625 Liberty Ave, Suite 1700
Pittsburgh PA 15222
www.eqt.com

TEL: (412) 395-3699

R. Alex Bosiljevac
Environmental Coordinator

January 11, 2017

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

RE: G70-D General Permit Registration Application
EQT Production Company
OXF-121 Natural Gas Production Site
Permit No. R13-3047, Plant ID No. 017-00049

Dear Director Durham:

Enclosed are one (1) original hard copy and two (2) complete PDFs included on CD-ROM of a G70-D General Permit Registration Application for the OXF-121 natural gas production site. A legal advertisement will be published in Doddridge Independent 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 email at abosiljevac@eqt.com.

Sincerely,

RAB

R. Alex Bosiljevac
EQT Corporation

Enclosures

PROJECT REPORT

EQT Production
OXF 121 Wellpad

G70-D Permit Application

Where energy meets innovation.

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

November 2016

Trinity Consultants

Environmental solutions delivered uncommonly well

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EQT Production Company (EQT) is submitting this Class II General Permit (G70-D) to the West Virginia Department of Environmental Protection (WVDEP) for the construction and operation of new equipment at an existing natural gas production well pad, OXF-121, located in Doddridge County, West Virginia. The wellpad is currently permitted under R13-3047. This general permit application is to replace the fifteen (15) existing 210 barrel (bbl) storage tanks with six (6) new 400 bbl storage vessels and also convert the existing R13 permit to a G70-D.

1.1. FACILITY AND PROJECT DESCRIPTION

The OXF-121 wellpad is an existing natural gas production facility. Natural gas and liquids (including water and condensate) are extracted from deposits underneath the surface. Natural gas is transported from the wells to a gas line for additional processing and compression, as necessary. The liquids produced are stored in storage vessels.

The OXF 121 wellpad currently consists of the following equipment

- Fifteen (15) 210 barrel (bbl) storage tanks for condensate/water (produced fluids) controlled by one(1) combustor , rated at 11.66 MMbtu/hr;
- One(1) line heater each rated at 1.15 MMBtu/hr ;
- Two (2) thermoelectric generators (TEGs), each rated at 0.013 MMbtu/hr heat input;
- Produced fluid truck loading; and
- Associated piping and components

As part of this application, EQT seeks to permit the following at the OXF-12 pad:

- Six (6) 400 barrel (bbl) storage tanks for condensate/water(produced fluids), each controlled by the aforementioned combustor;

Additionally, EQT requests that the department consolidate all existing equipment associated with this wellpad and their requirements under the current R13-3047 permit in the proposed G70-D permit.

A process flow diagram is included as Attachment D. A comparison of the potential emissions of the proposed and existing 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	5.52	50
Carbon Monoxide	4.64	80
Volatile Organic Compounds	8.12	80
Particulate Matter – 10/2.5	0.42	20
Sulfur Dioxide	0.03	20
Individual HAP (n-hexane)[1]	0.53	8
Total HAP[1]	0.84	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 OXF-121 Pad for air permitting purposes if, and only if, all three elements of the "stationary source" definition above are fulfilled.

WVDEP determined that the OXF-121 pad is a separate stationary source when the current permit was issued. There are no Marcellus facilities within a quarter-mile radius of the OXF-121 Pad. Therefore, the OXF-121 pad should continue to 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:

- 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: 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 **(Not Applicable)**;
- 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;
- Attachment S: Air Pollution Control Device Data Sheet;
- Attachment T: Emission Calculations;
- Attachment U: Facility Wide Controlled Emissions Summary Sheet;
- Attachment V: Class I Legal Advertisement; and
- Attachment W: General Permit Registration Application Fee.

2. SAMPLE EMISSION SOURCE CALCULATIONS

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

Emissions from this project will result from natural gas combustion in the line heater, combustors and TEGs, 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 methods by which emissions from each of these source types, as well as the existing source types, are calculated are summarized below.

- **Line Heaters, Enclosed Combustors and TEGs:** 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 used 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. Controlled calculations assume an overall control efficiency (capture and destruction) of 98%. The throughput for the produced fluids tanks are based on the maximum annualized monthly condensate and produced water at the OXF-121 well pad (i.e., the maximum monthly throughput for the pad times 12), and includes a safety factor of 1.80. The composition for the analysis was from a sample taken at OXF-121. The produced fluids throughput is calculated as follows:

$$Throughput\ \left(\frac{bbl}{day}\right) = \left(Condensate\ Throughput\ \left(\frac{bbl}{month}\right) + \left(Produced\ Water\ Throughput\ \left(\frac{bbl}{month}\right)\right)\right) * \frac{12\left(\frac{months}{year}\right)}{365\left(\frac{days}{year}\right)} \text{ x } 1.80$$

- **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. Truck loading is controlled by the enclosed combustors. 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]

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[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 (PSD) 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 (PSD) SOURCE CLASSIFICATION

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration (PSD) and new and modified sources of non-attainment pollutants under Non-Attainment New Source Review (NNSR). PSD and NNSR 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 will remain a minor source with respect to the NSR program after the project since potential emissions are below all the NNSR/PSD thresholds. As such, NNSR/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 NSR/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 Code of State Regulations (CSR) 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP, and 100 tpy of all other regulated pollutants.[6]. 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.

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

3.3. NEW SOURCE PERFORMANCE STANDARDS

New Source Performance Standards (NSPS), 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 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 Subpart 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). The proposed tanks at the wellpad will each have a capacity of 16,800 gallons. As such, Subparts K, Ka, and Kb do not apply to the storage tank at the wellpad.

3.3.3. 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 (see clarification below regarding dates). This NSPS was published in the Federal Register on August 16, 2012, and subsequently amended. The proposed project does not include any source categories under NSPS Subpart OOOO or change any prior determinations related to NSPS Subpart OOOO. Therefore, this subpart is not applicable to the proposed project.

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

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

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

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

The proposed project will include six (6) produced fluid storage vessels at the wellpad. These tanks 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.

Note that the proposed changes to the well pad do not meet the definition of modification under 60.5365a(i)(3)(i). Therefore, EQT will be not be subject to the leak detection and repair program under OOOOa.

The pneumatic controllers will potentially 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.

3.3.5. Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas processing plants (Subpart OOOO) and 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 (NESHAP)

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 JJJJJJ – Industrial, Commercial, and Institutional Boilers

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

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 does not include a triethylene glycol dehydration unit; therefore the requirements of this subpart do not apply.

3.4.2. NESHAP 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 heater at the wellpad are natural gas-fired and is specifically exempt from this subpart. Therefore, no sources at the wellpad are subject to any requirements under this subpart.

