June 9, 2017

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

Re: EQT Production Company, General G70-D Permit Application, GLO176 Well Pad

Dear Mr. Durham,

Enclosed are two electronic copies and one original hard copy of a proposed application for a G70-D General Air Permit for the GLO176 Well Pad. A legal advertisement will be published in the next few days and proof of publication will be forwarded as soon as it is received. Please contact me for payment of the application fee by credit card.

If you have any questions concerning this permit application, please contact me at (412) 395-3699 or by e-mail at abosiljevac@eqt.com

Sincerely,

Alex Bosiljevac
EQT Corporation

PROJECT REPORT

EQT Production
GLO 176 Pad

G70-D Permit Application

Where energy meets innovation.

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

May 2017

Trinity Consultants

EHS Solutions Delivered Uncommonly Well

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EQT Production Company (EQT) is submitting this Class II General Permit (G70-D) application to the West Virginia Department of Environmental Protection (WVDEP) for the construction and operation of equipment at a natural gas production well pad, GLO 176, located in Marion County, West Virginia. Note that the pad was formerly owned by Transenergy as the Wright Pad.

EQT is seeking this general permit since it is planning to drill and hydraulically fracture two (2) wells at the GLO 176 wellpad, which would be subject to LDAR requirements under the New Source Performance Standards (NSPS) Subpart OOOOa. WVDEP has determined that LDAR work practice requirements under this regulations are substantive requirements, and as such, require general permits. Except for LDAR requirements, the wellpad would be exempt from permitting as emissions are below applicable thresholds.

1.1. FACILITY AND PROJECT DESCRIPTION

The GLO 176 pad is a natural gas production facility that will consists of two (2) natural gas wells. Natural gas and liquids (including water and condensate) are extracted from deposits underneath the surface. Natural gas is transported from the well to a gas line for additional processing and compression, as necessary. The liquids produced are stored in storage vessels.

This application seeks to permit the following equipment:

- Four (4) 400 barrel (bbl) storage tanks for condensate/water (produced fluids);
- One (1) 100 bbl storage tanks for sand and produced fluids from the sand separator;
- Four (4) line heaters, each rated at 1.54 MMBtu/hr (heat input);
- One (1) thermoelectric generator, each rated at 0.013 MMBtu/hr (heat input);
- Produced fluid truck loading; and
- Associated piping and components.

A process flow diagram is included as Attachment D. A comparison of the potential emissions of the proposed equipment at the wellpad in comparison with G70-D emission limits is provided in Table 1. Facility emissions are well below the permit limits. Note that in accordance with condition 1.1.1. of the G70-D permit, fugitive emissions are not considered in determining eligibility of the permit.

Table 1 - Comparison of Wellpad Potential Emissions to G70-D Permit Emission Limits

Pollutant	Wellpad Potential Annual Emissions (tpy)	G70-D Maximum Annual Emission Limits (tpy)
Nitrogen Oxides	2.57	50
Carbon Monoxide	2.16	80
Volatile Organic Compounds	0.19	80
Particulate Matter – 10/2.5	0.20	20
Sulfur Dioxide	0.02	20
Individual HAP (n-hexane)[1]	0.11	8
Total HAP[1]	0.05	20

1. Includes fugitive emissions

1.2. SOURCE STATUS

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

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

Other additional pollutant emitting facilities should be aggregated with the GLO 176 Pad for air permitting purposes if, and only if, all three elements of the "stationary source" definition above are fulfilled.

There are no Marcellus facilities within a quarter-mile radius of the GLO 176 Pad. Therefore, the GLO 176 pad should be considered a separate stationary source with respect to permitting programs, including Title V and Prevention of Significant Deterioration (PSD). As discussed in this application, the facility is a minor source of air emissions with respect to New Source Review (NSR) and Title V permitting.

1.3. G70-D APPLICATION ORGANIZATION

This West Virginia Code of State Regulations, Title 45 (CSR) Series 13 (45 CSR 13) G70-D permit application is organized as follows:

- Section 2: Sample Emission Source Calculations;
- Section 3: Regulatory Discussion;
- Section 4: G70-D Application Form;
- Attachment A: Single Source Determination;
- Attachment B: Siting Criteria Waiver **(Not Applicable)**;
- Attachment C: Business Certificate;
- Attachment D: Process Flow Diagram;
- Attachment E: Process Description;
- Attachment F: Plot Plan;
- Attachment G: Area Map;
- Attachment H: G70-D Section Applicability Form;
- Attachment I: Emission Units Table;
- Attachment J: Fugitive Emissions Summary Sheet;
- Attachment K: Gas Well Data Sheet;
- Attachment L: Storage Vessel Data Sheet;
- Attachment M: Heaters Data Sheet;
- Attachment N: Engines Data Sheet;
- Attachment O: Truck Loading Data Sheet;
- Attachment P: Glycol Dehydrator Data Sheet **(Not Applicable)**;
- Attachment Q: Pneumatic Controller Data Sheet;
- Attachment R: Pneumatic Pump Data Sheet **(Not Applicable)**;
- Attachment S: Air Pollution Control Device Data Sheet **(Not Applicable)**;
- Attachment T: Emission Calculations;
- Attachment U: Emission Summary Sheet;
- Attachment V: Class I Legal Advertisement; and
- Attachment W: General Permit Registration Application Fee.

2. SAMPLE EMISSION SOURCE CALCULATIONS

The characteristics of the air emissions from the natural gas production operations, along with the methodology for calculating these emissions, are briefly described in this section of the application. Detailed emission calculations are presented in Attachment T of this application.

Emissions from this project will result from natural gas combustion in the line heaters, thermoelectric generators, as well as storage of organic liquids in storage tanks and loading of organic liquids into tank trucks. In addition, fugitive emissions will result from component leaks from the operation of the station. The method by which emissions from each of these source types, as well as the existing source types, are calculated is summarized below.

- **Line Heaters:** Potential emissions of criteria pollutants and hazardous air pollutants (HAPs) are calculated using U.S. EPA's AP-42 factors for natural gas external combustion.[1] These calculations assume a site-specific heat content of natural gas. Greenhouse gas emissions are calculated according to 40 CFR 98 Subpart C.[2]

- **Fugitive Equipment Leaks:** Emissions of VOC and HAPs from leaking equipment components have been estimated using facility estimated component counts and types along with emission factors from the *Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995.* Emission factors are based on average measured TOC from component types indicated. Greenhouse gas emissions from component leaks are calculated according to the procedures in 40 CFR 98 Subpart W.[3] Pneumatic devices at the wellpad are intermittent bleed and are assumed to be in operation 1/3 of the year.

- **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. The wellpad is not expected to produce condensate but will generate produced water. The throughput for the produced fluids tanks are based on the maximum annualized monthly produced water at the nearby Shaver Pad (i.e., the maximum monthly throughput for the pad times 12) and includes a safety factor of one hundred and twenty percent. The composition for the analysis was from a sample taken at GLO 176. Emissions of VOC and HAPs from the sand separator tank are calculated using ProMax. The produced fluids throughput is calculated as follows:

$$Throughput\left(\frac{bbl}{day}\right) = \left(Condensate\ Composition\ (\%) + \left(Produced\ Water\ Throughput\left(\frac{bbl}{month}\right)\right)\right) * \frac{12\left(\frac{months}{year}\right)}{365\left(\frac{days}{year}\right)}$$

- **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. U.S. EPA's AP-42 Chapter 5 Section 2 factors were used for capture efficiency.[4]

- **Haul Roads:** Fugitive dust emitted from facility roadways has been estimated using projected vehicle miles traveled along with U.S. EPA's AP-42 factors for unpaved haul roads.[5]

[1] U.S. EPA, AP 42, Fifth Edition, Volume I, Chapter 1.4, Natural Gas Combustion, Supplement D, July 1998.
[2] 40 CFR 98 Subpart C, *General Stationary Fuel combustion Sources*, Tables C-1 and C-2.
[3] 40 CFR 98 Subpart W, *Petroleum and Natural Gas Systems*, Section 98.233(r), *Population Count and Emission Factors*.
[4] U.S. EPA, AP 42, Fifth Edition, Volume I, Chapter 5.2, Transportation And Marketing Of Petroleum Liquids, June 2008.
[5] U.S. EPA, AP 42, Fifth Edition, Volume I, Section 13.2.2, Unpaved Roads, November 2006.

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

- Prevention of Significant Deterioration 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 G70-D 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 wellpad. 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 wellpad. Regulations that are categorically non-applicable are not discussed (e.g., NSPS Subpart J, Standards of Performance for Petroleum Refineries).

3.1. PREVENTION OF SIGNIFICANT DETERIORATION SOURCE CLASSIFICATION

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration. PSD regulations apply when a major source makes a change, such as installing new equipment or modifying existing equipment, and a significant increase in emissions results from the change. The wellpad is not a major source with respect to the PSD program since its potential emissions are below all the PSD thresholds. As such, PSD permitting is not triggered by this construction activity. EQT will monitor future construction activities at the site closely and will compare any future increase in emissions with the PSD thresholds to ensure these activities will not trigger this program.

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 CSR 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP and 100 tpy of all other regulated pollutants. The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility after the proposed project. Therefore, the wellpad 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 wellpad. The following NSPS could potentially apply to the wellpad:

- 40 CFR Part 60 Subparts D/Da/Db/Dc – Steam Generating Units
- 40 CFR Part 60 Subpart K/Ka/Kb – Storage Vessels for Petroleum Liquids/Volatile Organic Liquids
- 40 CFR Part 60 Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines

- 40 CFR Part 60 Subpart OOOO – Crude Oil and Natural Gas Production, Transmission, and Distribution
- 40 CFR Part 60 Subpart OOOOa – Crude Oil and Natural Gas Facilities

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

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

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

These subparts apply to storage tanks of certain sizes constructed, reconstructed, or modified during various time periods. Subpart K applies to storage tanks constructed, reconstructed, or modified prior to 1978, and Subpart Ka applies to those constructed, reconstructed, or modified prior to 1984. Both Subparts K and Ka apply to storage tanks with a capacity greater than 40,000 gallons. Subpart Kb applies to volatile organic liquid (VOL) storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m^3 (~19,813 gallons). All of the tanks at the wellpad 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 wellpad.

3.3.3. NSPS Subparts JJJJ – Stationary Spark Ignition Internal Combustion Engines

New Source Performance Standards 40 CFR Part 60 Subpart JJJJ (NSPS 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 proposed project will not include a SI ICE, as such, this subpart will not apply.

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

Subpart OOOO, Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution, applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011 and or before September 18, 2015. This NSPS was published in the Federal Register on August 16, 2012, and subsequently amended. The proposed project does not change applicability dates with respect to NSPS Subpart OOOO for existing equipment. Therefore, this subpart is not applicable to the proposed project.

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

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

- Hydraulically fractured wells;
- Centrifugal compressors located between the wellhead and the point of custody transfer to the natural gas distribution segment;
- Reciprocating compressors located between the wellhead and the point of custody transfer to the natural gas distribution segment;
- Continuous bleed natural gas-driven pneumatic controllers with a bleed rate of > 6 scfh located in the production, gathering, processing, or transmission and storage segments (excluding natural gas processing plants);
- Continuous bleed natural gas-driven pneumatic controllers located at natural gas processing plants;
- Pneumatic pumps located in the production and processing segments;
- Storage vessels located in the production, gathering, processing, or transmission and storage segments;

- The collection of fugitive emissions components at a well site;
- The collection of fugitive emissions components at a compressor station; and
- Sweetening units located onshore that process natural gas produced from either onshore or offshore wells.

Based on the rule, the following paragraphs describe the applicability of the facilities to be located at the proposed facility.

There are four (4) produced fluid storage vessels at the wellpad. The storage vessels at the facility will each have potential VOC emissions less than 6 tpy based on the permit application materials and enforceable limits to be included in the G70-D permit. As such, per 60.5365a(e), the tanks will not be storage vessel affected facilities under the rule.

Due to the proposed drilling and hydraulically fracturing of the two (2) wells at the pad, the wellpad will be subject to the requirements of hydraulically fractured wells under 40 CFR 60 Subpart OOOOa–Standards of Performance for Crude Oil and Natural Gas Facilities per 60.5365a(i). Therefore, EQT will be required to monitor all fugitive emission components (ex. connectors, flanges, etc.) with an optical gas imaging (OGI) device, and repair all sources of fugitive emissions in accordance with the rule. EQT must also develop a corporate-wide monitoring plan and a site specific monitoring plan (or one plan that incorporates all required elements), and conduct surveys on a semi-annual basis. EQT is also subject to the applicable recordkeeping and reporting requirements of the rule.

The new pneumatic controllers will potentially be subject to NSPS OOOOa. Per 60.5365a(d)(1), a pneumatic controller affected facility is a single continuous bleed natural gas driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh. No pneumatic controllers installed will meet the definition of a pneumatic controller affected facility. Therefore, these units are not subject to the requirements of Subpart OOOOa.

As part of this application, EQT will not be installing any pneumatic pumps as part of the well pad.

3.3.6. Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas processing plants (Subparts OOOO) and associated equipment (Subparts D-Dc and K-Kb), the applicability of a particular NSPS to the wellpad 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 wellpad 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 wellpad:

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

The applicability of these NESHAP Subparts is discussed in the following sections.

3.4.1. 40 CFR 63 Subpart HH – Oil and Natural Gas Production Facilities

This standard contains requirements for both major and area sources of HAP. At area sources, the only affected source is a triethylene glycol dehydration unit (§63.760(b)(2)). The wellpad does not include a triethylene glycol dehydration unit; therefore the requirements of this subpart do not apply.

3.4.2. 40 CFR 63 Subpart ZZZZ – Stationary Reciprocating Internal Engines

This rule affects reciprocating internal combustion engines (RICE) located at a major and area sources of HAP. The wellpad does not include a stationary RICE; therefore the requirement of this subpart do not apply.

