4732
Carbon Dioxide	0 *	9.9521
2,2-Dimethylbutane	0 *	0.0966223
Cyclopentane	0 *	0.0790546
2-Methylpentane	0 *	0.237164
3-Methylpentane	0 *	0.149325
n-Hexane	0 *	0.158109
2-Methylhexane	0 *	0.0527031
3-Methylhexane	0 *	0.0527031
Water	31.5851 *	31.5851

Mass Flow	Water lb/h	3 lb/h
Methane	0 *	130566
Ethane	0 *	15910.4
Propane	0 *	2811.62
Isobutane	0 *	367.586
n-Butane	0 *	419.661
Isopentane	0 *	115.975
n-Pentane	0 *	57.0369
Nitrogen	0 *	713.59
Carbon Dioxide	0 *	437.987
2,2-Dimethylbutane	0 *	8.32646
Cyclopentane	0 *	5.54433
2-Methylpentane	0 *	20.4377

* User Specified Values
 ? Extrapolated or Approximate Values

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Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	M3 Appalachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		
Flowsheet:	Daybrook Station	

Mass Flow	Water lb/h	3 lb/h			
3-Methylpentane	0 *	12.8682			
n-Hexane	0 *	13.6251			
2-Methylhexane	0 *	5.28095			
3-Methylhexane	0 *	5.28095			
Water	569.014 *	569.014			

Stream Properties

Property	Units	Water	3		
Temperature	°F	74 *	71.7309		
Pressure	psia	364.696 *	364.696		
Mole Fraction Vapor	%	0	99.7582		
Mole Fraction Light Liquid	%	100	0.241796		
Mole Fraction Heavy Liquid	%	0	0		
Molecular Weight	lb/lbmol	18.0153	17.247		
Mass Density	lb/ft ³	62.2572	1.17815		
Molar Flow	lbmol/h	31.5851	8815.43		
Mass Flow	lb/h	569.014	152040		
Vapor Volumetric Flow	ft ³ /h	9.13973	129049		
Liquid Volumetric Flow	gpm	1.1395	16089.3		
Std Vapor Volumetric Flow	MMSCFD	0.287665	80.2877		
Std Liquid Volumetric Flow	sgpm	1.1375 *	978.274		
Compressibility		0.0184266	0.936175		
Specific Gravity		0.998207			
API Gravity		9.96935			
Enthalpy	Btu/h	-3.88269E+06	-2.91827E+08		
Net Ideal Gas Heating Value	Btu/ft ³	0	959.554		
Net Liquid Heating Value	Btu/lb	-1059.76	21089.1		

Remarks

Energy Stream Report

Client Name:	M3 Applachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		
Flowsheet:	Daybrook Station	

Energy Streams

Energy Stream	Energy Rate	Power	From Block	To Block
Q-1	-981.542 Btu/h	-0.385761 hp	--	Produced Water Tanks

Remarks

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	M3 Appalachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		Modified: 12:57 PM, 4/18/2016
Flowsheet:	Daybrook Station	Status: Solved 1:37 PM, 4/18/2016

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Gas Analysis	Inlet		Water	Inlet	
3	Outlet	Slug Catcher			

Block Parameters

Pressure Drop	0 psi	Fraction to PStream 3	100 %
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Remarks

Blocks Produced Water Tanks Separator Report		
--	--	--

Client Name:	M3 Appalachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		Modified: 1:10 PM, 4/18/2016
Flowsheet:	Daybrook Station	Status: Solved 1:37 PM, 4/18/2016

Connections					
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Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
PW Inlet	Inlet	Slug Catcher	Flashed Vapors	Vapor Outlet	
PW Outlet	Light Liquid Outlet		Q-1	Energy	

Block Parameters					
------------------	--	--	--	--	--

Pressure Drop	350	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0.0563901	%	Heat Duty	-981.542	Btu/h
Mole Fraction Light Liquid	99.9436	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	0	%	Heat Release Curve Increments	5	

Remarks

Blocks
Slug Catcher
Separator Report

Client Name:	M3 Appalachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		Modified: 1:05 PM, 4/18/2016
Flowsheet:	Daybrook Station	Status: Solved 1:37 PM, 4/18/2016

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
3	Inlet	MIX-100	Vapor to Compressor	Vapor Outlet	
PW Inlet	Light Liquid Outlet	Produced Water Tanks			

Block Parameters

* Pressure Drop	0 psi	Main Liquid Phase	Light Liquid
Mole Fraction Vapor	99.7582 %	Heat Duty	0 Btu/h
Mole Fraction Light Liquid	0.241796 %	Heat Release Curve Type	Plug Flow
Mole Fraction Heavy Liquid	0 %	Heat Release Curve Increments	5