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 TEGs and line heater 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 6: To Prevent and Control the Air Pollution from the Combustion of Refuse

45 CSR 6 applies to activities involving incineration of refuse, defined as "the destruction of combustible refuse by burning in a furnace designed for that purpose. For the purposes of this rule, the destruction of any combustible liquid or gaseous material by burning in a flare or flare stack, thermal oxidizer or thermal catalytic oxidizer stack shall be considered incineration." The enclosed combustor is an incinerator and therefore must comply with this regulation. Per 45 CSR 6-4.3, opacity of emissions from this unit shall not exceed 20 percent, except as provided by 4.4. PM emissions from this unit will not exceed the levels calculated in accordance with 6-4.1.

3.5.4. 45 CSR 16: Standards of Performance for New Stationary Sources

45 CSR 16-1 incorporates the federal Clean Air Act (CAA) standards of performance for new stationary sources set forth in 40 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.

3.5.5. 45 CSR 17: To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage and Other Sources of Fugitive Particulate Matter

According to 45 CSR 17-3.1:

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

Due to the nature of the activities at the 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.

3.5.6. 45 CSR 21-28: Petroleum Liquid Storage in Fixed Roof Tanks

45 CSR 21-28 applies to any fixed roof petroleum liquid storage tank with a capacity greater than 40,000 gallons. The capacity of each storage tank at the wellpad is less than 40,000 gallons; therefore, 45 CSR 21-28 will not apply to the storage tanks at the wellpad.

3.5.7. 45 CSR 34: Emissions Standards for Hazardous Air Pollutants

45 CSR 34-1 incorporates the federal Clean Air Act (CAA) national emissions standards for hazardous air pollutants (NESHAPs) as set forth in 40 CPR Parts 61 and 63 by reference. As noted above, no NESHAP are applicable.

3.5.8. 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 (UPDATE)
☐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: OXF-121 Wellpad

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

City: New Milton	Zip Code: 26411	County: Doddridge

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 39.136081
Longitude: -80.821946

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities) 017-00049

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 Michael 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: Michael Gavin, Vice President Phone: Fax:
Email: gavinm@eqt.com Date: 12/20/16

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: General permit application for an existing natural gas production well pad and installation of six (6) 400 barrel produced fluids tanks.
Directions to the facility: From New Milton, WV Head northwest on Meathouse Fork toward Co Rte 25/2 for 1.2 miles. Turn left onto WV-18 S and continue 9.8 miles. Turn right onto Grove Summers Rd and continue for 5.9 miles. Turn left onto Sugar Run and continue straight onto Summers Rd Brushy Fork for 0.7 miles. Turn left onto Co Rd 22/3 for 0.4 miles. Continue onto Elklick Run for 1.1 miles and arrive at the wellpad.

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 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

ATTACHMENT C – CURRENT BUSINESS CERTIFICATE

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

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

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

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
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.

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ATTACHMENT D

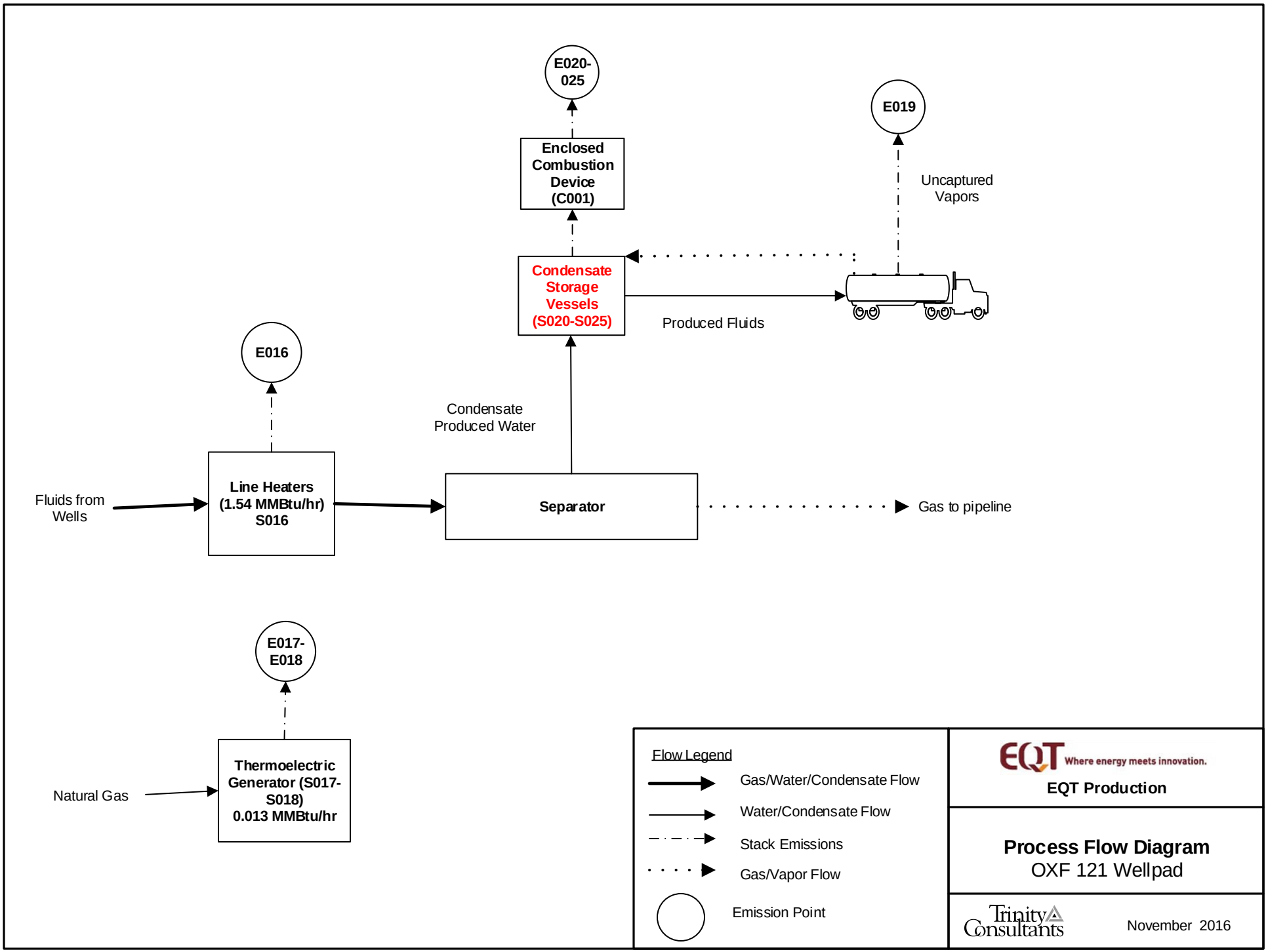
Process Flow Diagram

ATTACHMENT D – PROCESS FLOW DIAGRAM

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

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

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


E020-025
E019
Enclosed Combustion Device (C001)
Uncaptured Vapors
Condensate Storage Vessels (S020-S025)
Produced Fluids
E016
Condensate Produced Water
Fluids from Wells
Line Heaters (1.54 MMBtu/hr) S016
Separator
Gas to pipeline
E017-E018
Natural Gas
Thermoelectric Generator (S017-S018) 0.013 MMBtu/hr
Flow Legend
Gas/Water/Condensate Flow
Water/Condensate Flow
Stack Emissions
Gas/Vapor Flow
Emission Point
EQT Where energy meets innovation.
EQT Production
Process Flow Diagram
OXF 121 Wellpad
Trinity Consultants
November 2016

ATTACHMENT E

Process Description

ATTACHMENT E – PROCESS DESCRIPTION

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

Use the following guidelines to ensure a complete Process Description:

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

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

ATTACHMENT E – PROCESS DESCRIPTION

EQT is submitting this application to permit the installation of six (6) 400 bbl condensate tanks to replace the existing fifteen (15) 210 bbl storage tanks at the wellpad. The OXF 121 wellpad is currently authorized to operate under R13-3047.