3.4.3. 40 CFR 63 Subpart 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 line heaters are natural gas-fired and are specifically exempt from this subpart. Therefore, no sources at the wellpad are subject to any requirements under 40 CFR 63 Subpart JJJJJJ.

3.5. WEST VIRGINIA SIP REGULATIONS

The wellpad 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 line heaters are fuel burning units and therefore must comply with this regulation. Per 45 CSR 2-3, opacity of emissions from units shall not exceed 10 percent.

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

3.5.3. 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 CPR Part 60 by reference. As such, by complying with all applicable requirements of 40 CFR Part 60 at the wellpad, EQT will be complying with 45 CSR 16.

3.5.4. 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 wellpad, it is unlikely that fugitive particulate matter emissions will be emitted under normal operating conditions. However, EQT will take measures to ensure any fugitive particulate matter emissions will not cross the property boundary should any such emissions occur.

3.5.5. 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. The capacity of each storage tank proposed for the wellpad is less than 40,000 gallons; therefore, 45 CSR 21-28 will not apply to the petroleum liquid storage tanks at this wellpad.

3.5.6. 45 CSR 34: Emissions Standards for Hazardous Air Pollutants

45 CSR 34-1 incorporates the federal Clean Air Act (CAA) national emissions standards for hazardous air pollutants (NESHAPs) as set forth in 40 CPR Parts 61 and 63 by reference. As such, by complying with all applicable requirements of 40 CFR Parts 61 and 63 at the wellpad, EQT will be complying with 45 CSR 34. Note that there are no applicable requirements under 40 CFR Parts 61 and 63 for the wellpad.

3.5.7. Non-Applicability of Other SIP Rules

A thorough examination of the West Virginia SIP rules with respect to applicability at the wellpad 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 wellpad.

4. G70-D APPLICATION FORMS

The WVDEP permit application forms contained in this application include all applicable G70-D application forms including the required attachments.

west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25 4
Phone (304) 926-0475
Fax (304) 926-0479
www.dep.wv.gov

G70-D GENERAL PERMIT REGISTRATION APPLICATION

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION, RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF NATURAL GAS PRODUCTION FACILITIES LOCATED AT THE WELL SITE

☒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): EQT Production Company

Federal Employer ID No. (FEIN): 25-0724685

Applicant's Mailing Address: 625 Liberty Avenue, Suite 1700

City: Pittsburgh	State: PA	ZIP Code: 15222

Facility Name: GLO 176

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

City: Coburn	Zip Code: 26582	County: Marion

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.588137°
Longitude: -80.438007°

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities)

CERTIFICATION OF INFORMATION

This G70-D General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of the Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. **Any administratively incomplete or improperly signed or unsigned G70-D Registration Application will be returned to the applicant. Furthermore, if the G70-D forms are not utilized, the application will be returned to the applicant. No substitution of forms is allowed.**

I hereby certify that Mike Gavin 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 G70-D General Permit Registration Application and any supporting documents appended hereto is, to the best of my knowledge, true, accurate and complete, and that all reasonable efforts have been made to provide the most comprehensive information possible.

Responsible Official Signature: _____
Name and Title: Mike Gavin, Vice President — Phone: — Fax:
Email: gavinm@eqt.com — Date: 6/7/17

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

If applicable:
Environmental Contact
Name and Title: Alex Bosiljevac, Environmental Coordinator — Phone: 412-395-3699 — Fax: 412-395-7027
Email: ABosiljevac@eqt.com — Date:

OPERATING SITE INFORMATION
Briefly describe the proposed new operation and/or any change(s) to the facility: EQT Production Company (EQT) is submitting this Class II General Permit (G70-D) application to the West Virginia Department of Environmental Protection (WVDEP) for the construction and operation of equipment at a natural gas production well pad, GLO 176, located in Marion County, West Virginia. Note that the pad was formerly owned by Transenergy as the Wright Pad.
Directions to the facility: From Logansport, WV, head south on Buffalo Rd toward Curtisville Pike for 1.2 miles. Continue onto 7 Pines Rd. Keep right to continue on Glovers Gap- Seven Pines. Turn Sharp left onto Co Rd 4/4/Murray Run. Arrive at station at right

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): R. Alex Bosiljevac, abosiljevac@eqt.com ☒$500 (Construction, Modification, and Relocation) ☐$300 (Class II Administrative Update) ☒$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ, OOOO and/or OOOOa [1] ☐$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH [2] [1] Only one NSPS fee will apply. [2] Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ. *NSPS and NESHAP fees apply to new construction or if the source is being modified.*	
☒ Responsible Official or Authorized Representative Signature (if applicable)	
☒ Single Source Determination Form **(must be completed)** – 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
☒ G70-D Section Applicability Form – Attachment H	☒ Emission Units/ERD Table – Attachment I
☒ Fugitive Emissions Summary Sheet – Attachment J	
☒ Gas Well Affected Facility Data Sheet (if applicable) – Attachment K	
☒ 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 L	
☒ Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment M	
☐ Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N	
☒ Tanker Truck/Rail Car Loading Data Sheet (if applicable) – Attachment O	
☐ Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment P	
☒ Pneumatic Controllers Data Sheet – Attachment Q	
☒ Pneumatic Pump Data Sheet – Attachment R	
☐ Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment S	
☒ Emission Calculations (please be specific and include all calculation methodologies used) – Attachment T	
☒ Facility-wide Emission Summary Sheet(s) – Attachment U	
☒ Class I Legal Advertisement – Attachment V	
☒ One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments	

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

ATTACHMENT A

Single Source Determination

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

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

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

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

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

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

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

ATTACHMENT A: SINGLE SOURCE DETERMINATION MAP

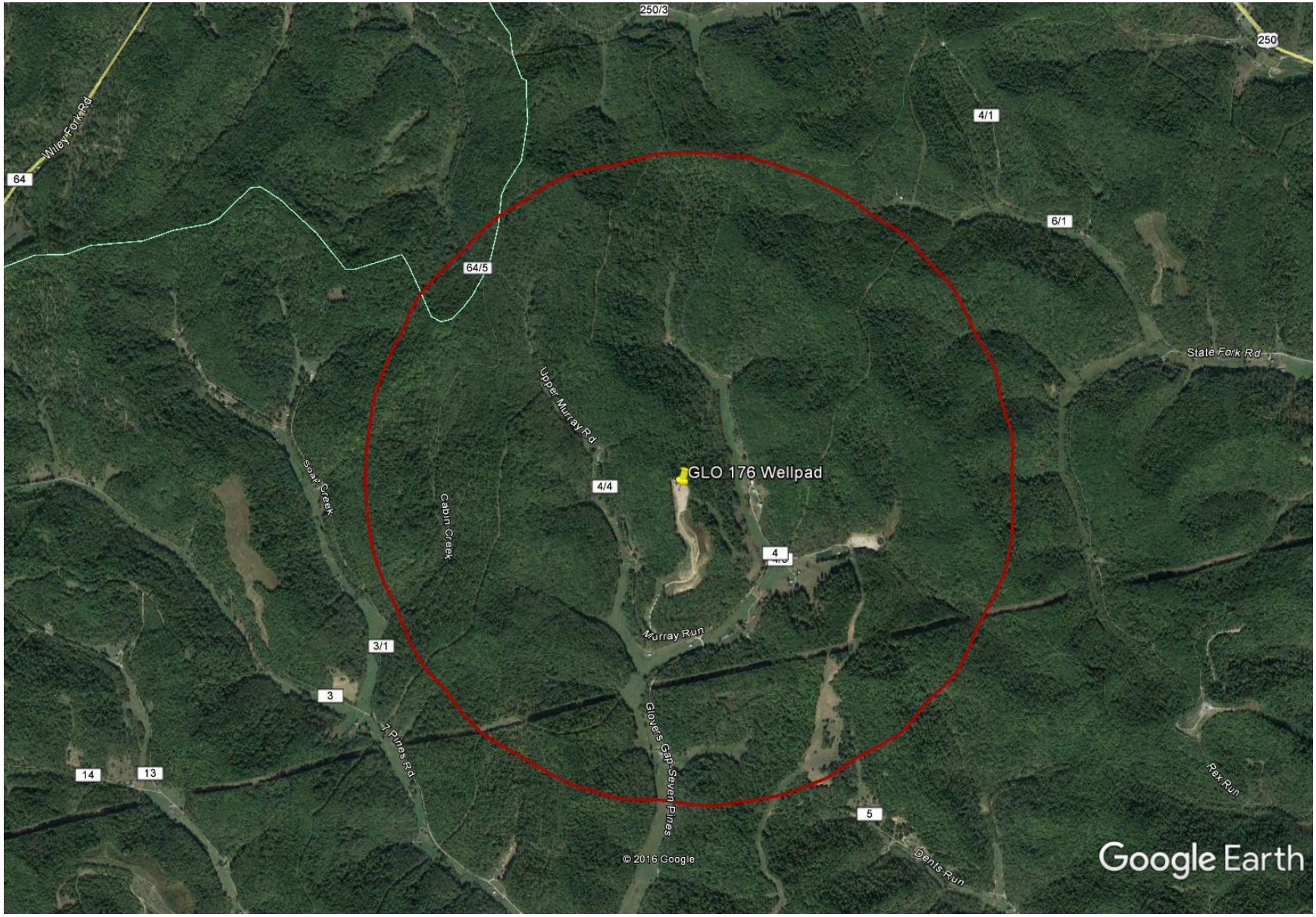


Figure 1 - Map of GLO 176 Location with 1 Mile Radius Circle

Coordinates:
Latitude: 39°35’17.28" N
Longitude: 80°26’16.80" W

ATTACHMENT B

Siting Criteria Waiver *(Not Applicable)*

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

G70-D General Permit
Siting Criteria Waiver

WV Division of Air Quality 300' Waiver

I _____ hereby
Print Name

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

construct an emission unit(s) at a natural gas production 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

ATTACHMENT C

Business Certificate

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
EQT PRODUCTION COMPANY
625 LIBERTY AVE 1700
PITTSBURGH, PA 15222-3114

BUSINESS REGISTRATION ACCOUNT NUMBER: **1022-8081**

This certificate is issued on: 08/4/2010

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

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

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

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

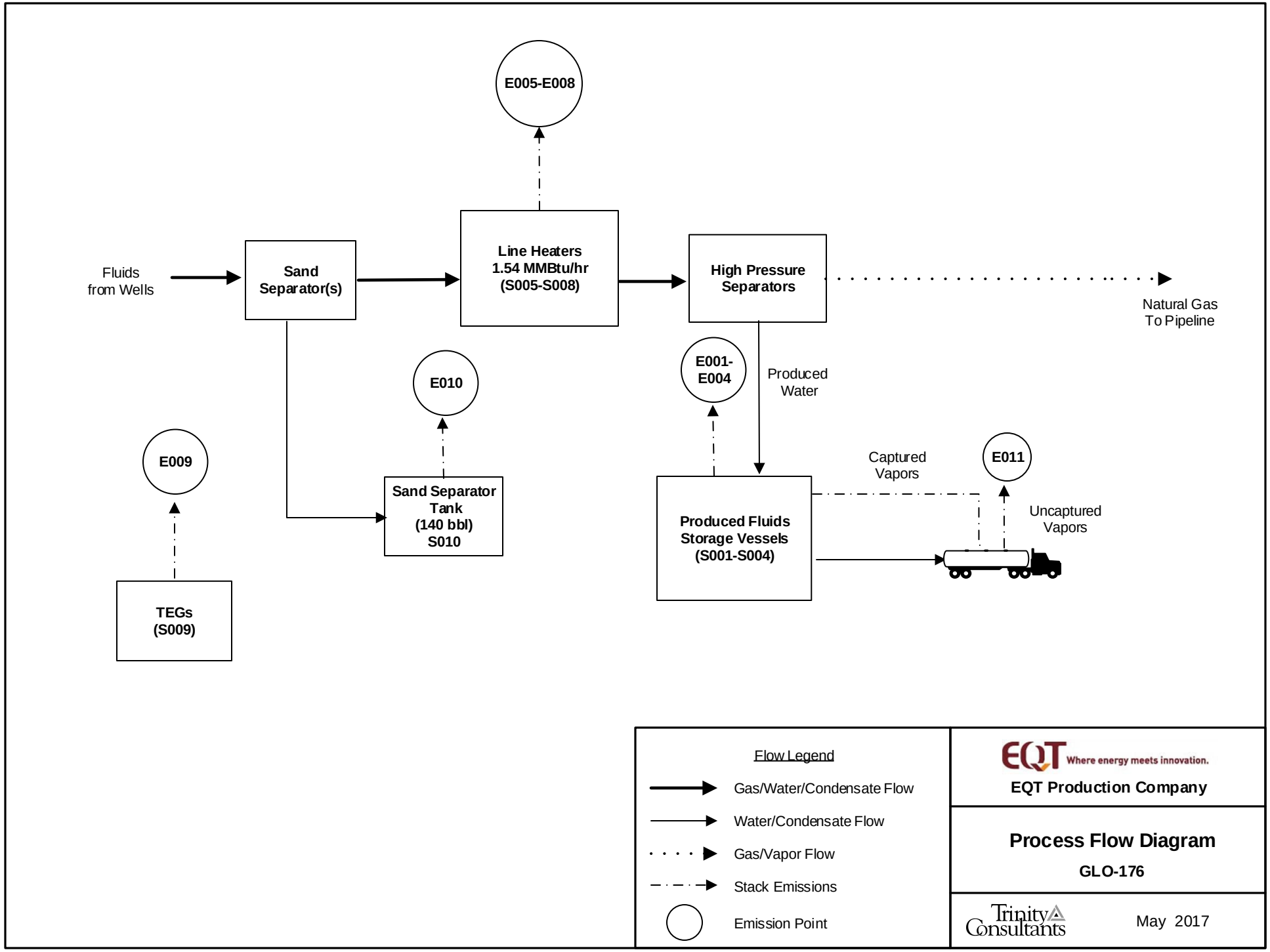
Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

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

atL006 v.3
L0553297664

ATTACHMENT D

Process Flow Diagram


E005-E008
Fluids from Wells
Sand Separator(s)
Line Heaters 1.54 MMBtu/hr (S005-S008)
High Pressure Separators
Natural Gas To Pipeline
E001-E004
Produced Water
E010
E009
Sand Separator Tank (140 bbl) S010
Captured Vapors
E011
Uncaptured Vapors
Produced Fluids Storage Vessels (S001-S004)
TEGs (S009)
Flow Legend
Gas/Water/Condensate Flow
Water/Condensate Flow
Gas/Vapor Flow
Stack Emissions
Emission Point
EQT Where energy meets innovation.
EQT Production Company
Process Flow Diagram
GLO-176
Trinity Consultants
May 2017

ATTACHMENT E

Process Description

ATTACHMENT E: PROCESS DESCRIPTION

This G70-D Permit Application involves the construction of a new natural gas production wellpad (GLO-176). The wellpad will consist of two (2) wells, each with the same basic operation. The following equipment will be installed at the facility: four (4) storage tanks, four (4) line heaters, and one (1) sand separator tank.