Remarks

Flowsheet Environment Environment 1					
Client Name:	M3 Appalachia Gathering, LLC			Job: Produced Water Storage Tanks Calculations	
Location:					
Flowsheet:	Daybrook Station				
Environment Settings					
Number of Poynting Intervals	0	Freeze Out Temperature	10 °F		
Gibbs Excess Model	77 °F	Threshold Difference			
Evaluation Temperature		Phase Tolerance	1 %		
Components					
Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Methane	False	False	2,2-Dimethylbutane	False	False
Ethane	False	False	Cyclopentane	False	False
Propane	False	False	2-Methylpentane	False	False
Isobutane	False	False	3-Methylpentane	False	False
n-Butane	False	False	n-Hexane	False	False
Isopentane	False	False	2-Methylhexane	False	False
n-Pentane	False	False	3-Methylhexane	False	False
Nitrogen	False	False	Water	False	True
Carbon Dioxide	False	False			
Physical Property Method Sets					
Liquid Molar Volume	COSTALD	Overall Package	Peng-Robinson		
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson		
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson		
Remarks					

Environments Report

Client Name:	M3 Appalachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		

Project-Wide Constants

Atmospheric Pressure	14.6959 psia	IG Ref Pressure	14.6959 psia
IG Ref Temperature	60 °F	IG Ref Volume	379.485 ft ³ /lbmol
Liq Ref Temperature	60 °F		

Environment [Environment 1]

Environment Settings

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

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Methane	False	False	2,2-Dimethylbutane	False	False
Ethane	False	False	Cyclopentane	False	False
Propane	False	False	2-Methylpentane	False	False
Isobutane	False	False	3-Methylpentane	False	False
n-Butane	False	False	n-Hexane	False	False
Isopentane	False	False	2-Methylhexane	False	False
n-Pentane	False	False	3-Methylhexane	False	False
Nitrogen	False	False	Water	False	True
Carbon Dioxide	False	False			

Physical Property Method Sets

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

Remarks

Calculator Report

Client Name:	M3 Applachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
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Location:		
-----------	--	--

Simple Specifier 1

Source Code

CV1 = Tin

Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Daybrook Station!PStreams!Water!Phases!Total!Properties!Temperature
Value	74
Unit	°F

Measured Variable [Tin]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Daybrook Station!PStreams!Gas Analysis!Phases!Total!Properties!Temperature
Value	74
Unit	°F

Remarks

Simple Specifier 2

Source Code

CV1 = Pin

Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Daybrook Station!PStreams!Water!Phases!Total!Properties!Pressure
Value	350
Unit	psig

Measured Variable [Pin]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Daybrook Station!PStreams!Gas Analysis!Phases!Total!Properties!Pressure
Value	350
Unit	psig

Remarks

Simple Specifier 3

Source Code

CV1 = Flow

Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!Daybrook Station!PStreams!Gas Analysis!Phases!Total!Properties!Std Vapor Volumetric Flow
Value	80
Unit	MMSCFD

Measured Variable [Flow]

SourceMoniker	ProMax:ProMax!Project!User Value Sets!Inputs!Gas Flow!Properties!Parameter
Value	80
Unit	MMSCFD

Remarks

Calculator Report	
Client Name:	M3 Applachia Gathering, LLC
Location:	
Job: Produced Water Storage Tanks Calculations	
Simple Specifier 4	
Source Code	
CV1 = MV1	
Calculated Variable [CV1]	
SourceMoniker	ProMax:ProMax!Project!Flowsheets!Daybrook Station!PStreams!Water!Phases!Total!Properties!Std Liquid Volumetric Flow
Value	39
Unit	bbl/d
Measured Variable [MV1]	
SourceMoniker	ProMax:ProMax!Project!User Value Sets!Inputs!Water Flow!Properties!Parameter
Value	39
Unit	bbl/d
Remarks	

User Value Sets Report

Client Name:	M3 Applachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		

Tank-1

User Value [BlockReady]

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

User Value [ShellLength]

* Parameter	20 ft	Upper Bound	ft
* Lower Bound	0 ft	* Enforce Bounds	False

User Value [ShellDiam]

* Parameter	12 ft	Upper Bound	ft
* Lower Bound	0 ft	* Enforce Bounds	False

User Value [BreatherVP]

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

User Value [BreatherVacP]

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

User Value [DomeRadius]

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

User Value [OpPress]

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

User Value [AvgPercentLiq]

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

User Value [MaxPercentLiq]

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

User Value [AnnNetTP]

* Parameter	26.3245 bbl/day	Upper Bound	bbl/day
* Lower Bound	0 bbl/day	* Enforce Bounds	False

User Value [OREff]

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

User Value [MaxAvgT]

* Parameter	65.5 °F	Upper Bound	°F
Lower Bound	°F	* Enforce Bounds	False

User Value [MinAvgT]