The OXF-121 wellpad consists of five (5) wells, each with the basic operation. The incoming gas/liquid stream from the underground well will pass through a line heater (S016) to raise/maintain temperature of the stream and prevent hydrate formation. The stream will then pass through a high pressure separator, which will separate gas (natural gas from the separator is sent to the sales line) from liquids (condensate and produced water). The liquids are then transferred to the produced fluids tank (S001-S015)

Emissions from the storage vessels are controlled by a single enclosed combustor (C001). Once the tanks are filled, the contents are loaded into trucks for transport (S019). EQT utilizes vapor balancing in the truck loading operations, which means the vapors displaced by the filling of tanker trucks are routed back into the battery of tanks and ultimately to the combustor. Facility electricity is provided a pair of thermoelectric generators (S017-S018), respectively.

A process flow diagram is included as Attachment D.

ATTACHMENT F

Plot Plan

ATTACHMENT F – PLOT PLAN

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

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

Use the following guidelines to ensure a complete Plot Plan:

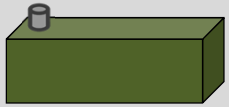
- Facility name
- Company name
- Company facility ID number (for existing facilities)
- Plot scale, north arrow, date drawn, and submittal date.
- Facility boundary lines
- Base elevation
- Lat/Long reference coordinates from the area map and corresponding reference point elevation
- Location of all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

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

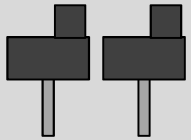
NOTE: This diagram is not to scale. Locations and distances between surface equipment are not known at this time.

Entrance to OXF-121 pad

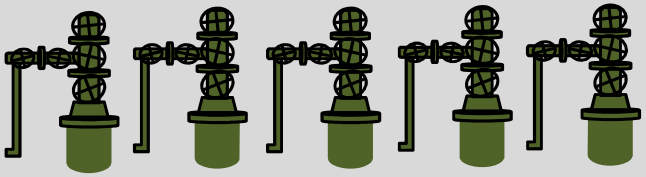
Production Units w/ In-Line Heaters (1) S016



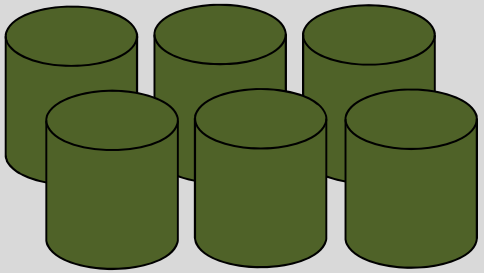
Thermoelectric Generators (2) S017-S018



Wellheads (5)



Combustor 11.66 MMBTU/hr C001



Produced Fluid Tanks 400 bbl (6) S020-S025

Attachment F

OXF-121 Well Pad Plot Plan

ATTACHMENT G

Area Map

ATTACHMENT G – AREA MAP

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

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

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

ATTACHMENT G

Figure 1 - Map of OXF-121 Location

Note – Ring represents 300 ft radius around wellpad equipment.

UTM Northing (KM)	4,331.892
UTM Easting (KM)	515.388
Elevation (m)	261

ATTACHMENT H

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	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S002	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S003	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S004	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S005	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S006	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S007	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S008	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S009	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S010	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S011	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S012	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S013	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S014	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S015	C001	Condensate Storage Tank	2010	2010	210 bbl	Existing – To be removed	C001	--
S016	E016	Line Heater	2010	2010	1.15 MMBtu/hr	Existing; No change	Existing; No change	--
S017	E017	Thermoelectric Generator	2010	2010	0.013 MMBtu/hr	Existing; No change	None	--
S018	E018	Thermoelectric Generator	2010	2010	0.013 MMBtu/hr	Existing; No change	None	--
S019	E019 (Uncaptured) C001 (Controlled, Captured)	Uncaptured Liquid Loading	2010/2016	2010/2016	2,111,540	Modified; Increased Throughput	C001	--
S020	C001	Produced fluid tank	TBD	TBD	400 bbl	New	C001	--
S021	C001	Produced fluid tank	TBD	TBD	400 bbl	New	C001	--
S022	C001	Produced fluid tank	TBD	TBD	400 bbl	New	C001	--
S023	C001	Produced fluid tank	TBD	TBD	400 bbl	New	C001	--
S024	C001	Produced fluid tank	TBD	TBD	400 bbl	New	C001	--
S025	C001	Produced fluid tank	TBD	TBD	400 bbl	New	C001	--
C001	C001	Combustor	2010	2010	11.66 MMBtu/hr	Existing; No change	N/A	--

[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	9	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☐ Gas ☒ Liquid ☐ Both	1.73	0.05	0.33
Valves	☐ Yes ☒ No	179	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☒ Gas ☐ Liquid ☐ Both	1.71	0.05	17.64
Safety Relief Valves	☐ 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	2.25	0.07	1.98
Open Ended Lines	☐ 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	0.02	6.4E-04	1.67
Sampling Connections	☐ Yes ☐ No	---	N/A	☐ Gas ☐ Liquid ☐ Both	--	--	--
Connections (Not sampling)	☐ Yes ☒ No	765	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	2.24	0.07	8.40
Compressors	☐ Yes ☐ No	---	N/A	☐ Gas ☐ Liquid ☐ Both	--	--	--
Flanges	☐ Yes ☐ No	---	(included in connections)	☐ Gas ☐ Liquid ☐ Both	--	--	--
Other[1]	☐ Yes ☒ No	25	40 CFR 98 Subpart W	☒ Gas ☐ Liquid ☐ Both	4.41	0.14	183.05

[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?
047-017-05847	1/29/2010	1/25/2010	Green	None
047-017-05791	2/1/2010	1/29/2010	Green	None
047-017-05849	2/22/2010	2/19/2010	Green	None
047-017-05792	3/26/2010	3/24/2010	Green	None
047-017-05848	3/27/2010	3/26/2010	Green	None

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 OXF-121 Wellpad	2. Tank Name Produced Fluid Tanks (water and condensate)
3. Emission Unit ID number S020-S025	4. Emission Point ID number C001
5. Date Installed , Modified or Relocated *(for existing tanks)* N/A (new 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: ☒ New construction ☐ New stored material ☐ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)*	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 8-42 below are not required.***	

TANK INFORMATION

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 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**	13B. Maximum daily throughput (gal/day) **See attached emissions calculations**
14. Number of tank turnovers per year **See attached emissions calculations**	15. Maximum tank fill rate (gal/min) **See attached emissions calculations**
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 12.5 oz Pressure Setting

☒ Emergency Relief Valve (psig)

Vacuum Setting 14.4 oz Pressure Setting

☐ Thief Hatch Weighted ☐ Yes ☒ No – Cashco Lockdown Hatch

[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: Green	21B. Roof Color: Green	21C. Year Last Painted: New	
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): 0.06	
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.			