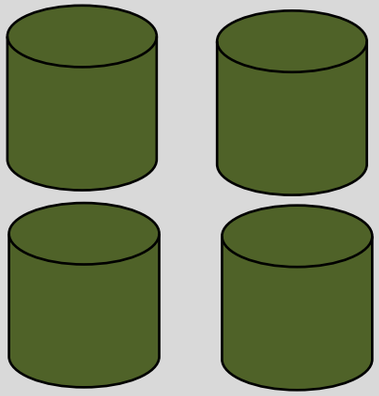
The incoming gas/liquid stream from the underground wells will pass through a sand separator, where sand, water, and residual solids are displaced and transferred to the sand separator tank (S010). The gas stream will then pass through the line heaters (S005-S008) to raise/maintain temperature. The stream will then pass through the high pressure (3 phase) separators, which will separate gas (natural gas from the separator is sent to the sales line) from liquids (produced water). The produced fluids stream is then transferred to the produced fluid storage vessels (S001-S004).

Once the tanks are filled, the contents are loaded into trucks for transport. EQT utilizes vapor balancing in the condensate truck loading operations, which means the vapors displaced by the filling of tanker trucks (S011) are routed back into the battery of tanks and ultimately to the combustors. Electricity will be provided at the facility through the natural gas fired thermoelectric generator (S009).

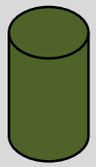
A process flow diagram is included as Attachment D.

ATTACHMENT F

Plot Plan



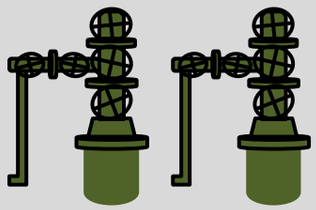
Produced Water Tanks
400 bbl



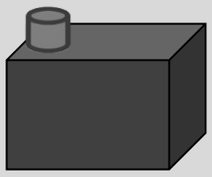
Sand Separator Tank

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

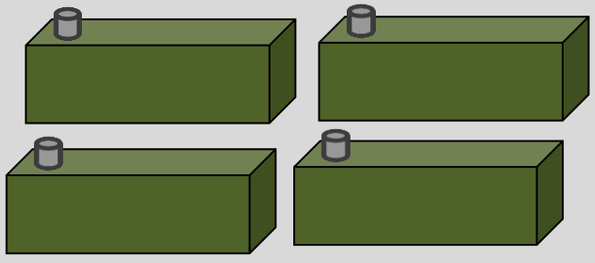
Entrance to GLO-176



Wellheads
(2)



TEG
0.013 MMBtu/hr



Line Heaters
(4)
1.54 MMBtu/hr

Attachment F

GLO-176 Well Pad Plot Plan

ATTACHMENT G

Area Map

ATTACHMENT G: AREA MAP

Figure 1 - Map of GLO-176 Location

Zone: 17
UTM Northing (KM): 4,382.196
UTM Easting (KM): 548.258
Elevation: ~1,527 ft

ATTACHMENT H

G70-D Section Applicability Form

ATTACHMENT H – G70-D SECTION APPLICABILITY FORM

General Permit G70-D Registration
Section Applicability Form

General Permit G70-D was developed to allow qualified applicants to seek registration for a variety of sources. These sources include gas well affected facilities, storage vessels, gas production units, in-line heaters, heater treaters, glycol dehydration units and associated reboilers, pneumatic controllers, pneumatic pumps, reciprocating internal combustion engines (RICEs), tank truck/rail car 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 G70-D allows the registrant to choose which sections of the permit they are seeking registration under. Therefore, please mark which additional sections that you are applying for registration under. If the applicant is seeking registration under multiple sections, please select all that apply. Please keep in mind, that if this registration is approved, the issued registration will state which sections will apply to your affected facility.

GENERAL PERMIT G70-D APPLICABLE SECTIONS	
☒ Section 5.0	Gas and Oil Well Affected Facility (NSPS, Subpart OOOO/OOOOa)
☒ Section 6.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☐Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)
☐ Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa and/or NESHAP Subpart HH
☒ Section 9.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
☐Section 10.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO/OOOOa)
☐Section 11.0	Pneumatic Pump Affected Facility (NSPS, Subpart OOOOa)
☒Section 12.0	Fugitive Emissions GHG and VOC Standards (NSPS, Subpart OOOOa)
☐ Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines
☒ Section 14.0	Tanker Truck/Rail Car Loading[2]
☐Section 15.0	Glycol Dehydration Units[3]

1 Applicants that are subject to Section 6 may also be subject to Section 7 if the applicant is subject to the NSPS, Subparts OOOO or OOOOa control requirements or the applicable control device requirements of Section 8.

2 Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 8.

3 Applicants that are subject to Section 15 may also be subject to the requirements of Section 9 (reboilers). Applicants that are subject to Section 15 may also be subject to control device and emission reduction device requirements of Section 8.

ATTACHMENT I

Emission Units 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 L 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]
S001	E001	Produced Fluid Storage Tank	TBD	TBD	400 bbl	New	None	---
S002	E002	Produced Fluid Storage Tank	TBD	TBD	400 bbl	New	None	---
S003	E003	Produced Fluid Storage Tank	TBD	TBD	400 bbl	New	None	---
S004	E004	Produced Fluid Storage Tank	TBD	TBD	400 bbl	New	None	---
S005	E005	Line Heater	TBD	TBD	1.54 MMBtu/hr	New	None	---
S006	E006	Line Heater	TBD	TBD	1.54 MMBtu/hr	New	None	---
S007	E007	Line Heater	TBD	TBD	1.54 MMBtu/hr	New	None	---
S008	E008	Line Heater	TBD	TBD	1.54 MMBtu/hr	New	None	---
S009	E009	TEG	TBD	TBD	0.013 MMBtu/hr	New	None	---
S010	E010	Sand Separator Storage Tank	TBD	TBD	100 bbl	New	None	---
S011	E011 (Uncaptured)	Liquid Loading	TBD	TBD	766,500 gal/yr	New	None	---

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

ATTACHMENT J

Fugitive Emissions Summary Sheet

ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

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

Source/Equipment: Fugitive Emissions

Leak Detection Method Used	☐ Audible, visual, and olfactory (AVO) inspections	☐ Infrared (FLIR) cameras	☒ Other (please describe) Will satisfy condition 12.1.1 of the G70-D	☐ 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 (methane, CO_2e)
Pumps	☐ Yes ☒ No	8	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☐ Gas ☒ Liquid ☐ Both	0.01	9.5E-04	0.32
Valves	☐ Yes ☒ No	147	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☒ Gas ☐ Liquid ☐ Both	0.18	0.01	17.06
Safety Relief Valves	☐ Yes ☒ No	16	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☒ Gas ☐ Liquid ☐ Both	0.34	0.02	2.75
Open Ended Lines	☐ Yes ☒ No	14	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☐ Gas ☐ Liquid ☒ Both	4.7E-03	3.1E-04	3.54
Sampling Connections	☐ Yes ☒ No	0	N/A	☐ Gas ☐ Liquid ☐ Both	---	---	---
Connections (Not sampling)	☐ Yes ☒ No	657	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☐ Gas ☐ Liquid ☒ Both	0.25	0.02	8.47
Compressors	☐ Yes ☒ No	0	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☒ Gas ☐ Liquid ☐ Both	---	---	---
Flanges	☐ Yes ☐ No	---	(included in connections)	☐ Gas ☐ Liquid ☐ Both	---	---	---
Other[1]	☐ Yes ☒ No	10	40 CFR 98 Subpart W	☒ Gas ☐ Liquid ☐ Both	0.19	0.01	85.94

[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.):
Pneumatic Controller count is 'Other' category. An estimate of Miscellaneous Gas Venting emissions are included in the Emission Calculations and serve to include such sources as compressor venting, pigging, vessel blowdowns and other sources.

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/rail car loading, etc.) N/A

ATTACHMENT K

Gas Well Data Sheet

ATTACHMENT K – GAS WELL AFFECTED FACILITY DATA SHEET

Complete this data sheet if you are the owner or operator of a gas well affected facility for which construction, modification or reconstruction commenced after August 23, 2011. This form must be completed for natural gas well affected facilities regardless of when flowback operations occur (or have occurred).

API Number	Date of Flowback	Date of Well Completion	Green Completion and/or Combustion Device	Subject to OOOO or OOOOa?
47-049-02281	10/1/2017	10/1/2017	Green	Yes – OOOOa
47-049-02282	10/1/2017	10/1/2017	Green	Yes – OOOOa

Note: If future wells are planned and no API number is available please list as PLANNED.
If there are existing wells that commenced construction prior to August 23, 2011, please acknowledge as existing.

This is the same API (American Petroleum Institute) well number(s) provided in the well completion notification and as provided to the WVDEP, Office of Oil and Gas for the well permit. The API number may be provided on the application without the state code (047).

Every oil and gas well permitted in West Virginia since 1929 has been issued an API number. This API is used by agencies to identify and track oil and gas wells.

The API number has the following format: 047-001-00001

Where,

047 = State code. The state code for WV is 047.
001 = County Code. County codes are odd numbers, beginning with 001 (Barbour) and continuing to 109 (Wyoming).
00001= Well number. Each well will have a unique well number.

ATTACHMENT L

Storage Vessel Data Sheet

ATTACHMENT L – 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 (REQUIRED)

1. Bulk Storage Area Name GLO 176	2. Tank Name Produced Fluids Tanks (water)
3. Emission Unit ID number S001-S004	4. Emission Point ID number E001-E004
5. Date Installed , Modified or Relocated *(for existing tanks)* Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? ☐ Yes ☒ No Was the tank manufactured after September 18, 2015? ☒ Yes ☐ No	6. Type of change: Existing, no change ☒ New construction ☐ New stored material ☐ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)* N/A	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 8-42 below are not required.***	

TANK INFORMATION

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 400 bbls	
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". 400 bbls	

13A. Maximum annual throughput (gal/yr) **See attached emissions calculations for all throughput values**	13B. Maximum daily throughput (gal/day) **See attached emissions calculations for all throughput values**
14. Number of tank turnovers per year **See attached emissions calculations for all throughput values**	15. Maximum tank fill rate (gal/min) **See attached emissions calculations for all throughput values**
16. Tank fill method ☐ Submerged ☒ Splash ☐ Bottom Loading	
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): ☒ Fixed Roof ☒ vertical ☐ horizontal ☐ flat roof ☒ cone roof ☐ dome roof ☐ other (describe) ☐ External Floating Roof ☐ pontoon roof ☐ double deck roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting ☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm ☐ Pressurized ☐ spherical ☐ cylindrical ☐ Other (describe)	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket of _____ ☐ Carbon Adsorption[1]

☐ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors)

☒ Conservation Vent (psig) ☐ Condenser[1]

0.5 oz Vacuum Setting 14.4 oz Pressure Setting

☐ Emergency Relief Valve (psig)

Vacuum Setting Pressure Setting

☐ Thief Hatch Weighted ☐ Yes ☒ No

[1] Complete appropriate Air Pollution Control Device Sheet

20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method[1]
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
See attached Emissions Calculation for all values									

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

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

TANK CONSTRUCTION AND OPERATION INFORMATION		
21. Tank Shell Construction: ☒ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)		
21A. Shell Color: Blue	21B. Roof Color: Blue	21C. Year Last Painted: N/A
22. Shell Condition (if metal and unlined): ☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable		

22A. Is the tank heated? ☐ Yes ☒ No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?
23. Operating Pressure Range (psig): **Must be listed for tanks using VRUs with closed vent system.**		
24. Is the tank a **Vertical Fixed Roof Tank**? ☒ Yes ☐ No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft): 0.17
25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☒		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type *(check one):* ☐ Metallic (mechanical) shoe seal ☐ Liquid mounted resilient seal ☐ Vapor mounted resilient seal ☐ Other (describe):		
25C. Is the Floating Roof equipped with a secondary seal? ☐ Yes ☐ No		
25D. If yes, how is the secondary seal mounted? *(check one)* ☐ Shoe ☐ Rim ☐ Other (describe):		
25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No		
25F. Describe deck fittings:		
26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply		
26A. Deck Type: ☐ Bolted ☐ Welded	26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction: ☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)		
26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
27. Closed Vent System with VRU? ☐ Yes ☒ No		
28. Closed Vent System with Enclosed Combustor? ☐ Yes ☒ No		
SITE INFORMATION - Not Applicable: Tank calculations performed using ProMax software		
29. Provide the city and state on which the data in this section are based:		
30. Daily Avg. Ambient Temperature (°F):	31. Annual Avg. Maximum Temperature (°F):	
32. Annual Avg. Minimum Temperature (°F):	33. Avg. Wind Speed (mph):	
34. Annual Avg. Solar Insulation Factor (BTU/ft^2-day):	35. Atmospheric Pressure (psia):	
LIQUID INFORMATION - Not Applicable: Tank calculations performed using ProMax software		
36. Avg. daily temperature range of bulk liquid (°F):	36A. Minimum (°F):	36B. Maximum (°F):
37. Avg. operating pressure range of tank (psig):	37A. Minimum (psig):	37B. Maximum (psig):
38A. Minimum liquid surface temperature (°F):	38B. Corresponding vapor pressure (psia):	
39A. Avg. liquid surface temperature (°F):	39B. Corresponding vapor pressure (psia):	
40A. Maximum liquid surface temperature (°F):	40B. Corresponding vapor pressure (psia):	
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.		