* Parameter	44 °F	Upper Bound	°F
Lower Bound	°F	* Enforce Bounds	False

User Value [BulkLiqT]

* Parameter	59.09 °F	Upper Bound	°F
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* User Specified Values
 ? Extrapolated or Approximate Values

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User Value Sets Report

Client Name:	M3 Appalachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		
User Value [BulkLiqT]		
Lower Bound	°F	* Enforce Bounds False
User Value [AvgP]		
* Parameter	14.2535 psia	Upper Bound psia
Lower Bound	psia	* Enforce Bounds False
User Value [ThermI]		
* Parameter	1123 Btu/ft^2/day	Upper Bound Btu/ft^2/day
Lower Bound	Btu/ft^2/day	* Enforce Bounds False
User Value [AvgWindSpeed]		
* Parameter	6.3 mi/h	Upper Bound mi/h
Lower Bound	mi/h	* Enforce Bounds False
User Value [MaxHourlyLoadingRate]		
* Parameter	1.09686 bbl/hr	Upper Bound bbl/hr
* Lower Bound	0 bbl/hr	* Enforce Bounds False
User Value [EntrainedOilFrac]		
* Parameter	1 %	Upper Bound %
Lower Bound	%	* Enforce Bounds False
User Value [TurnoverRate]		
* Parameter	6.62432 fractional	Upper Bound fractional
Lower Bound	fractional	* Enforce Bounds False
User Value [LLossSatFactor]		
* Parameter	1.45 fractional	Upper Bound fractional
Lower Bound	fractional	* Enforce Bounds False
User Value [AtmPressure]		
* Parameter	14.2535 psia	Upper Bound psia
Lower Bound	psia	* Enforce Bounds False
User Value [TVP]		
* Parameter	108.882 psia	Upper Bound psia
Lower Bound	psia	* Enforce Bounds False
User Value [AvgLiqSurfaceT]		
* Parameter	65.0762 °F	Upper Bound °F
Lower Bound	°F	* Enforce Bounds False
User Value [MaxLiqSurfaceT]		
* Parameter	75.9425 °F	Upper Bound °F
Lower Bound	°F	* Enforce Bounds False
User Value [TotalLosses]		
* Parameter	0.00060009 ton/yr	Upper Bound ton/yr
Lower Bound	ton/yr	* Enforce Bounds False
User Value [WorkingLosses]		
* Parameter	0.000150023 ton/yr	Upper Bound ton/yr
Lower Bound	ton/yr	* Enforce Bounds False

* User Specified Values
 ? Extrapolated or Approximate Values

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User Value Sets Report

Client Name:	M3 Appalachia Gathering, LLC	Job: Produced Water Storage Tanks Calculations
Location:		

User Value [StandingLosses]			
* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]			
* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [WithdrawalLoss]			
* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [LoadingLosses]			
* Parameter	0.000867766 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [MaxHourlyLoadingLoss]			
* Parameter	7.66474 lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	* Enforce Bounds	False

User Value [DeckFittingLosses]			
* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [DeckSeamLosses]			
* Parameter	0 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [FlashingLosses]			
* Parameter	0.0202548 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [GasMoleWeight]			
* Parameter	0.0443819 kg/mol	Upper Bound	kg/mol
Lower Bound	kg/mol	* Enforce Bounds	False

Remarks
 This User Value Set was programmatically generated. GUID={B3D5DA5F-1754-4F47-B05A-0B6BC151E6F5}

Sum Component Flow/Frac

User Value [CompSum]			
* Parameter	0.0201165 ton/yr	Upper Bound	ton/yr
Lower Bound		* Enforce Bounds	False

Remarks
 This User Value Set was programmatically generated. GUID={8F8FC7FD-3FE9-4A7E-B3BC-57E7C76CECE1}

Sum Component Flow/Frac.37

User Value [CompSum]			
* Parameter	1.22807E-05 ton/yr	Upper Bound	ton/yr

User Value Sets Report	
Client Name:	M3 Appalachia Gathering, LLC
Location:	Job: Produced Water Storage Tanks Calculations
Sum Component Flow/Frac.37	
User Value [CompSum]	
Lower Bound	ton/yr * Enforce Bounds False
Remarks	
This User Value Set was programmatically generated. GUID={4D9E12EB-B621-4356-9B34-14C8874E3BD1}	
Inputs	
User Value [Gas Flow]	
* Parameter	80 MMSCFD Upper Bound MMSCFD
Lower Bound	MMSCFD * Enforce Bounds False
User Value [Water Flow]	
* Parameter	1.1375 sgpm Upper Bound sgpm
Lower Bound	sgpm * Enforce Bounds False
Remarks	