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]
S016	E016	Line Heater	2010	Existing; No Change	1.15	1,050
S017	E017	Thermoelectric Generator	2010	Existing; No Change	0.013	1,050
S018	E018	Thermoelectric Generator	2010	Existing; No Change	0.013	1,050

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

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

3 New, modification, removal

4 Enter design heat input capacity in MMBtu/hr.

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

ATTACHMENT N

Engines Data Sheet *(Not Applicable)*

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 ☐
Calculation Methodology[9]	**Pollutant[10]**	**Hourly PTE (lb/hr)[11]**	**Annual PTE (tons/year)[11]**	**Hourly PTE (lb/hr)[11]**	**Annual PTE (tons/year)[11]**	**Hourly PTE (lb/hr)[11]**	**Annual PTE (tons/year)[11]**
	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 NOT APPLICABLE (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:	
Manufacturer:	Model #:
Design Operating Temperature:	Design gas volume: scfm
Service life of catalyst:	Provide manufacturer data? ☐Yes ☐ No
Volume of gas handled: acfm at °F	Operating temperature range for NSCR/Ox Cat: From °F to °F
Reducing agent used, if any:	Ammonia slip (ppm):
Pressure drop against catalyst bed (delta P):	
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#: S019	Emission Point ID#: E019	Year Installed/Modified: 2008/2016
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. N/A		
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		

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]		EPA 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

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:	Make/Model:
Primary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No
Secondary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No

VAPOR COMBUSTION
(Including Enclosed Combustors)

General Information

Control Device ID#: C001	Installation Date:2010 ☐ New ☐ Modified ☐ Relocated	
Maximum Rated Total Flow Capacity ~7,860 scfh ~188,380 scfd	Maximum Design Heat Input (from mfg. spec sheet) 11.66 MMBTU/hr	Design Heat Content 1,500 BTU/scf

Control Device Information

Type of Vapor Combustion Control?

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

Manufacturer: Leed Fabrication Model: Enclosed Combustor 48''	Hours of operation per year? 8760

List the emission units whose emissions are controlled by this vapor control device
(Emission Point ID# S019, S020-S025)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
S020-S025	Produced Fluid Tanks		
S019	Liquid Loading		

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	~25 feet	~4 feet	☐ Yes ☐ No ☒ N/A Provide determination.

Waste Gas Information

Maximum Waste Gas Flow Rate 130 (scfm)	Heat Value of Waste Gas Stream Varies 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	Will automatic re-ignition be used?
1	50 scfh	0.05 BTU/hr	☐ 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.

		Item/Tag No.:		Page	1	of	2
		Project No.:		Revision:	B		
		Project:		Date:	27 February 2014		
	Enviromental Control Equipment Data Sheet			By:	JS		
		P.O. No.:	-	Checked:	SG		
		RFQ No.:	-	Approved:	MS		
	Client:	Ref. P&ID:	-				
	Site:			Supplier:	LEED FABRICATION		
	Unit/Lease:	Remarks:	-	Model No.:	L30-0011-00		

GENERAL

1	Design Code:		NDE:	LEED Fabrication Standards
2	Service:		Customer Specs:	☐ Yes
3	Description:	Standard Dual Stage 48 High Efficiency Combustor		☑ No

PROCESS DATA

	Gas Composition:	mol %	Process Conditions: Variable	Value	Units
4	Methane		Flow Rate	Up to 140	Mscfd
5	Ethane		Pressure	Up to 12	oz/in2
6	Propane		Temperature		°F
7	I-Butane		Molecular Weight		
8	n-Butane		Process/Waste Stream	☑ Gas	☐ Liquid
9	I-Pentane		Detailed Process Description / Process Notes:		
10	n-Pentane		1. Turndown 10:1. Based on an expected normal operating rate indicated above.		
11	n-Hexane		2. DRE: 98 % operating at design conditions		
12	CO2		3. Burner Pressure Drop: Min. 0.10 oz/in2		
13	N2				
14	Helium				
15	H_2O				
16	C7				
17	C8				
18	C9				
19	C10				
20	C11+				
21	TOTAL				

	Other Components:	PPMV	Available Utilities:	
22	H2S		Fuel / Pilot Gas	Min. 30psig Natural Gas /Propane 40-50 SCFH
23	Benzene		Instrument Air	NA
24	Toluene		Power	120 V / 60 Hz or Solar Power
25	E-Benzene		Steam	NA
26	Xylene		Purge Gas	

DESIGN DATA

27	Ambient Temperatures:		Noise Performance Requirements:	Under 85 dBA
28	Low, °F	-20	Structural Design Code:	
29	High, °F	120	Wind Design Code:	ASCE
30	Design Conditions: Pressure/Temperature			
31	Max. Relative Humidity, %	90	Pressure/Speed	100 mph
32	Elevation (ASL), ft		Category	
33	Area Classification:	Class I Div 2	Seismic Design Code:	
34	Electrical Design Code:	NEC	Location	

EQUIPMENT SPECIFICATION

35	Type:	☐ Elevated ☑ Enclosed	Equipment Design:	
36		☐ Above Ground	Component	Material / Size / Rating / Other
37		☑ Stack ☐ Multiple Stack	Burner	
38		☐ Portable / Trailer	Burner Tip / Assist Gas Burner	304 SS
39			Burner Body	Carbon Steel
40	Smokeless By:	☐ Steam ☐ Assist Air	Pilot	
41		☐ Gas Assist ☑ Staging	Pilot Tip	304 SS
42			Pilot Line(s)	Carbon Steel
43	Stack:	☑ Self Supporting	Firebox / Stack	
44	Flare Burner:	☐ Non-Smokeless ☑ Smokeless ☐ Gas Assist	Shell	Carbon Steel
45	Pilot:	☑ Intermittent ☐ Continuous	Piping	Carbon Steel
46	Pilot Air Inspirator:	☑ Local ☐ Remote	Nozzles	Carbon Steel
47	Pilot Flame Control:	☐ No ☑ Yes (Thermocouple)	Flanges	Carbon Steel
48			Insulation	Blanket
49	Pilot Ignition:	☐ Flamefront Generator ☑ Inspirating Ignitor	Insulation Pins	304 SS
50		☐ Electronic ☑ Automatic ☐ Manual	Refractory	NA
51		☐ With Pilot Flame Control	Refractory Anchors	NA
52		☐ With Auto Pilot Re-Ignition	Ladders and Platforms	NA
53			Stack Sample Connections	Per EPA requirements
54	Pilot Ignition Backup:	☐ Manual Specify: i.e Piezo-Electric	Sight Glass	2
55		☐ Battery Pack	Other	