41A. Material name and composition:			
41B. CAS number:			
41C. Liquid density (lb/gal):			
41D. Liquid molecular weight (lb/lb-mole):			
41E. Vapor molecular weight (lb/lb-mole):			
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year. From: To:			
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.			

GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name GLO 176	2. Tank Name Sand Separator Tank
3. Emission Unit ID number S010	4. Emission Point ID number E010
5. Date Installed , Modified or Relocated *(for existing tanks)* Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? ☐ Yes ☒ No Was the tank manufactured after September 18, 2015? ☒ Yes ☐ No	6. Type of change: Existing, no change ☒ New construction ☐ New stored material ☐ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)* N/A	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 8-42 below are not required.***	

TANK INFORMATION

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 100 bbls	
9A. Tank Internal Diameter (ft.) 10	9B. Tank Internal Height (ft.) 10
10A. Maximum Liquid Height (ft.) 10	10B. Average Liquid Height (ft.) 5
11A. Maximum Vapor Space Height (ft.) 10	11B. Average Vapor Space Height (ft.) 5
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume". 140 bbls	
13A. Maximum annual throughput (gal/yr) **See attached emissions calculations for all throughput values**	13B. Maximum daily throughput (gal/day) **See attached emissions calculations for all throughput values**
14. Number of tank turnovers per year **See attached emissions calculations for all throughput values**	15. Maximum tank fill rate (gal/min) **See attached emissions calculations for all throughput values**
16. Tank fill method ☐ Submerged ☒ Splash ☐ Bottom Loading	
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): ☒ Fixed Roof ☐ vertical ☒ horizontal ☐ flat roof ☐ cone roof ☐ dome roof ☐ other (describe) ☐ External Floating Roof ☐ pontoon roof ☐ double deck roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting ☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm ☐ Pressurized ☐ spherical ☐ cylindrical	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☒ Does Not Apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket of _____ ☐ Carbon Adsorption[1]

☐ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors)

☐ Conservation Vent (psig) ☐ Condenser[1]

Vacuum Setting Pressure Setting

☐ Emergency Relief Valve (psig)

Vacuum Setting Pressure Setting

☐ Thief Hatch Weighted ☐ Yes ☐ No

[1] Complete appropriate Air Pollution Control Device Sheet

20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method[1]
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
See attached Emissions Calculation for all values									

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

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

TANK CONSTRUCTION AND OPERATION INFORMATION

21. Tank Shell Construction:

☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☒ Other (describe) Welded

21A. Shell Color: Gray	21B. Roof Color: Gray	21C. Year Last Painted: 2016

22. Shell Condition (if metal and unlined):

☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ Yes ☒ No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?

23. Operating Pressure Range (psig):

Must be listed for tanks using VRUs with closed vent system.

24. Is the tank a **Vertical Fixed Roof Tank**? ☐ Yes ☒ No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):

25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☒

25A. Year Internal Floaters Installed:

25B. Primary Seal Type *(check one):* ☐ Metallic (mechanical) shoe seal ☐ Liquid mounted resilient seal ☐ Vapor mounted resilient seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a secondary seal? ☐ Yes ☐ No

25D. If yes, how is the secondary seal mounted? *(check one)* ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No

25F. Describe deck fittings:

26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply

26A. Deck Type: ☐ Bolted ☐ Welded	26B. For bolted decks, provide deck construction:

26C. Deck seam. Continuous sheet construction:

☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)

26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:

27. Closed Vent System with VRU? ☐ Yes ☒ No

28. Closed Vent System with Enclosed Combustor? ☐ Yes ☒ No

SITE INFORMATION - Not Applicable: Tank calculations performed using E&P Tank software

29. Provide the city and state on which the data in this section are based:

30. Daily Avg. Ambient Temperature (°F):	31. Annual Avg. Maximum Temperature (°F):
32. Annual Avg. Minimum Temperature (°F):	33. Avg. Wind Speed (mph):

34. Annual Avg. Solar Insulation Factor (BTU/ft^2-day):		35. Atmospheric Pressure (psia):	
LIQUID INFORMATION - Not Applicable: Tank calculations performed using E&P Tank software			
36. Avg. daily temperature range of bulk liquid (°F):	36A. Minimum (°F):	36B. Maximum (°F):	
37. Avg. operating pressure range of tank (psig):	37A. Minimum (psig):	37B. Maximum (psig):	
38A. Minimum liquid surface temperature (°F):		38B. Corresponding vapor pressure (psia):	
39A. Avg. liquid surface temperature (°F):		39B. Corresponding vapor pressure (psia):	
40A. Maximum liquid surface temperature (°F):		40B. Corresponding vapor pressure (psia):	
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:			
41B. CAS number:			
41C. Liquid density (lb/gal):			
41D. Liquid molecular weight (lb/lb-mole):			
41E. Vapor molecular weight (lb/lb-mole):			
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year. From: To:			
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.			

STORAGE TANK DATA TABLE

List all deminimis storage tanks (i.e. lube oil, glycol, diesel etc.)

Source ID #[1]	Status[2]	Content[3]	Volume[4]
Not Applicable			

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

ATTACHMENT M

Heaters Data Sheet

ATTACHMENT M – 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]
S005	E005	Line Heater	TBD	New	1.54	~1,066
S006	E006	Line Heater	TBD	New	1.54	~1,066
S007	E007	Line Heater	TBD	New	1.54	~1,066
S008	E008	Line Heater	TBD	New	1.54	~1,066
S009	E009	TEG	TBD	New	0.013	~1,066

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

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

3 New, modification, removal

4 Enter design heat input capacity in MMBtu/hr.

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

ATTACHMENT N

Engines Data Sheet

ATTACHMENT N – INTERNAL COMBUSTION ENGINE DATA SHEET – NOT APPLICABLE

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]			
Engine Manufacturer/Model			
Manufacturers Rated bhp/rpm			
Source Status[2]			
Date Installed/ Modified/Removed/Relocated[3]			
Engine Manufactured /Reconstruction Date[4]			
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable)[5]	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources
Engine Type[6]			
APCD Type[7]			
Fuel Type[8]			
H_2S (gr/100 scf)			
Operating bhp/rpm			
BSFC (BTU/bhp-hr)			
Hourly Fuel Throughput	ft^3/hr gal/hr	ft^3/hr gal/hr	ft^3/hr gal/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	MMft^3/yr gal/yr	MMft^3/yr gal/yr	MMft^3/yr gal/yr
Fuel Usage or Hours of Operation Metered	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

	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]
	NO_x						
	CO						
	VOC						
	SO_2						
	PM_{10}						
	Formaldehyde						
	Total HAPs						
	GHG (CO_2e)						

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

2 Enter the Source Status using the following codes:

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

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

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

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

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

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

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

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

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

8 Enter the Fuel Type using the following codes:

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

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

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

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

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

Engine Air Pollution Control Device
(Emission Unit ID# 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: Sequential multi-part fuel injection

Manufacturer:	Model #:
Design Operating Temperature:	Design gas volume:
Service life of catalyst:	Provide manufacturer data? ☐Yes ☐ No
Volume of gas handled:	Operating temperature range for NSCR/Ox Cat:
Reducing agent used, if any:	Ammonia slip (ppm):

Pressure drop against catalyst bed (delta P):

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

Is temperature and pressure drop of catalyst required to be monitored per 40CFR63 Subpart ZZZZ?
☐ Yes ☐ No

How often is catalyst recommended or required to be replaced (hours of operation)?

How often is performance test required?
☐ Initial
☐ Annual
☐ Every 8,760 hours of operation
☐ Field Testing Required
☐ No performance test required. If so, why (please list any maintenance required and the applicable sections in NSPS/GACT,

ATTACHMENT O

Truck Loading Data Sheet

ATTACHMENT O – TANKER TRUCK/RAIL CAR 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/rail cars. Use extra pages if necessary.

Truck/Rail Car Loadout Collection Efficiencies

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

- For tanker trucks/rail cars passing the MACT level annual leak test – 99.2%
- For tanker trucks/rail cars passing the NSPS level annual leak test – 98.7%
- For tanker trucks/rail cars 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/rail car 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.

Emission Unit ID#: S011	Emission Point ID#: E011	Year Installed/Modified: N/A
Emission Unit Description: Uncaptured 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/rail cars loading at one (1) time: 1
Are tanker trucks/rail cars pressure tested for leaks at this or any other location? ☐ Yes ☒ No ☐ Not Required If Yes, Please describe:		
Provide description of closed vent system and any bypasses. Trucks utilize vapor recovery lines to route displaced vapors back into battery of tanks.		
Are any of the following truck/rail car loadout systems utilized? ☐ Closed System to tanker truck/rail car passing a MACT level annual leak test? ☐ Closed System to tanker truck/rail car passing a NSPS level annual leak test? ☒ Closed System to tanker truck/rail car 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	7	7	7	7

Bulk Liquid Data (use extra pages as necessary)

Liquid Name	Produced Fluids		
Max. Daily Throughput (1000 gal/day)	See attached emissions calculations for all throughput values		
Max. Annual Throughput (1000 gal/yr)	See attached emissions calculations for all throughput values		
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]	VB (captured loading losses)		

Max. Collection Efficiency (%)		0		
Max. Control Efficiency (%)		0		
Max.VOC Emission Rate	Loading (lb/hr)	See attached emission calculations for breakdown		
	Annual (ton/yr)	See attached emission calculations for breakdown		
Max.HAP Emission Rate	Loading (lb/hr)	See attached emission calculations for breakdown		
	Annual (ton/yr)	See attached emission calculations for breakdown		
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)

ATTACHMENT P

Glycol Dehydrator Data Sheet *(Not Applicable)*

ATTACHMENT P – GLYCOL DEHYDRATION UNIT DATA SHEET - NOT APPLICABLE

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

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

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

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

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

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

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

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

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

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

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

Control Device Technical Data

Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)

Emissions Data

Emission Unit ID / Emission Point ID[4]	Description	Calculation Methodology[5]	PTE[6]	Controlled Maximum Hourly Emissions (lb/hr)	Controlled Maximum Annual Emissions (tpy)
	Reboiler Vent		NO_x		
			CO		
			VOC		
			SO_2		
			PM_{10}		

			GHG (CO_2e)		
	Glycol Regenerator Still Vent	GRI-GlyCalc™	VOC		
		GRI-GlyCalc™	Benzene		
		GRI-GlyCalc™	Toluene		
		GRI-GlyCalc™	Ethylbenzene		
		GRI-GlyCalc™	Xylenes		
		GRI-GlyCalc™	n-Hexane		
	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 well site 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.

ATTACHMENT Q

Pneumatic Controller Data Sheet

ATTACHMENT Q – PNEUMATIC CONTROLLERS DATA SHEET

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

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

☐ Yes ☒ No

Please list approximate number.

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

☐ Yes ☒ No

Please list approximate number.

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

☐ Yes ☒ No

Please list approximate number.

ATTACHMENT R

Pneumatic Pump Data Sheet *(Not Applicable)*

ATTACHMENT R – PNEUMATIC PUMP DATA SHEET

Are there any natural gas-driven diaphragm pumps located at a well site that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list.

Source ID #	Date	Pump Make/Model	Pump Size

ATTACHMENT S

Air Pollution Control Device Data Sheet

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

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

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

The following five (5) rows are only to be completed if registering an alternative air pollution control device.

Emission Unit ID: **Not Applicable**	Make/Model:
Primary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No
Secondary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No

VAPOR COMBUSTION– Not Applicable
(Including Enclosed Combustors)

General Information

Control Device ID#:	Installation Date: ☐ New ☐ Modified ☐ Relocated	
Maximum Rated Total Flow Capacity	Maximum Design Heat Input (from mfg. spec sheet)	Design Heat Content

Control Device Information

Type of Vapor Combustion Control?

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

Manufacturer: LEED Model:	Hours of operation per year?

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

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

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

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

Waste Gas Information

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

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

Pilot Gas Information

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

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

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

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

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

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

ADSORPTION SYSTEM – Not Applicable		
General Information		
Control Device ID#:	Installation Date: ☐ New ☐ Modified ☐ Relocated	
Manufacturer:	Model:	Control Device Name:
Design Inlet Volume: scfm	Adsorbent charge per adsorber vessel and number of adsorber vessels:	
Length of Mass Transfer Zone supplied by the manufacturer:	Adsorber diameter: ft Adsorber area: ft^2	
Adsorbent type and physical properties:	Overall Control Efficiency (%):	
Working Capacity of Adsorbent (%):		
Operating Parameters		
Inlet volume: scfm @ °F		
Adsorption time per adsorption bed (life expectancy):	Breakthrough Capacity (lbs of VOC/100 lbs of adsorbent):	
Temperature range of carbon bed adsorber. °F - °F		
Control Device Technical Data		
Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)	
Describe the warning and/or alarm system that protects against operation when unit is not meeting the design requirements:		
Has the control device been tested by the manufacturer and certified?		
Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty.		
Additional information attached? ☐ Yes ☐ No Please attach copies of manufacturer's data sheets, drawings, and performance testing.		