* User Specified Values
 ? Extrapolated or Approximate Values

Facility-Wide Emission Summary

ATTACHMENT S – 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 ₂ e)	
	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	0.22	0.97	0.71	3.09	0.01	0.03	0.10	0.45	0.10	0.45	1,761.46	7,715.20
CE-2	1.52	6.66	0.22	0.97	0.71	3.09	0.01	0.03	0.10	0.45	0.10	0.45	1,761.46	7,715.20
CE-3	3.91	17.14	1.07	4.70	2.51	10.97	0.01	0.02	0.09	0.39	0.09	0.39	4,586.89	20,090.59
CE-4	5.51	24.14	1.65	7.24	3.52	15.45	0.01	0.03	0.13	0.56	0.13	0.56	1,350.62	5,914.93
CE-5	5.51	24.14	1.65	7.24	3.52	15.45	0.01	0.03	0.13	0.56	0.13	0.56	1,350.62	5,914.93
CE-6	2.61	11.44	0.99	4.35	1.67	7.32	4.0E-03	0.02	0.07	0.30	0.07	0.30	796.40	3,488.25
RBV-1	0.19	0.83	0.16	0.70	0.01	0.05	1.1E-03	0.01	0.01	0.06	0.01	0.06	234.24	1,025.95
RSV-1	---	---	---	---	0.06	0.27	---	---	---	---	---	---	---	---
T01-T02, T07-T18	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T03-T06	---	---	---	---	0.00	0.02	---	---	---	---	---	---	0.54	2.37
L1	---	---	---	---	3.3E-3	8.7E-4	---	---	---	---	---	---	---	---
FUG	---	---	---	---	---	6.08	---	---	---	---	---	---	---	1,436.93
TOTAL	20.77	91.02	5.96	26.18	12.71	61.79	0.04	0.16	0.63	2.77	0.63	2.77	11,842.23	53,304.35

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 S – 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	0.00	0.02	0.00	0.02	4.1E-04	1.8E-03	1.9E-03	8.3E-03	0.01	0.05	0.32	1.41
CE-2	0.12	0.53	0.00	0.02	0.00	0.02	4.1E-04	1.8E-03	1.9E-03	8.3E-03	0.01	0.05	0.32	1.41
CE-3	0.20	0.89	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	1.0E-02	0.04	0.37	1.62
CE-4	0.66	2.90	6.0E-03	2.5E-02	0.01	0.02	0.00	0.00	0.00	0.01	1.4E-02	0.06	0.91	3.98
CE-5	0.66	2.90	0.01	0.03	0.01	0.02	0.00	0.00	0.00	0.01	1.4E-02	0.06	0.91	3.98
CE-6	0.31	1.37	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	3.0E-03	0.01	0.32	1.41
RBV-1	1.4E-04	6.3E-04	4.0E-06	1.8E-05	0.00	0.00	---	---	---	---	3.4E-03	0.02	0.00	0.02
RSV-1	---	---	0.02	0.10	0.02	0.10	2.3E-3	0.01	0.01	0.05	2.0E-02	0.10	0.07	0.36
T01-T02, T07-T19	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T03-T06			---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00
L1	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00
FUG	---	---	---	<0.01	---	<0.01	---	<0.01	---	<0.01	---	0.01	---	0.02
TOTAL	2.08	9.12	0.05	0.22	0.04	0.21	5.7E-03	2.0E-02	0.02	0.09	0.09	0.40	3.22	14.19

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.

According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

Class I Legal Advertisement

ATTACHMENT T – CLASS I LEGAL ADVERTISEMENT

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

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

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

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

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

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

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

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

AIR QUALITY PERMIT NOTICE Notice of Application

Notice is given that M3 Appalachia Gathering, LLC (M3) has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a modification to an existing natural gas compressor station (Daybrook Station) located on Toothman Road in Marion County, West Virginia. The site latitude and longitude coordinates are: 39.620542 N -80.254792 W

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

Nitrogen Oxides	91.02 tons per year (tpy)
Carbon Monoxide	26.18 tpy
Particulate Matter-2.5/10	2.77 tpy
Volatile Organic Compounds	61.79 tpy
Sulfur Dioxide	0.16 tpy
Formaldehyde	9.12 tpy
Benzene	0.22 tpy
Toluene	0.21 tpy
Ethylbenzene	0.02 tpy
Xylenes	0.09 tpy
Hexane	0.40 tpy
Total Hazardous Air Pollutants	14.19 tpy
Carbon Dioxide Equivalents (CO ₂ e)	53,304 tpy

Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the XX Day of Month, 2016.

By: M3 Appalachia Gathering, LLC
Attn: Eric Tennison
Environmental Health & Safety Director
742 Fairmont Road, Suite E
Westover, WV 26501