Environmental Control Equipment
Data Sheet

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Client:		**Ref. P&ID:**	-		
Site:		**Supplier:**	LEED FABRICATION		
Unit/Lease:		**Remarks:**	-	**Model No.:**	L30-0011-00

EQUIPMENT SPECIFICATION

Flame Detection: ☐ Thermocouple ☑ Ionization Rod ☐ UV Scanner

General Configuration:

Auxiliary Equipment	
Valves	NA
Blowers	NA
Dampers	NA
Inlet KO / Liquid Seal	NA
Flame / Detonation Arrestor	Yes
Instrumentation & Controls	
Solenoids / Shut-Off Valves	Check with Sales for available config.
Flow Meters	NA
Calorimeter	NA
Pressure Switches/Transmitters	NA
Thermocouples	Check with Sales for available config.
Temperature Switches/Transmitters	NA
BMS	Check with Sales for available config.
CEMS	NA
Other	NA

FABRICATION AND INSPECTION

Special requirements	☐ Skid Mounted ☑ Concrete Pad ☐ Other
Inspection	☑ Vendor Standard ☐ Other. Specify:
Material Certification	☑ Vendor Standard ☐ MTR ☐ Certificate of Compliance ☐ Other (Specify):
NDE	☑ Vendor Standard ☐ Radiography. Specify: ☐ Ultrasonic. Specify: ☐ Liquid Penetrant. ☐ Magnetic Particles. ☐ PMI. Specify: ☐ Other. Specify:
Surface Preparation	☑ Vendor Standard ☐ Other. Specify:
Paint System	☑ Vendor Standard ☐ Other. Specify:
Finished Color	☑ Vendor Standard ☐ Other. Specify:

Equipment Info	
Component	**Weight / Dimensions**
Burner	
Burner Assembly	
Stack	
Stack Assembly	48 " OD x 25 ' H
Pilot Tip	
Pilot Line(s)	
Stack Assembly	
Auxiliary Equipment	
Blowers	
Inlet KO / Liquid Seal	
Flame / Detonation Arrestor	
Skid	
Instrumentation & Controls	
BMS	
Control Panel	

Additional Notes:

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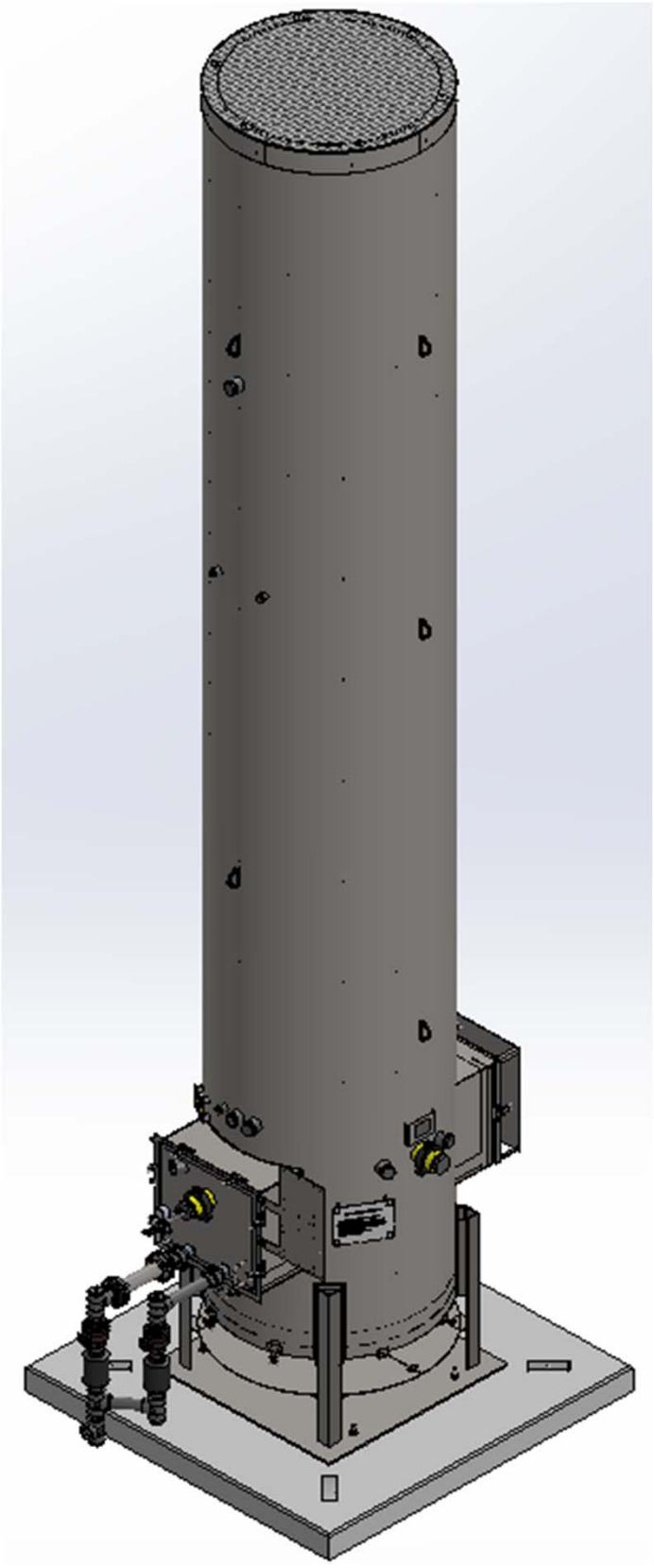
				By:	JS		
Environmental Control Equipment Data Sheet		P.O. No.:	-	Checked:	SG		
		RFQ No.:	-	Approved:	MS		
Client:		Ref. P&ID:	-				
Site:				Supplier:	LEED FABRICATION		
Unit/Lease:		Remarks:	-	Model No.:	L30-0011-00		

GENERAL ARRANGEMENT



ATTACHMENT T

Emission Calculations

ATTACHMENT T – EMISSIONS CALCULATIONS

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

Use the following guidelines to ensure complete emission calculations:

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

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

Company Name: **EQT Production, LLC**
Facility Name: **OXF 121 Pad**
Project Description: **G70-D Application**