VAPOR RECOVERY UNIT – Not Applicable

General Information

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

Device Information

Manufacturer:
Model:

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

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

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

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

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

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

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

ATTACHMENT T

Emission Calculations

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Facility-Wide Emission Summary - Controlled

Wells	2	
Storage Tanks	4	
Sand Separator Tank	1	
Line Heaters	4	
TEGs	1	
Dehy Reboiler	0	
Glycol Dehy	0	
Dehy Drip Tank	0	
Dehy Combustor	0	
Compressor	0	
High Pressure Separator	2	
Low Pressure Separator	0	
Vapor Recovery Unit	0	
Tank Combustor	0	
Length of lease road	1,800	feet

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

CO_2	1
CH_4	25
N_2O	298

Emission Point ID #	Emission Source ID#s	Emission Source Description	NO_x		CO		VOC		SO_2		CH_4		PM_{10}		$PM_{2.5}$		CO_2e	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
E001-E004	S001-S004	Storage Vessels	---	---	---	---	0.01	0.04	---	---	0.08	0.37	---	---	---	---	2.11	9.23
E005	S005	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.00	0.01	0.01	0.05	0.01	0.05	180.18	789.20
E006	S006	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.00	0.01	0.01	0.05	0.01	0.05	180.18	789.20
E007	S007	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.00	0.01	0.01	0.05	0.01	0.05	180.18	789.20
E008	S008	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.00	0.01	0.01	0.05	0.01	0.05	180.18	789.20
E009	S009	TEG	1.2E-03	5.4E-03	1.0E-03	4.5E-03	6.8E-05	3.0E-04	7.4E-06	3.2E-05	0.00	0.00	9.4E-05	4.1E-04	9.4E-05	4.1E-04	1.52	6.64
E010	S010	Sand Separator Tank	---	---	---	---	7.0E-04	3.1E-03	---	---	0.00	0.00	---	---	---	---	0.01	0.06
E011	S011	Uncaptured Liquid Loading	---	---	---	---	3.0E-03	7.8E-04	---	---	---	---	---	---	---	---	---	---
---	---	Fugitives	---	---	---	---	---	0.98	---	---		4.72	---	---	---	---	---	118.08
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	---	---	0.10	---	0.01	---	---
Facility Total			0.59	2.57	0.49	2.16	0.05	1.16	3.5E-03	0.02	0.10	5.15	0.04	0.29	0.04	0.21	724.37	3290.81
Facility Total (excluding fugitive emissions)			0.59	2.57	0.49	2.16	0.05	0.19	3.5E-03	0.02	0.10	0.43	0.04	0.20	0.04	0.20	724.37	3,172.72

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Facility-Wide Emission Summary - Controlled

Emission Point ID #	Emission Source ID#s	Emission Source Description	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		n-Hexane		BTEX		Total HAP	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
E001-E004	S001-S004	Storage Vessels	---	---	---	---	---	---	---	---	---	---	6.8E-05	3.0E-04	---	---	6.8E-05	3.0E-04
E005	S005	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	8.1E-06	3.5E-05	2.8E-03	0.01
E006	S006	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	8.1E-06	3.5E-05	2.8E-03	0.01
E007	S007	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	8.1E-06	3.5E-05	2.8E-03	0.01
E008	S008	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	8.1E-06	3.5E-05	2.8E-03	0.01
E009	S009	TEG	9.3E-07	4.1E-06	2.6E-08	1.1E-07	4.2E-08	1.8E-07	---	---	---	---	2.2E-05	9.7E-05	6.8E-08	3.0E-07	2.3E-05	1.0E-04
E010	S010	Sand Separator Tank	---	---	---	---	---	---	---	---	---	---	4.5E-06	2.0E-05	<0.01	<0.01	4.5E-06	2.0E-05
E011	S011	Uncaptured Liquid Loading	---	---	---	---	---	---	---	---	---	---	4.2E-06	1.1E-06	<0.01	<0.01	4.2E-06	1.1E-06
---	---	Fugitives	---	---	---	<0.01	---	<0.01	---	<0.01	---	<0.01	---	0.06	<0.01	<0.01	---	0.06
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Facility Total			4.4E-04	1.9E-03	1.2E-05	5.4E-05	2.0E-05	8.7E-05	<0.01	<0.01	<0.01	<0.01	0.01	0.11	3.2E-05	1.4E-04	0.01	0.11
Facility Total (excluding fugitive emissions)			4.4E-04	1.9E-03	1.2E-05	5.4E-05	2.0E-05	8.7E-05	<0.01	<0.01	<0.01	<0.01	0.01	0.05	3.2E-05	1.4E-04	0.01	0.05

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Produced Fluids Storage Vessels

Potential Throughput

Operational Hours	8,760	hrs/yr
Maximum Condensate Throughput[1]	0	bbl/day
Maximum Produced Water Throughput[1]	50	bbl/day

[1] Based on the highest monthly throughput recorded at the Shaver (February 2017), a similar pad near GLO 176 pad. Includes a safety factor of 50%.

Overall Control Efficiency of Combustor 0%

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	0.084	0.369	0.084	0.369
Ethane	<0.001	<0.001	<0.001	<0.001	4.9E-04	0.002	4.9E-04	0.002
Propane	<0.001	<0.001	1.1E-04	4.8E-04	0.008	0.033	0.008	0.034
Isobutane	<0.001	<0.001	4.9E-06	2.1E-05	5.0E-04	0.002	0.001	0.002
n-Butane	<0.001	<0.001	9.6E-06	4.2E-05	0.001	0.003	0.001	0.003
Isopentane	<0.001	<0.001	8.6E-07	3.7E-06	9.3E-05	4.1E-04	9.4E-05	4.1E-04
n-Pentane	<0.001	<0.001	6.2E-08	2.7E-07	1.6E-05	7.2E-05	1.7E-05	7.2E-05
Hexane	<0.001	<0.001	1.7E-07	7.6E-07	6.8E-05	3.0E-04	6.8E-05	3.0E-04
Total VOC Emissions:	0.00	0.00	0.00	0.00	0.01	0.04	0.01	0.04
Total HAP Emissions:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

[1] Uncontrolled emissions calculation using Promax (sum of produced water and condensate). Non-methane emissions are taken from the tank emissions stencil. Methane emissions are taken from the flash stream composition.

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Produced Fluids Storage Vessels

Storage Tanks - Controlled[2]

	Breathing		Working		Flashing		Total Emissions	
	lb/hr	tpy			lb/hr	tpy	lb/hr	tpy
Methane	<0.001	<0.001	<0.001	<0.001	0.084	0.369	0.084	0.369
Ethane	<0.001	<0.001	<0.001	<0.001	4.9E-04	0.002	4.9E-04	0.002
Propane	<0.001	<0.001	1.1E-04	4.8E-04	0.008	0.033	0.008	0.034
Isobutane	<0.001	<0.001	4.9E-06	2.1E-05	5.0E-04	0.002	0.001	0.002
n-Butane	<0.001	<0.001	9.6E-06	4.2E-05	0.001	0.003	0.001	0.003
Isopentane	<0.001	<0.001	8.6E-07	3.7E-06	9.3E-05	4.1E-04	9.4E-05	4.1E-04
n-Pentane	<0.001	<0.001	6.2E-08	2.7E-07	1.6E-05	7.2E-05	1.7E-05	7.2E-05
Hexane	<0.001	<0.001	1.7E-07	7.6E-07	6.8E-05	3.0E-04	6.8E-05	3.0E-04
Total VOC Emissions:	0.00	0.00	0.00	0.00	0.01	0.04	0.01	0.04
Total HAP Emissions:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

[2] Controlled emissions are equal to uncontrolled emissions since there is no control device

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Sand Separator Storage Vessel

Throughput Parameter	Value	Units
Tank Capacity	4,200	gallons
Operational Hours	8,760	hrs/yr
Total Produced Water and Sand Throughput	200	bbl/month
Percent Produced Water	50%	
Total Produced Water Throughput	100	bbl/month

[1] Conservatively assumes 2 turnovers/month of sand and produced water.

Description	Potential Throughput (gal/yr)
Produced Water and Sand	100,800

Overall Control Efficiency of Combustor 0%

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	0.001	0.003	0.001	0.003
Ethane	<0.001	<0.001	<0.001	<0.001	4.3E-07	1.9E-06	4.3E-07	1.9E-06
Propane	<0.001	<0.001	1.0E-04	4.4E-04	0.001	0.002	0.001	0.003
Isobutane	<0.001	<0.001	1.6E-06	7.2E-06	3.3E-05	1.4E-04	3.4E-05	1.5E-04
n-Butane	<0.001	<0.001	2.2E-06	9.5E-06	4.8E-05	2.1E-04	5.0E-05	2.2E-04
Isopentane	<0.001	<0.001	7.1E-08	3.1E-07	6.1E-06	2.7E-05	6.2E-06	2.7E-05
n-Pentane	<0.001	<0.001	3.7E-09	1.6E-08	1.1E-06	4.7E-06	1.1E-06	4.8E-06
Hexane	<0.001	<0.001	2.9E-09	1.3E-08	4.5E-06	2.0E-05	4.5E-06	2.0E-05
Total VOC Emissions:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total HAP Emissions:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

[1] Uncontrolled emissions calculation using Promax (sum of produced water and condensate). Non-methane emissions are taken from the tank emissions stencil. Methane emissions are taken from the flash stream composition.

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Sand Separator Storage Vessel

Storage Tanks - Controlled[2]

	Breathing		Working		Flashing		Total Emissions	
	lb/hr	tpy			lb/hr	tpy	lb/hr	tpy
Methane	<0.001	<0.001	<0.001	<0.001	0.001	0.003	0.001	0.003
Ethane	<0.001	<0.001	<0.001	<0.001	4.3E-07	1.9E-06	4.3E-07	1.9E-06
Propane	<0.001	<0.001	1.0E-04	4.4E-04	0.001	0.002	0.001	0.003
Isobutane	<0.001	<0.001	1.6E-06	7.2E-06	3.3E-05	1.4E-04	3.4E-05	1.5E-04
n-Butane	<0.001	<0.001	2.2E-06	9.5E-06	4.8E-05	2.1E-04	5.0E-05	2.2E-04
Isopentane	<0.001	<0.001	7.1E-08	3.1E-07	6.1E-06	2.7E-05	6.2E-06	2.7E-05
n-Pentane	<0.001	<0.001	3.7E-09	1.6E-08	1.1E-06	4.7E-06	1.1E-06	4.8E-06
Hexane	<0.001	<0.001	2.9E-09	1.3E-08	4.5E-06	2.0E-05	4.5E-06	2.0E-05
Total VOC Emissions:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total HAP Emissions:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

[2] Controlled emissions are equal to uncontrolled emissions since there is no control device

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Line Heaters

Source Designation:	**S005-S008**
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,050
Heat Input (MMBtu/hr)	1.54
Fuel Consumption (MMscf/hr):	1.47E-03
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[1, 4]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
NO_x	100	0.15	0.64
CO	84	0.12	0.54
VOC	5.5	0.01	0.04
SO_2	0.6	8.8E-04	3.9E-03
PM Total	7.6	0.01	0.05
PM Condensable	5.7	0.01	0.04
PM_{10} (Filterable)	1.9	2.8E-03	0.01
$PM_{2.5}$ (Filterable)	1.9	2.8E-03	0.01
Lead	5.00E-04	7.3E-07	3.2E-06
CO_2	117.0	180.00	788.38
CH_4	2.21E-03	3.4E-03	1.5E-02
N_2O	2.21E-04	3.4E-04	1.5E-03

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Line Heaters

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
HAPs:			
2-Methylnaphthalene	2.4E-05	3.5E-08	1.5E-07
3-Methylchloranthrene	1.8E-06	2.6E-09	1.2E-08
7,12-Dimethylbenz(a)anthracene	1.6E-05	2.3E-08	1.0E-07
Acenaphthene	1.8E-06	2.6E-09	1.2E-08
Acenaphthylene	1.8E-06	2.6E-09	1.2E-08
Anthracene	2.4E-06	3.5E-09	1.5E-08
Benz(a)anthracene	1.8E-06	2.6E-09	1.2E-08
Benzene	2.1E-03	3.1E-06	1.3E-05
Benzo(a)pyrene	1.2E-06	1.8E-09	7.7E-09
Benzo(b)fluoranthene	1.8E-06	2.6E-09	1.2E-08
Benzo(g,h,i)perylene	1.2E-06	1.8E-09	7.7E-09
Benzo(k)fluoranthene	1.8E-06	2.6E-09	1.2E-08
Chrysene	1.8E-06	2.6E-09	1.2E-08
Dibenzo(a,h) anthracene	1.2E-06	1.8E-09	7.7E-09
Dichlorobenzene	1.2E-03	1.8E-06	7.7E-06
Fluoranthene	3.0E-06	4.4E-09	1.9E-08
Fluorene	2.8E-06	4.1E-09	1.8E-08
Formaldehyde	7.5E-02	1.1E-04	4.8E-04
Hexane	1.8E+00	2.6E-03	1.2E-02
Indo(1,2,3-cd)pyrene	1.8E-06	2.6E-09	1.2E-08
Naphthalene	6.1E-04	8.9E-07	3.9E-06
Phenanthrene	1.7E-05	2.5E-08	1.1E-07
Pyrene	5.0E-06	7.3E-09	3.2E-08
Toluene	3.4E-03	5.0E-06	2.2E-05
Arsenic	2.0E-04	2.9E-07	1.3E-06
Beryllium	1.2E-05	1.8E-08	7.7E-08
Cadmium	1.1E-03	1.6E-06	7.1E-06
Chromium	1.4E-03	2.1E-06	9.0E-06
Cobalt	8.4E-05	1.2E-07	5.4E-07
Manganese	3.8E-04	5.6E-07	2.4E-06
Mercury	2.6E-04	3.8E-07	1.7E-06
Nickel	2.1E-03	3.1E-06	1.3E-05
Selenium	2.4E-05	3.5E-08	1.5E-07
Total HAP		**2.8E-03**	**1.2E-02**

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

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

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

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

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Thermoelectric Generators

Source Designation:	**S009**
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,050
Heat Input (MMBtu/hr) [1]	0.013
Fuel Consumption (MMscf/hr):	1.23E-05
Potential Annual Hours of Operation (hr/yr):	8,760

[1] Global Themorelectric specification sheet states 311 ft^3/day at 1000 BTU/ft^3.

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[2, 5]	Potential Emissions (lb/hr)[3]	Potential Emissions (tons/yr)[4]
NO_x	100	1.2E-03	0.01
CO	84	1.0E-03	4.5E-03
VOC	5.5	6.8E-05	3.0E-04
SO_2	0.6	7.4E-06	3.2E-05
PM Total	7.6	9.4E-05	4.1E-04
PM Condensable	5.7	7.0E-05	3.1E-04
PM_{10} (Filterable)	1.9	2.3E-05	1.0E-04
$PM_{2.5}$ (Filterable)	1.9	2.3E-05	1.0E-04
Lead	5.00E-04	6.2E-09	2.7E-08
CO_2	116.9	1.51	6.64
CH_4	2.21E-03	2.9E-05	1.3E-04
N_2O	2.21E-04	2.9E-06	1.3E-05

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Thermoelectric Generators

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[2]	Potential Emissions (lb/hr)[3]	Potential Emissions (tons/yr)[4]
HAPs:			
2-Methylnaphthalene	2.4E-05	3.0E-10	1.3E-09
3-Methylchloranthrene	1.8E-06	2.2E-11	9.7E-11
7,12-Dimethylbenz(a)anthracene	1.6E-05	2.0E-10	8.6E-10
Acenaphthene	1.8E-06	2.2E-11	9.7E-11
Acenaphthylene	1.8E-06	2.2E-11	9.7E-11
Anthracene	2.4E-06	3.0E-11	1.3E-10
Benz(a)anthracene	1.8E-06	2.2E-11	9.7E-11
Benzene	2.1E-03	2.6E-08	1.1E-07
Benzo(a)pyrene	1.2E-06	1.5E-11	6.5E-11
Benzo(b)fluoranthene	1.8E-06	2.2E-11	9.7E-11
Benzo(g,h,i)perylene	1.2E-06	1.5E-11	6.5E-11
Benzo(k)fluoranthene	1.8E-06	2.2E-11	9.7E-11
Chrysene	1.8E-06	2.2E-11	9.7E-11
Dibenzo(a,h) anthracene	1.2E-06	1.5E-11	6.5E-11
Dichlorobenzene	1.2E-03	1.5E-08	6.5E-08
Fluoranthene	3.0E-06	3.7E-11	1.6E-10
Fluorene	2.8E-06	3.5E-11	1.5E-10
Formaldehyde	7.5E-02	9.3E-07	4.1E-06
Hexane	1.8E+00	2.2E-05	9.7E-05
Indo(1,2,3-cd)pyrene	1.8E-06	2.2E-11	9.7E-11
Naphthalene	6.1E-04	7.5E-09	3.3E-08
Phenanthrene	1.7E-05	2.1E-10	9.2E-10
Pyrene	5.0E-06	6.2E-11	2.7E-10
Toluene	3.4E-03	4.2E-08	1.8E-07
Arsenic	2.0E-04	2.5E-09	1.1E-08
Beryllium	1.2E-05	1.5E-10	6.5E-10
Cadmium	1.1E-03	1.4E-08	5.9E-08
Chromium	1.4E-03	1.7E-08	7.6E-08
Cobalt	8.4E-05	1.0E-09	4.5E-09
Manganese	3.8E-04	4.7E-09	2.1E-08
Mercury	2.6E-04	3.2E-09	1.4E-08
Nickel	2.1E-03	2.6E-08	1.1E-07
Selenium	2.4E-05	3.0E-10	1.3E-09
Total HAP		**2.3E-05**	**1.0E-04**

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

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

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

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

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Liquid Loading

Throughput 766,500 gal/yr
Capture Efficiency 0% non-tested tanker trucks
Control Efficiency 0% Combustor destruction efficiency

Liquid Loading Emissions

	Uncontrolled Emissions		Uncaptured Emissions		Controlled Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Propane	0.003	0.001	0.003	0.001	<0.001	<0.001
Isobutane	1.2E-04	3.0E-05	1.2E-04	3.0E-05	<0.001	<0.001
n-Butane	2.3E-04	6.0E-05	2.3E-04	6.0E-05	<0.001	<0.001
Isopentane	2.1E-05	5.3E-06	2.1E-05	5.3E-06	<0.001	<0.001
n-Pentane	1.5E-06	3.9E-07	1.5E-06	3.9E-07	<0.001	<0.001
Hexane	4.2E-06	1.1E-06	4.2E-06	1.1E-06	<0.001	<0.001
Total VOC Emissions:	0.003	0.001	0.003	0.001	<0.001	<0.001
Total HAP Emissions:	0.000	0.000	0.000	0.000	<0.001	<0.001

[1] Uncontrolled emissions calculation using Promax (sum of produced water and condensate).
[2] Hourly emissions assume two hours of loading per day, five days per week.

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D 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	8	1.44	0.01	6.6E-04	0.01	9.5E-04
Compressor	Gas	0.22800	0	---	0.02	1.4E-03	---	---
Valves	Gas	0.00597	147	8.47	0.02	1.4E-03	0.18	0.01
Pressure Relief Valves	Gas	0.10400	16	16.07	0.02	1.4E-03	0.34	0.02
Open-Ended Lines	All	0.00170	14	0.22	0.02	1.4E-03	4.7E-03	3.1E-04
Connectors	All	0.00183	657	11.61	0.02	1.4E-03	0.25	0.02
Intermittent Pneumatic Devices[4]	Gas	13.5	10	---	---	---	0.19	0.01
			Emission Totals:	**37.81**	**---**	**---**	**0.98**	**0.06**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-1. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). SOCMI factors were used as it was representative of natural gas liquids extraction. 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 and one meter per wellhead. Pressure relief valves count includes one Emergency Pressure Relief valve and one lock-down hatch for each storage tank. Pneumatic devices assume 5 per well. A 50% compliance margin is added to the component counts based on Subpart W counts.

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

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

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D 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	8	1.44	0.0E+00	0.0E+00	<0.01	0.0E+00	9.5E-04
Compressor	Gas	0.22800	0	---	---	---	<0.01	---	---
Valves	Gas	0.00597	147	8.47	0.0E+00	0.0E+00	<0.01	0.0E+00	0.01
Pressure Relief Valves	Gas	0.10400	16	16.07	0.0E+00	0.0E+00	<0.01	0.0E+00	0.02
Open-Ended Lines	All	0.00170	14	0.22	0.0E+00	0.0E+00	<0.01	0.0E+00	3.1E-04
Connectors	All	0.00183	657	11.61	0.0E+00	0.0E+00	<0.01	0.0E+00	0.02
Intermittent Pneumatic Devices[4]	Gas	13.5	10	---	0.0E+00	0.0E+00	<0.01	0.0E+00	0.01
			Emission Totals:	**37.81**	**0.0E+00**	**0.0E+00**	**<0.01**	**0.0E+00**	**0.06**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-1. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). SOCMI factors were used as it was representative of natural gas liquids extraction. 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 and one meter per wellhead. Pressure relief valves count includes one Emergency Pressure Relief valve and one lock-down hatch for each storage tank. Pneumatic devices assume 5 per well. A 50% compliance margin is added to the component counts based on Subpart W counts.

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

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

GHG Fugitive Emissions from Component Leaks

Component	Component Count	GHG Emission Factor[1] scf/hr/component	CH_4 Emissions[2,3] (tpy)	CO_2 Emissions[2,3] (tpy)	CO_2e Emissions[4] (tpy)
Pumps	8	0.01	0.01	6.9E-05	0.32
Compressor	0	4.17	---	---	---
Valves	147	0.027	0.68	3.6E-03	17.06
Pressure Relief Devices	16	0.04	0.11	5.9E-04	2.75
Open-Ended Lines	14	0.061	0.14	7.5E-04	3.54
Connectors	657	0.003	0.34	1.8E-03	8.47
Intermittent Pneumatic Devices	10	6	3.44	0.02	85.94
Total			**4.72**	**0.03**	**118.08**

[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 CH_4 and CO_2 based on gas analysis:
CH_4: 93% CO_2: 0.18%

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

Company Name: EQT Production, LLC
Facility Name: GLO 176 Pad
Project Description: G70D Application

Haul Roads

Estimated Potential Road Fugitive Emissions

Unpaved Road Emissions

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

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

Description	Weight of Empty Truck (tons)	Weight of Truck w/ Max Load (tons)	Mean Vehicle Weight (tons)	Length of Unpaved Road Traveled (mile)	Trips Per Year	Mileage Per Year	Control (%)	Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
Liquids Hauling	20	40	30	0.34	192	131	0	0.28	0.07	0.01
Employee Vehicles	3	3	3	0.34	200	136	0	0.10	0.03	0.00
Total Potential Emissions								**0.38**	**0.10**	**0.01**

Company Name: **EQT Production, LLC**
Facility Name: **GLO 176 Pad**
Project Description: **G70D Application**

Gas Analysis

Sample Location: Shaver 1H Gas Analysis
Sample Date: 12/13/2016
HHV (Btu/scf): 1,066 Note: A BTU content of 1,050 was used for calculations.

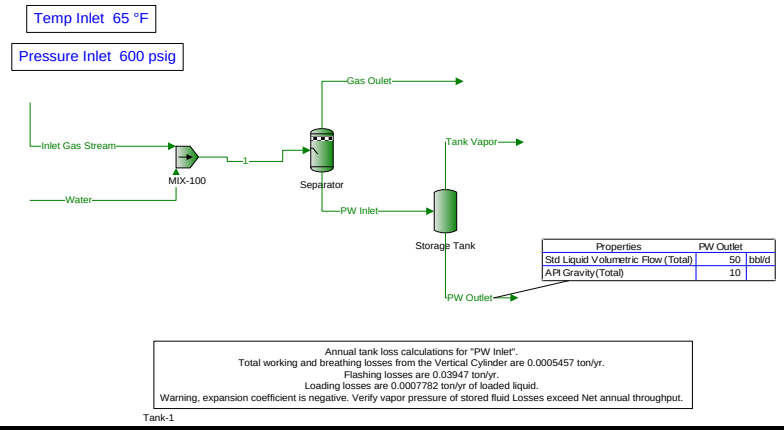
Constituent	Natural Gas Stream Speciation (Mole %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.181	44.01	0.08	0.00	0.461
Nitrogen	0.344	28.01	0.10	0.01	0.560
Methane	92.694	16.04	14.87	0.86	86.364
Ethane	6.007	30.07	1.81	0.10	10.492
Propane	0.611	44.10	0.27	0.02	1.564
Isobutane	0.047	58.12	0.03	0.00	0.158
n-Butane	0.059	58.12	0.03	0.00	0.198
Isopentane	0.010	72.15	0.01	0.00	0.042
n-Pentane	0.005	72.15	0.00	0.00	0.020
Cyclopentane	<0.001	70.1	0.0	0.0	0.000
n-Hexane	0.028	86.18	0.02	0.00	0.139
Cyclohexane	<0.001	84.16	0.00	0.00	0.000
Other Hexanes	<0.001	86.18	0.00	0.00	0.000
Heptanes	<0.001	100.21	0.00	0.00	0.000
Methylcyclohexane	<0.001	98.19	0.00	0.00	0.000
2,2,4-Trimethylpentane	<0.001	114.23	0.00	0.00	0.000
Benzene*	<0.001	78.11	0.00	0.00	0.000
Toluene*	<0.001	92.14	0.00	0.00	0.000
Ethylbenzene*	<0.001	106.17	0.00	0.00	0.000
Xylenes*	<0.001	106.16	0.00	0.00	0.000
C8 + Heavies	<0.001	130.80	0.00	0.00	0.000
Totals	99.99		17.22	1.00	100

TOC (Total)	99.46	98.98
VOC (Total)	0.76	2.12
HAP (Total)	0.03	0.14

GLO 176 Wellpad
Plant Schematic

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	
Flowsheet:	GLO 176 Wellpad	

GLO 176 Wellpad



Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	
Flowsheet:	GLO 176 Wellpad	

Connections

	Gas Oulet	Inlet Gas Stream	PW Inlet	PW Outlet	Tank Vapor
From Block	Separator	--	Separator	Storage Tank	Storage Tank
To Block	--	MIX-100	Storage Tank	--	--

Stream Composition

Mole Fraction	Gas Oulet %	Inlet Gas Stream %	PW Inlet %	PW Outlet %	Tank Vapor %
Methane	92.6556	92.7083 *	0.0881184	0.00227811	87.9439
Ethane	6.00443	6.0079 *	0.00720858	0.000288906	7.08936
Propane	0.61045	0.610792 *	0.000436035	1.26118E-05	0.433801
Isobutane	0.0467812	0.046807 *	2.1387E-05	4.65649E-07	0.0214339
n-Butane	0.0586763	0.0587088 *	3.15626E-05	8.37251E-07	0.0314784
Isopentane	0.00999604	0.0100015 *	3.22692E-06	6.40783E-08	0.00324033
n-Pentane	0.00479814	0.00480072 *	5.65669E-07	4.12272E-09	0.000575297
Nitrogen	0.344161	0.344352 *	0.000180049	2.29255E-06	0.18211
Oxygen	0	0 *	0	0	0
Carbon Dioxide	0.180308	0.180527 *	0.00333491	0.00120193	2.1864
Hexane	0.0277893	0.0278042 *	1.9584E-06	1.008E-08	0.00199602
Water	0.0570416	0 *	99.9007	99.9962	2.10572