Facility-Wide Emission Summary - Controlled

Wells	5	per pad
Storage Tanks	6	per pad
Sand Separator Tank	0	per pad
Line Heaters	1	per pad
TEGs	2	per pad
Dehy Reboiler	0	per pad
Glycol Dehy	0	per pad
Dehy Drip Tank	0	per pad
Dehy Combustor	0	per pad
Compressor	0	per pad
High Pressure Separator	5	per pad
Low Pressure Separator	0	per pad
Vapor Recovery Unit	0	per pad
Tank Combustor	1	per pad
Length of lease road	2,405	feet

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

CO_2	1
CH_4	25
N_2O	298

Emission Point ID #	Emission Source ID#s	Emission Source Description	NO_X		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		CH_4		CO_2e	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
C001	S020-S025	Storage Vessels	---	---	---	---	1.55	6.79	---	---	---	---	---	---	0.165	0.724	4.13	18.10
C001	S019	Captured Liquid Loading	---	---	---	---	0.22	0.06	---	---	---	---	---	---	---	---	---	---
C001	C001	Tank Combustor	1.15	5.03	0.96	4.22	2.8E-04	1.2E-03	0.01	0.03	0.09	0.38	0.09	0.38	1.2E-04	5.1E-04	1,371.10	6,005.43
C001	**S020-S025**	**---**	**1.15**	**5.03**	**0.96**	**4.22**	**1.77**	**6.85**	**0.01**	**0.03**	**0.09**	**0.38**	**0.09**	**0.38**	**0.17**	**0.72**	**1,375.24**	**6,023.53**
E016	S016	Line Heater	0.11	0.48	0.09	0.40	0.01	0.03	6.6E-04	2.9E-03	0.01	0.04	0.01	0.04	2.5E-03	0.01	135.14	591.90
E017	S017	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	9.4E-05	4.1E-04	9.4E-05	4.1E-04	2.9E-05	1.3E-04	1.52	6.64
E018	S018	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	9.4E-05	4.1E-04	9.4E-05	4.1E-04	2.9E-05	1.3E-04	1.52	6.64
E019	S019	Uncaptured Liquid Loading	---	---	---	---	4.79	1.25	---	---	---	---	---	---	---	---	---	---
---	---	Fugitives	---	---	---	---	---	12.36	---	---	---	---	---	---	---	8.52	---	213.07
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	0.30	---	0.03	---	---	---	---
Facility Total			1.26	5.52	1.06	4.64	6.57	20.48	0.01	0.03	0.10	0.72	0.10	0.45	0.17	9.26	1,513.41	6,841.79
Facility Total (excluding fugitive emissions)			1.26	5.52	1.06	4.64	6.57	8.12	0.01	0.03	0.10	0.42	0.10	0.42	0.17	0.74	1,513.41	6,628.72

1. Emissions routed to combustors are divided evenly by the total number of combustors (i.e., Combustor Point Emissions = [storage tanks emissions + captured loading emissions] / [number of combustors] + combustor emissions). However, emissions can be routed to either combustor.

Company Name: EQT Production, LLC
Facility Name: OXF 121 Pad
Project Description: G70-D 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
C001	S020-S025	Storage Vessels	---	---	1.6E-03	7.1E-03	3.5E-03	1.6E-02	9.7E-05	4.3E-04	1.5E-03	6.6E-03	0.06	0.27	0.01	0.03	0.09	0.38
C001	S019	Captured Liquid Loading	---	---	1.3E-04	3.5E-05	2.8E-04	7.2E-05	8.5E-06	2.2E-06	1.7E-04	4.4E-05	0.01	2.2E-03	5.9E-04	1.5E-04	0.01	2.9E-03
C001	C001	Tank Combustor	---	---	---	---	---	---	---	---	---	---			---	---	---	---
C001	**S020-S025**		---	---	**1.8E-03**	**7.2E-03**	**3.8E-03**	**1.6E-02**	**1.1E-04**	**4.3E-04**	**1.7E-03**	**6.6E-03**	**0.07**	**0.28**	**0.01**	**0.03**	**0.10**	**0.38**
E016	S016	Line Heater	8.2E-05	3.6E-04	2.3E-06	1.0E-05	3.7E-06	1.6E-05	---	---	---	---	2.0E-03	0.01	6.0E-06	2.6E-05	2.1E-03	0.01
E017	S017	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
E018	S018	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
E019	S019	Uncaptured Liquid Loading	---	---	2.9E-03	7.4E-04	0.01	1.5E-03	1.8E-04	4.8E-05	3.6E-03	9.5E-04	0.18	0.05	0.01	3.3E-03	0.24	0.06
---	---	Fugitives	---	---	---	0.01	---	0.01	---	<0.01	---	0.01	---	0.20	<0.01	0.02	---	0.39
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	<0.01	<0.01	---	---
Facility Total			8.4E-05	3.7E-04	4.6E-03	0.01	0.01	0.03	2.9E-04	4.7E-04	0.01	0.01	0.25	0.53	0.02	0.06	0.34	0.84
Facility Total (excluding fugitive emissions)			8.4E-05	3.7E-04	4.6E-03	0.01	9.7E-03	1.7E-02	2.9E-04	4.7E-04	5.3E-03	7.6E-03	0.25	0.33	0.02	0.03	0.34	0.45

1. Emissions routed to combustors are divided evenly by the total number of combustors (i.e., Combustor Point Emissions = [storage tanks emissions + captured loading emissions] / [number of combustors] + combustor emissions). However, emissions can be routed to either combustor.

Company Name: EQT Production, LLC
Facility Name: OXF 121 Pad
Project Description: G70-D Application

Produced Fluids Storage Vessels

Potential Throughput

Operational Hours	8,760	hrs/yr
Maximum Condensate Throughput[1]	40	bbl/day
Maximum Produced Water Throughput[1]	98	bbl/day

[1] Based on the highest monthly throughput recorded at the site (August 2013). Includes a 80 percent compliance margin

Overall Control Efficiency of Combustor 98%

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	8.265	36.201	8.265	36.201
Ethane	<0.001	<0.001	<0.001	<0.001	12.558	55.006	12.558	55.006
Propane	0.336	1.472	0.594	2.603	23.082	101.100	24.013	105.175
Isobutane	0.090	0.393	0.159	0.694	6.788	29.730	7.036	30.817
n-Butane	0.219	0.959	0.387	1.696	16.703	73.160	17.309	75.815
Isopentane	0.090	0.395	0.159	0.698	7.253	31.770	7.503	32.863
n-Pentane	0.088	0.386	0.156	0.683	7.454	32.650	7.699	33.720
n-Hexane	0.036	0.159	0.064	0.281	3.039	13.310	3.139	13.749
Cyclohexane	0.003	0.013	0.005	0.022	0.324	1.420	0.332	1.455
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	0.037	0.161	0.065	0.284	3.368	14.750	3.469	15.195
n-Octane	0.008	0.034	0.014	0.060	0.742	3.249	0.763	3.342
n-Nonane	0.002	0.007	0.003	0.013	0.167	0.734	0.172	0.754
n-Decane	0.002	0.007	0.003	0.012	0.163	0.713	0.167	0.732
n-Undecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dodecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Triethylene Glycol	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Isohexane	0.053	0.234	0.094	0.414	4.575	20.040	4.723	20.688
3-Methylpentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2,3-Dimethylbutane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methylcyclohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Decane, 2-Methyl-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	0.001	0.003	0.001	0.004	0.080	0.349	0.081	0.356
Toluene	0.001	0.005	0.002	0.009	0.174	0.762	0.177	0.776
Ethylbenzene	3.7E-05	1.6E-04	6.6E-05	2.9E-04	0.005	0.021	0.005	0.021
m-Xylene	0.001	0.003	0.001	0.006	0.073	0.320	0.075	0.329
Isooctane	0.009	0.041	0.016	0.072	0.835	3.657	0.861	3.770
Total VOC Emissions:	0.97	4.27	1.72	7.55	74.83	327.73	77.52	339.56
Total HAP Emissions:	4.8E-02	0.21	0.08	0.37	4.21	18.42	4.34	19.00