Mass Flow	Gas Oulet lb/h	Inlet Gas Stream lb/h	PW Inlet lb/h	PW Outlet lb/h	Tank Vapor lb/h
Methane	16329.4	16330 *	0.572946	0.0147978	0.558149
Ethane	1983.44	1983.53 *	0.0878509	0.00351746	0.0843334
Propane	295.714	295.722 *	0.00779279	0.000225178	0.00756761
Isobutane	29.8704	29.8709 *	0.000503812	1.09586E-05	0.000492853
n-Butane	37.4655	37.4663 *	0.000743519	1.97038E-05	0.000723815
Isopentane	7.9229	7.923 *	9.43612E-05	1.87194E-06	9.24892E-05
n-Pentane	3.80302	3.80304 *	1.65412E-05	1.20439E-07	1.64208E-05
Nitrogen	105.914	105.916 *	0.00204424	2.60038E-05	0.00201824
Oxygen	0	0 *	0	0	0
Carbon Dioxide	87.1742	87.2337 *	0.059485	0.021418	0.038067
Hexane	26.308	26.308 *	6.84008E-05	3.5172E-07	6.80491E-05
Water	11.2891	0 *	729.434	729.419	0.0150077

Volumetric Flow	Gas Oulet ft^3/h	Inlet Gas Stream ft^3/h	PW Inlet gpm	PW Outlet gpm	Tank Vapor ft^3/h
Methane	8547.12	8500.19	0.00278429	7.20568E-05	13.3047
Ethane	422.353	420.019	0.000292319	1.17239E-05	1.06719
Propane	32.8223	32.6511	2.21976E-05	6.42402E-07	0.0650431
Isobutane	1.83867	1.8301	1.31264E-06	2.85937E-08	0.00320251
n-Butane	2.11663	2.10675	1.91303E-06	5.077E-08	0.00470003
Isopentane	0.152268	0.151866	2.26078E-07	4.49124E-09	0.000481468
n-Pentane	0.0863093	0.0860972	3.97093E-08	2.8953E-10	8.55211E-05
Nitrogen	36.2103	36.0164	5.42512E-06	6.91621E-08	0.0276286
Oxygen	0	0	0	0	0
Carbon Dioxide	14.7957	14.7271	9.25719E-05	3.33909E-05	0.32998
Hexane	0.0996503	0.101374	1.56096E-07	8.03739E-10	0.000295639
Water	4.96773	0	1.45811	1.45913	0.318056

Stream Properties

Property	Units	Gas Oulet	Inlet Gas Stream	PW Inlet	PW Outlet	Tank Vapor
Temperature	°F	63.7283	65 *	63.7283	65.2024	65.2024
Pressure	psia	609.696	614.696 *	609.696	14.6959	14.6959 *
Mole Fraction Vapor	%	100	100	0	0	100
Mole Fraction Light Liquid	%	0	0	100	100	0

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	
Flowsheet:	GLO 176 Wellpad	

Stream Properties

Property	Units	Gas Oulet	Inlet Gas Stream	PW Inlet	PW Outlet	Tank Vapor
Mole Fraction Heavy Liquid	%	0	0	0	0	0
Molecular Weight	lb/lbmol	17.2208	17.2204	18.0154	18.0156	17.8592
Mass Density	lb/ft^3	2.08752	2.09902	62.296	62.3236	0.0467243
Molar Flow	lbmol/h	1098.57	1097.98	40.53	40.4904	0.0395615
Mass Flow	lb/h	18918.3	18907.7	730.166	729.459	0.706536
Vapor Volumetric Flow	ft^3/h	9062.56	9007.88	11.7209	11.7044	15.1214
Liquid Volumetric Flow	gpm	1129.88	1123.06	1.46131	1.45925	1.88526
Std Vapor Volumetric Flow	MMSCFD	10.0053	10 *	0.369132	0.368771	0.000360311
Std Liquid Volumetric Flow	sgpm	122.006	121.988	1.46269	1.45833	0.00435691
Compressibility		0.89545	0.89565	0.0313908	0.000754182	0.997237
Specific Gravity		0.594589	0.594575	0.998829	0.999272	0.616629
API Gravity				10.0945	10.0025	
Enthalpy	Btu/h	-3.63993E+07	-3.63247E+07	-4.98558E+06	-4.98412E+06	-1463.63
Thermal Conductivity	Btu/(h*ft*°F)	0.0205949	0.020663	0.342714	0.344777	0.0179878
Net Ideal Gas Heating Value	Btu/ft^3	958.896	959.443	0.929969	0.0257287	926.402
Net Liquid Heating Value	Btu/lb	21110.5	21123.7	-1039.13	-1059.16	19638.4
Gross Ideal Gas Heating Value	Btu/ft^3	1062.82	1063.4	51.2906	50.3367	1027.64
Gross Liquid Heating Value	Btu/lb	23400.6	23414.5	21.6809	0.597034	21789.6

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	
Flowsheet:	GLO 176 Wellpad	

Connections

	Water	1			
From Block	--	MIX-100			
To Block	MIX-100	Separator			

Stream Composition

Mole Fraction	Water %	1 %			
Methane	0 *	89.3619			
Ethane	0 *	5.79104			
Propane	0 *	0.588745			
Isobutane	0 *	0.0451175			
n-Butane	0 *	0.0565897			
Isopentane	0 *	0.00964049			
n-Pentane	0 *	0.00462744			
Nitrogen	0 *	0.331922			
Oxygen	0 *	0			
Carbon Dioxide	0 *	0.174011			
Hexane	0 *	0.0268006			
Water	100 *	3.60955			

Mass Flow	Water lb/h	1 lb/h			
Methane	0 *	16330			
Ethane	0 *	1983.53			
Propane	0 *	295.722			
Isobutane	0 *	29.8709			
n-Butane	0 *	37.4663			
Isopentane	0 *	7.923			
n-Pentane	0 *	3.80304			
Nitrogen	0 *	105.916			
Oxygen	0 *	0			
Carbon Dioxide	0 *	87.2337			
Hexane	0 *	26.308			
Water	740.723 *	740.723			

Volumetric Flow	Water gpm	1 ft^3/h			
Methane	0	8478.38			
Ethane	0	418.06			
Propane	0	32.4027			
Isobutane	0	1.80777			
n-Butane	0	2.07797			
Isopentane	0	0.145983			
n-Pentane	0	0.0832962			
Nitrogen	0	35.9521			
Oxygen	0	0			
Carbon Dioxide	0	14.6638			
Hexane	0	0.0830256			
Water	1.48093	16.6382			

Stream Properties

Property	Units	Water	1			
Temperature	°F	65 *	64.0335			
Pressure	psia	614.696 *	614.696			
Mole Fraction Vapor	%	0	96.4421			
Mole Fraction Light Liquid	%	100	3.55789			
Mole Fraction Heavy Liquid	%	0	0			
Molecular Weight	lb/lbmol	18.0153	17.2491			
Mass Density	lb/ft^3	62.3594	2.18309			
Molar Flow	lbmol/h	41.1164	1139.1			

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	
Flowsheet:	GLO 176 Wellpad	

Stream Properties

Property	Units	Water	1			
Mass Flow	lb/h	740.723	19648.4			
Vapor Volumetric Flow	ft^3/h	11.8783	9000.29			
Liquid Volumetric Flow	gpm	1.48093	1122.11			
Std Vapor Volumetric Flow	MMSCFD	0.374472	10.3745			
Std Liquid Volumetric Flow	sgpm	1.48076 *	123.469			
Compressibility		0.0315391	0.864185			
Specific Gravity		0.999846				
API Gravity		9.92622				
Enthalpy	Btu/h	-5.06012E+06	-4.13848E+07			
Thermal Conductivity	Btu/(h*ft*°F)	0.344737				
Net Ideal Gas Heating Value	Btu/ft^3	0	924.811			
Net Liquid Heating Value	Btu/lb	-1059.76	20287.4			
Gross Ideal Gas Heating Value	Btu/ft^3	50.3101	1026.83			
Gross Liquid Heating Value	Btu/lb	0	22531.8			

Remarks

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	Modified: 4:05 PM, 6/15/2016
Flowsheet:	GLO 176 Wellpad	Status: Solved 11:03 AM, 5/12/2017

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Water	Inlet		Inlet Gas Stream	Inlet	
1	Outlet	Separator			

Block Parameters

Pressure Drop	0 psi	Fraction to PStream 1	100 %

Remarks

Blocks
Separator
Separator Report

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	Modified: 4:09 PM, 6/15/2016
Flowsheet:	GLO 176 Wellpad	Status: Solved 11:03 AM, 5/12/2017

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
1	Inlet	MIX-100	Gas Oulet	Vapor Outlet	
PW Inlet	Light Liquid Outlet	Storage Tank			

Block Parameters

* Pressure Drop	5	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	96.4419	%	Heat Duty	0	Btu/h
Mole Fraction Light Liquid	3.55808	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	0	%	Heat Release Curve Increments	10	

Remarks

Blocks
Storage Tank
Separator Report

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	Modified: 4:10 PM, 6/15/2016
Flowsheet:	GLO 176 Wellpad	Status: Solved 11:03 AM, 5/12/2017

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
PW Inlet	Inlet	Separator	Tank Vapor	Vapor Outlet	
PW Outlet	Light Liquid Outlet				

Block Parameters

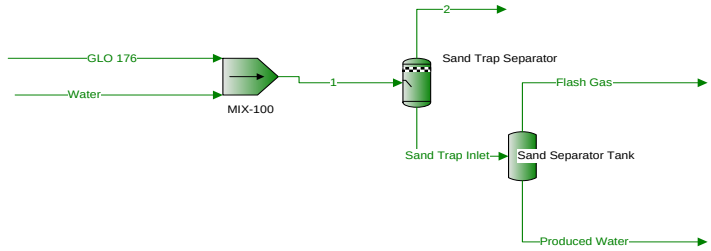
Pressure Drop	595	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0.0976105	%	Heat Duty	0	Btu/h
Mole Fraction Light Liquid	99.9024	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	0	%	Heat Release Curve Increments	10	

Remarks

Sand Separator Tank
Plant Schematic

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	
Flowsheet:	Sand Separator Tank	

EQT GLO 176
Sand Trap Blowdown Tank



Tank loss calculations for "Sand Trap Inlet".
Total working and breathing losses from the Horizontal Cylinder are 0.0004587 ton/yr.
Flashing losses are 0.002595 ton/yr.

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	
Flowsheet:	Sand Separator Tank	

Connections

	Flash Gas	GLO 176	Produced Water	Sand Trap Inlet	Water
From Block	Sand Separator Tank	--	Sand Separator Tank	Sand Trap Separator	--
To Block	--	MIX-100	--	Sand Separator Tank	MIX-100

Stream Composition

Mole Fraction	Flash Gas %	GLO 176 %	Produced Water %	Sand Trap Inlet %	Water %
Methane	87.9904	92.7083 *	0.00231939	0.0881686	0
Ethane	7.09368	6.0079 *	0.000294267	0.00721523	0
Propane	0.434147	0.610792 *	1.28484E-05	0.00043643	0
Isobutane	0.0214644	0.046807 *	4.74926E-07	2.14172E-05	0
n-Butane	0.0315013	0.0587088 *	8.52809E-07	3.15875E-05	0
Isopentane	0.00324407	0.0100015 *	6.53185E-08	3.23047E-06	0
n-Pentane	0.000575629	0.00480072 *	4.1967E-09	5.65829E-07	0
Nitrogen	0.182257	0.344352 *	2.33488E-06	0.000180159	0
Oxygen	0	0 *	0	0	0
Carbon Dioxide	2.17632	0.180527 *	0.00121791	0.00334014	0
Hexane	0.00199761	0.0278042 *	1.0265E-08	1.95931E-06	0
Water	2.06443	0 *	99.9962	99.9006	100

Mass Flow	Flash Gas lb/h	GLO 176 lb/h	Produced Water lb/h	Sand Trap Inlet lb/h	Water lb/h
Methane	0.0366965	16330 *	0.000990436	0.0376869	0
Ethane	0.0055451	1983.53 *	0.000235528	0.00578063	0
Propane	0.000497681	295.722 *	1.50809E-05	0.000512762	0
Isobutane	3.24325E-05	29.8709 *	7.34766E-07	3.31672E-05	0
n-Butane	4.7598E-05	37.4663 *	1.3194E-06	4.89174E-05	0
Isopentane	6.08468E-06	7.923 *	1.25443E-07	6.21013E-06	0
n-Pentane	1.07967E-06	3.80304 *	8.05969E-09	1.08773E-06	0
Nitrogen	0.00013273	105.916 *	1.74105E-06	0.000134471	0
Oxygen	0	0 *	0	0	0
Carbon Dioxide	0.00248993	87.2337 *	0.00142674	0.00391667	0
Hexane	4.4752E-06	26.308 *	2.35464E-08	4.49874E-06	0
Water	0.000966851	0 *	47.9519	47.9529	59.2091

Volumetric Flow	Flash Gas ft^3/h	GLO 176 ft^3/h	Produced Water gpm	Sand Trap Inlet gpm	Water gpm
Methane	0.859934	8500.19	4.82253E-06	0.000183132	0
Ethane	0.0689758	420.019	7.8499E-07	1.92338E-05	0
Propane	0.00420445	32.6511	4.30218E-08	1.46053E-06	0
Isobutane	0.00020713	1.8301	1.91711E-09	8.64113E-08	0
n-Butane	0.00030377	2.10675	3.3995E-09	1.25856E-07	0
Isopentane	3.11287E-05	0.151866	3.00957E-10	1.48782E-08	0
n-Pentane	5.52612E-06	0.0860972	1.93744E-11	2.61113E-09	0
Nitrogen	0.00178633	36.0164	4.63031E-09	3.5684E-07	0
Oxygen	0	0	0	0	0
Carbon Dioxide	0.0212176	14.7271	2.22418E-06	6.09487E-06	0
Hexane	1.91062E-05	0.101374	5.38055E-11	1.02661E-08	0
Water	0.0201431	0	0.0959217	0.0958546	0.118377

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production
Location:	GLO 176 Wellpad
Flowsheet:	Sand Separator Tank
Job:	GLO 176 Wellpad

Stream Properties

Property	Units	Flash Gas	GLO 176	Produced Water	Sand Trap Inlet	Water
Temperature	°F	65.116	65 *	65.116	63.6422	65 *
Pressure	psia	14.9459 *	614.696 *	14.9459	609.696	614.696 *
Mole Fraction Vapor	%	100	100	0	0	0
Mole Fraction Light Liquid	%	0	0	100	100	100
Mole Fraction Heavy Liquid	%	0	0	0	0	0
Molecular Weight	lb/lbmol	17.8563	17.2204	18.0156	18.0154	18.0153
Mass Density	lb/ft^3	0.0475216	2.09902	62.3244	62.2967	62.3594
Molar Flow	lbmol/h	0.00259967	1097.98	2.66184	2.66444	3.28661
Mass Flow	lb/h	0.0464205	18907.7	47.9546	48.001	59.2091
Vapor Volumetric Flow	ft^3/h	0.976828	9007.88	0.769436	0.770522	0.949482
Liquid Volumetric Flow	gpm	0.121786	1123.06	0.0959296	0.0960651	0.118377
Std Vapor Volumetric Flow	MMSCFD	2.36768E-05	10 *	0.024243	0.0242667	0.0299332
Std Liquid Volumetric Flow	sgpm	0.000286385	121.988	0.0958708	0.0961572	0.118363 *
Compressibility		0.99719	0.89565	0.000767129	0.0313956	0.0315391
Specific Gravity		0.616529	0.594575	0.999284	0.998841	0.999846
API Gravity				10.0026	10.0946	9.92622
Enthalpy	Btu/h	-96.0678	-3.63247E+07	-327660	-327756	-404477
Thermal Conductivity	Btu/(h*ft*°F)	0.0179873	0.020663	0.344734	0.342672	0.344737
Net Ideal Gas Heating Value	Btu/ft^3	926.905	959.443	0.0261972	0.930545	0
Net Liquid Heating Value	Btu/lb	19652.7	21123.7	-1059.15	-1039.12	-1059.76
Gross Ideal Gas Heating Value	Btu/ft^3	1028.18	1063.4	50.3371	51.2912	50.3101
Gross Liquid Heating Value	Btu/lb	21805	23414.5	0.607915	21.6943	0

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	
Flowsheet:	Sand Separator Tank	

Connections

	1	2			
From Block	MIX-100	Sand Trap Separator			
To Block	Sand Trap Separator	--			

Stream Composition

Mole Fraction	1 %	2 %			
Methane	92.4316	92.6556			
Ethane	5.98997	6.00448			
Propane	0.608969	0.610445			
Isobutane	0.0466673	0.0467805			
n-Butane	0.0585336	0.0586755			
Isopentane	0.00997165	0.00999583			
n-Pentane	0.00478639	0.004798			
Nitrogen	0.343324	0.344156			
Oxygen	0	0			
Carbon Dioxide	0.179988	0.180417			
Hexane	0.0277212	0.0277884			
Water	0.298438	0.0568737			

Mass Flow	1 lb/h	2 lb/h			
Methane	16330	16329.9			
Ethane	1983.53	1983.52			
Propane	295.722	295.722			
Isobutane	29.8709	29.8709			
n-Butane	37.4663	37.4662			
Isopentane	7.923	7.92299			
n-Pentane	3.80304	3.80304			
Nitrogen	105.916	105.916			
Oxygen	0	0			
Carbon Dioxide	87.2337	87.2298			
Hexane	26.308	26.308			
Water	59.2091	11.2563			

Volumetric Flow	1 ft^3/h	2 ft^3/h			
Methane	8477.13	8545.47			
Ethane	417.938	422.195			
Propane	32.3859	32.801			
Isobutane	1.80623	1.8367			
n-Butane	2.07598	2.1141			
Isopentane	0.145572	0.151744			
n-Pentane	0.0831019	0.0860617			
Nitrogen	35.9482	36.2052			
Oxygen	0	0			
Carbon Dioxide	14.669	14.8007			
Hexane	0.0817558	0.0980326			
Water	5.69905	4.95205			

Stream Properties

Property	Units	1	2			
Temperature	°F	63.9658	63.6422			
Pressure	psia	614.696	609.696			
Mole Fraction Vapor	%	99.7583	100			
Mole Fraction Light Liquid	%	0.241697	0			
Mole Fraction Heavy Liquid	%	0	0			
Molecular Weight	lb/lbmol	17.2228	17.2209			

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	
Flowsheet:	Sand Separator Tank	

Stream Properties

Property	Units	1	2			
Mass Density	lb/ft^3	2.11026	2.08802			
Molar Flow	lbmol/h	1101.27	1098.6			
Mass Flow	lb/h	18966.9	18918.9			
Vapor Volumetric Flow	ft^3/h	8987.96	9060.71			
Liquid Volumetric Flow	gpm	1120.58	1129.65			
Std Vapor Volumetric Flow	MMSCFD	10.0299	10.0057			
Std Liquid Volumetric Flow	sgpm	122.106	122.01			
Compressibility		0.892761	0.895385			
Specific Gravity			0.59459			
API Gravity						
Enthalpy	Btu/h	-3.67292E+07	-3.64015E+07			
Thermal Conductivity	Btu/(h*ft*°F)		0.0205918			
Net Ideal Gas Heating Value	Btu/ft^3	956.579	958.897			
Net Liquid Heating Value	Btu/lb	21054.4	21110.5			
Gross Ideal Gas Heating Value	Btu/ft^3	1060.37	1062.82			
Gross Liquid Heating Value	Btu/lb	23341.4	23400.6			

Remarks

Blocks
MIX-100
Mixer/Splitter Report

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	Modified: 1:16 PM, 4/4/2017
Flowsheet:	Sand Separator Tank	Status: Solved 11:03 AM, 5/12/2017

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
GLO 176	Inlet		Water	Inlet	
1	Outlet	Sand Trap Separator			

Block Parameters

Pressure Drop	0 psi	Fraction to PStream 1	100 %

Remarks

Blocks
Sand Separator Tank
Separator Report

Client Name:	EQT Production	Job: GLO 176 Wellpad	
Location:	GLO 176 Wellpad	Modified: 1:23 PM, 4/4/2017	
Flowsheet:	Sand Separator Tank	Status: Solved 11:03 AM, 5/12/2017	

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Sand Trap Inlet	Inlet	Sand Trap Separator	Flash Gas	Vapor Outlet	
Produced Water	Light Liquid Outlet				

Block Parameters

Pressure Drop	594.75	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	0.0975692	%	Heat Duty	0	Btu/h
Mole Fraction Light Liquid	99.9024	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	0	%	Heat Release Curve Increments	10	

Remarks

Blocks
Sand Trap Separator
Separator Report

Client Name:	EQT Production	Job: GLO 176 Wellpad
Location:	GLO 176 Wellpad	Modified: 1:22 PM, 4/4/2017
Flowsheet:	Sand Separator Tank	Status: Solved 11:03 AM, 5/12/2017

Connections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
1	Inlet	MIX-100	2	Vapor Outlet	
Sand Trap Inlet	Light Liquid Outlet	Sand Separator Tank			

Block Parameters

* Pressure Drop	5	psi	Main Liquid Phase	Light Liquid	
Mole Fraction Vapor	99.7581	%	Heat Duty	0	Btu/h
Mole Fraction Light Liquid	0.241943	%	Heat Release Curve Type	Plug Flow	
Mole Fraction Heavy Liquid	0	%	Heat Release Curve Increments	10	

Remarks

C6+ Gas Analysis Report

Gas Analytical
Stonewood, West Virginia
8444 Water Street
Stonewood, WV 26301-8006

Report Date: Dec 14, 2016 11:49a

Client:	EQT PRODUCTION	Date Sampled:	Dec 6, 2016
Client Code:	0555	Analysis Date:	Dec 13, 2016 12:00a
Site:	SHAVER 1H 518041	Collected By:	JH
Field:	940-WEST VIRGINIA	Date Effective:	Jan 1, 2017 12:00a
Meter:	518041	Sample Pressure (PSI):	60.0
Source Laboratory	Stonewood, WV	Sample Temp (°F):	70
Lab File No:	**516602841**	Field H2O (lb/MMSCFD):	
Cylinder No:	1		
Analysis Status:	good		
Sample Type:	Spot		
Measurement Analyst:	Ashley Free		

Component	Mol %	GPM @Contract PSIA
H2S		
Methane	92.6944	0.0000
Ethane	6.0070	1.6098
Propane	0.6107	0.1686
I-Butane	0.0468	0.0153
N-Butane	0.0587	0.0185
I-Pentane	0.0100	0.0037
N-Pentane	0.0048	0.0017
Nitrogen	0.3443	0.0000
Oxygen	0.0150	0.0000
Carbon Dioxide	0.1805	0.0000
Helium	0.0000	
Hexanes+	0.0278	0.0121
TOTAL	100.0000	1.8297

Analytical Results at Base Conditions (Real)	
BTU/SCF (Dry):	1,065.7982 BTU/ft³
BTU/SCF (Saturated):	1,047.5708 BTU/ft³
PSIA:	14.696 PSI
Temperature (°F):	60.0 °F
Z Factor (Dry):	0.99769
Z Factor (Saturated):	0.99734

Analytical Results at Contract Conditions (Real)	
BTU/SCF (Dry):	1,068.2697 BTU/ft³
BTU/SCF (Saturated):	1,050.0431 BTU/ft³
PSIA:	14.730 PSI
Temperature (°F):	60.0 °F
Z Factor (Dry):	0.99770
Z Factor (Saturated):	0.99734

Calculated Specific Gravities			
Ideal Gravity:	0.5947	Real Gravity:	0.5958
Molecular Wt:	17.2246	lb/lbmol	

Methods, standards, and uncertainties based on GPA 2261-13.
Analytical Calculations performed in accordance with GPA 2172-09.

Source	Date	Notes

ATTACHMENT U

Emission Summary Sheet

ATTACHMENT U – 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}		$PM_{2.5}$		CH_4		GHG (CO_2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
E001-E004 (S001-S004)	---	---	---	---	0.01	0.04	---	---	---	---	---	---	0.08	0.37	2.11	9.23
E005 (S005)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	0.00	0.01	180.18	789.20
E006 (S006)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	0.00	0.01	180.18	789.20
E007 (S007)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	0.00	0.01	180.18	789.20
E008 (S008)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	0.00	0.01	180.18	789.20
E009 (S009)	1.2E-03	5.4E-03	1.0E-03	4.5E-03	6.8E-05	3.0E-04	7.4E-06	3.2E-05	9.4E-05	4.1E-04	9.4E-05	4.1E-04	<0.01	<0.01	1.52	6.64
E010 (S010)	---	---	---	---	7.0E-04	3.1E-03	---	---	---	---	---	---	<0.01	<0.01	0.01	0.06
E011 (S011)	---	---	---	---	3.0E-03	7.8E-04	---	---	---	---	---	---	---	---	---	---
Fugitives	---	---	---	---	---	0.98	---	---	---	---	---	---	---	4.72	---	118.08
Haul Roads	---	---	---	---	---	---	---	---	---	0.10	---	0.01	---	---	---	---
Facility Total	0.59	2.57	0.49	2.16	0.05	1.16	3.5E-03	0.02	0.04	0.29	0.04	0.21	0.10	5.15	724.37	3,290.81
Facility Total (excl. fugitives)	0.59	2.57	0.49	2.16	0.05	0.19	3.5E-03	0.02	0.04	0.20	0.04	0.20	0.10	0.43	724.37	3,172.72

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.
According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

ATTACHMENT U – 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
E001-E004 (S001-S004)	---	---	---	---	---	---	---	---	---	---	6.8E-05	3.0E-04	6.8E-05	3.0E-04
E005 (S005)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E006 (S006)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E007 (S007)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E008 (S008)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E009(S009)	9.3E-07	4.1E-06	2.6E-08	1.1E-07	4.2E-08	1.8E-07	---	---	---	---	2.2E-05	9.7E-05	2.3E-05	1.0E-04
E010 (S010)	---	---	---	---	---	---	---	---	---	---	4.5E-06	2.0E-05	4.5E-06	2.0E-05
E011 (S011)	---	---	---	---	---	---	---	---	---	---	4.2E-06	1.1E-06	4.2E-06	1.1E-06
Fugitives	---	---	---	<0.01	---	<0.01	---	<0.01	---	<0.01	---	0.06	---	0.06
Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Facility Total	4.4E-04	1.9E-03	1.2E-05	5.4E-05	2.0E-05	8.7E-05	<0.01	<0.01	<0.01	<0.01	0.01	0.11	0.01	0.11
Facility Total (excl. fugitives)	4.4E-04	1.9E-03	1.2E-05	5.4E-05	2.0E-05	8.7E-05	<0.01	<0.01	<0.01	<0.01	0.01	0.05	0.01	0.05

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.
According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

ATTACHMENT V

Class I Legal Advertisement

RECOMMENDED PUBLIC NOTICE TEMPLATE

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that EQT Production Company has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-D General Permit Registration for an existing natural gas production facility, GLO 176, located 1 miles east of Coburn in Marion County, West Virginia. The latitude and longitude coordinates are: 39.588137°N, -80.438007°W.

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

Pollutant	Emissions in tpy (tons per year)
NOx	2.57
CO	2.16
VOC	0.19
SO_2	0.02
PM	0.29
Formaldehyde	1.9E-03
Benzene	5.4E-05
Toluene	8.7E-05
Ethylbenzene	<0.01
Xylene	<0.01
n-Hexane	0.11
Total HAPs	0.11
Carbon Dioxide Equivalents (CO_2e)	3,290.81

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

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.
Dated this the **(Day)** day of **(Month)**, 2017.

By: EQT Production Company
Mike Gavin, Vice President
625 Liberty Ave Suite 1700
Pittsburgh, PA 15222

ATTACHMENT W

General Permit Registration Application Fee