[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.
[2] Emission calculations based on OXF -121 condensate sample

Company Name: EQT Production, LLC
Facility Name: OXF 121 Pad
Project Description: G70-D Application

Produced Fluids Storage Vessels

Storage Tanks - Controlled

	Breathing		Working		Flashing		Total Emissions	
	lb/hr	tpy			lb/hr	tpy	lb/hr	tpy
Methane	<0.001	<0.001	<0.001	<0.001	0.165	0.724	0.165	0.724
Ethane	<0.001	<0.001	<0.001	<0.001	0.251	1.100	0.251	1.100
Propane	0.007	0.029	0.012	0.052	0.462	2.022	0.480	2.104
Isobutane	0.002	0.008	0.003	0.014	0.136	0.595	0.141	0.616
n-Butane	0.004	0.019	0.008	0.034	0.334	1.463	0.346	1.516
Isopentane	0.002	0.008	0.003	0.014	0.145	0.635	0.150	0.657
n-Pentane	0.002	0.008	0.003	0.014	0.149	0.653	0.154	0.674
n-Hexane	0.001	0.003	0.001	0.006	0.061	0.266	0.063	0.275
Cyclohexane	5.7E-05	2.5E-04	1.0E-04	4.4E-04	0.006	0.028	0.007	0.029
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	0.001	0.003	0.001	0.006	0.067	0.295	0.069	0.304
n-Octane	1.5E-04	0.001	2.7E-04	0.001	0.015	0.065	0.015	0.067
n-Nonane	3.3E-05	1.5E-04	5.9E-05	2.6E-04	0.003	0.015	0.003	0.015
n-Decane	3.0E-05	1.3E-04	5.3E-05	2.3E-04	0.003	0.014	0.003	0.015
n-Undecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dodecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Triethylene Glycol	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Isohexane	0.001	0.005	0.002	0.008	0.092	0.401	0.094	0.414
3-Methylpentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2,3-Dimethylbutane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methylcyclohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Decane, 2-Methyl-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	1.2E-05	5.1E-05	2.1E-05	9.0E-05	0.002	0.007	0.002	0.007
Toluene	2.4E-05	1.1E-04	4.3E-05	1.9E-04	0.003	0.015	0.004	0.016
Ethylbenzene	7.4E-07	3.3E-06	1.3E-06	5.8E-06	9.5E-05	4.2E-04	9.7E-05	4.3E-04
m-Xylene	1.5E-05	6.5E-05	2.6E-05	1.1E-04	0.001	0.006	0.002	0.007
Isooctane	1.9E-04	0.001	3.3E-04	0.001	0.017	0.073	0.017	0.075
Total VOC Emissions:	1.9E-02	0.09	0.03	0.15	1.50	6.55	1.55	6.79
Total HAP Emissions:	9.6E-04	4.2E-03	1.7E-03	7.4E-03	8.4E-02	0.37	0.09	0.38

Company Name: EQT Production, LLC
Facility Name: OXF 121 Pad
Project Description: G70-D Application

Tank Combustor

Source Designation:	**C001**
Pilot Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,050
Pilot Rating (MMBtu/hr)	0.05
Combustor Rating (MMBtu/hr) [1]	11.66
Combustor Rating (Mscfd) [1]	188.38
Combustor Rating (scf/hr)	7849.17
Pilot Fuel Consumption (scf/hr):	50.00
Potential Annual Hours of Operation (hr/yr):	8,760

[1] Maximum heat input for 48" model from Leed Enclosed Combustor Operations Manual

Enclosed Combustor Emissions

Pollutant	Emission Factors [2] (lb/MMBtu)	Combustor (lb/hr)	Combustor (tpy)	Pilot (lb/hr)	Pilot (tpy)	Total (lb/hr)	Total (tpy)
NO_x	0.10	1.14	5.01	5.1E-03	0.02	1.15	5.03
CO	0.08	0.96	4.21	4.3E-03	0.02	0.96	4.22
VOC	5.4E-03	---	---	2.8E-04	1.2E-03	0.00	0.00
SO_2	5.9E-04	0.01	0.03	3.1E-05	1.4E-04	0.01	0.03
PM/PM_{10}	0.01	0.09	0.38	3.9E-04	1.7E-03	0.09	0.38
CO_2	117.00	1364.189	5975.146	6.14	26.90	1370.33	6002.05
CH_4	2.2E-03	---	---	1.2E-04	5.1E-04	0.00	0.00
N_2O	2.2E-04	2.6E-03	0.01	1.2E-05	5.1E-05	2.6E-03	0.01

[2] Emission factors from AP-42 Ch. 1.4 for natural gas combustion were used as they were determined to be most representative of the process. Ch. 5.3 (Natural Gas Processing) was consulted, however, factors contained there are appropriate for amine gas sweetening processes, which is not the case at the wellpad. Also, Ch. 13.5 (Industrial Flares) was consulted, but since the control device in this case is an enclosed combustor vs. an elevated flare, these factors were also determined to be inappropriate.

Combustor Maximum Loading:

$$\frac{7849.17\ \text{scf}}{\text{hr}} \left| \frac{\text{lb-mol}}{379.5\ \text{scf}} \right| \frac{20.44\ \text{lb}}{\text{lb-mol}} = 422.66\ \text{lb/hr}$$

Company Name: EQT Production, LLC
Facility Name: OXF 121 Pad
Project Description: G70-D Application

Line Heaters

Source Designation:	**S016**
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,050
Heat Input (MMBtu/hr)	1.15
Fuel Consumption (MMscf/hr):	1.10E-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	0.11	0.48
CO	84	0.09	0.40
VOC	5.5	0.01	0.03
SO_2	0.6	6.6E-04	2.9E-03
PM Total	7.6	0.01	0.04
PM Condensable	5.7	0.01	0.03
PM_{10} (Filterable)	1.9	2.1E-03	0.01
$PM_{2.5}$ (Filterable)	1.9	2.1E-03	0.01
Lead	5.00E-04	5.5E-07	2.4E-06
CO_2	117.0	135.00	591.29
CH_4	2.21E-03	2.5E-03	1.1E-02
N_2O	2.21E-04	2.5E-04	1.1E-03

Company Name: EQT Production, LLC
Facility Name: OXF 121 Pad
Project Description: G70-D 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	2.6E-08	1.2E-07
3-Methylchloranthrene	1.8E-06	2.0E-09	8.7E-09
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.8E-08	7.7E-08
Acenaphthene	1.8E-06	2.0E-09	8.7E-09
Acenaphthylene	1.8E-06	2.0E-09	8.7E-09
Anthracene	2.4E-06	2.6E-09	1.2E-08
Benz(a)anthracene	1.8E-06	2.0E-09	8.7E-09
Benzene	2.1E-03	2.3E-06	1.0E-05
Benzo(a)pyrene	1.2E-06	1.3E-09	5.8E-09
Benzo(b)fluoranthene	1.8E-06	2.0E-09	8.7E-09
Benzo(g,h,i)perylene	1.2E-06	1.3E-09	5.8E-09
Benzo(k)fluoranthene	1.8E-06	2.0E-09	8.7E-09
Chrysene	1.8E-06	2.0E-09	8.7E-09
Dibenzo(a,h) anthracene	1.2E-06	1.3E-09	5.8E-09
Dichlorobenzene	1.2E-03	1.3E-06	5.8E-06
Fluoranthene	3.0E-06	3.3E-09	1.4E-08
Fluorene	2.8E-06	3.1E-09	1.3E-08
Formaldehyde	7.5E-02	8.2E-05	3.6E-04
Hexane	1.8E+00	2.0E-03	8.7E-03
Indo(1,2,3-cd)pyrene	1.8E-06	2.0E-09	8.7E-09
Naphthalene	6.1E-04	6.7E-07	2.9E-06
Phenanthrene	1.7E-05	1.9E-08	8.2E-08
Pyrene	5.0E-06	5.5E-09	2.4E-08
Toluene	3.4E-03	3.7E-06	1.6E-05
Arsenic	2.0E-04	2.2E-07	9.6E-07
Beryllium	1.2E-05	1.3E-08	5.8E-08
Cadmium	1.1E-03	1.2E-06	5.3E-06
Chromium	1.4E-03	1.5E-06	6.7E-06
Cobalt	8.4E-05	9.2E-08	4.0E-07
Manganese	3.8E-04	4.2E-07	1.8E-06
Mercury	2.6E-04	2.9E-07	1.3E-06
Nickel	2.1E-03	2.3E-06	1.0E-05
Selenium	2.4E-05	2.6E-08	1.2E-07
Total HAP		**2.1E-03**	**9.1E-03**

[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: OXF 121 Pad
Project Description: G70-D Application

Thermoelectric Generators

Source Designation:	**S017-S018**
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: OXF 121 Pad
Project Description: G70-D 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: OXF 121 Pad
Project Description: G70-D Application

Liquid Loading

Throughput 2,115,540 gal/yr
Capture Efficiency 70% non-tested tanker trucks
Control Efficiency 98% Combustor destruction efficiency

Liquid Loading Emissions

	Uncontrolled Emissions		Uncaptured Emissions		Controlled Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Propane	5.508	1.432	1.652	0.430	0.077	0.020
Isobutane	1.469	0.382	0.441	0.115	0.021	0.005
n-Butane	3.588	0.933	1.076	0.280	0.050	0.013
Isopentane	1.477	0.384	0.443	0.115	0.021	0.005
n-Pentane	1.445	0.376	0.434	0.113	0.020	0.005
n-Hexane	0.593	0.154	0.178	0.046	0.008	0.002
Cyclohexane	0.047	0.012	0.014	0.004	0.001	1.7E-04
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	0.601	0.156	0.180	0.047	0.008	0.002
n-Octane	0.126	0.033	0.038	0.010	0.002	4.6E-04
n-Nonane	0.027	0.007	0.008	0.002	3.8E-04	9.9E-05
n-Decane	0.025	0.006	0.007	0.002	3.4E-04	9.0E-05
n-Undecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dodecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Triethylene Glycol	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Isohexane	0.875	0.228	0.263	0.068	0.012	0.003
3-Methylpentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2,3-Dimethylbutane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methylcyclohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Decane, 2-Methyl-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	0.010	0.002	0.003	0.001	1.3E-04	3.5E-05
Toluene	0.020	0.005	0.006	0.002	2.8E-04	7.2E-05
Ethylbenzene	0.001	1.6E-04	1.8E-04	4.8E-05	8.5E-06	2.2E-06
m-Xylene	0.012	0.003	0.004	0.001	1.7E-04	4.4E-05
Isooctane	0.152	0.040	0.046	0.012	0.002	0.001
Total VOC Emissions:	15.975	4.153	4.792	1.246	0.224	0.058
Total HAP Emissions:	0.787	0.205	0.236	0.061	0.011	0.003

[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: OXF 121 Pad
Project Description: G70-D Application

Fugitive Emissions

Fugitive Emissions from Component Leaks

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

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

Fugitive VOC/Total Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Annual Fugitive Emissions (tpy)	Weight Fraction VOC	Weight Fraction HAP	VOC Emissions[3] (tpy)	HAP Emissions[3] (tpy)
Pumps	Light Liquid	0.01990	9	1.73	1.00	0.03	1.73	0.05
Compressor	Gas	0.22800	0	---	0.17	0.01	---	---
Valves	Gas	0.00597	179	10.29	0.17	0.01	1.71	0.05
Pressure Relief Valves	Gas	0.10400	14	13.56	0.17	0.01	2.25	0.07
Open-Ended Lines	All	0.00170	8	0.12	0.17	0.01	0.02	6.4E-04
Connectors	All	0.00183	765	13.52	0.17	0.01	2.24	0.07
Intermittent Pneumatic Devices[4]	Gas	13.5	25	---	---	---	4.41	0.14
			Emission Totals:	**39.22**	**---**	**---**	**12.36**	**0.39**

[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: OXF 121 Pad
Project Description: G70-D Application

Fugitive Emissions

Fugitive Specific HAP Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Annual Fugitive Emissions (tpy)	Benzene Emissions[3] (tpy)	Toluene Emissions[3] (tpy)	Ethylbenzene Emissions[3] (tpy)	Xylene Emissions[3] (tpy)	n-Hexane Emissions[4] (tpy)
Pumps	Light Liquid	0.01990	9	1.73	1.3E-04	3.1E-04	<0.01	1.8E-04	0.01
Compressor	Gas	0.22800	0	---	---	---	<0.01	---	---
Valves	Gas	0.00597	179	10.29	7.9E-04	1.9E-03	<0.01	1.1E-03	0.03
Pressure Relief Valves	Gas	0.10400	14	13.56	1.0E-03	2.4E-03	<0.01	1.4E-03	0.04
Open-Ended Lines	All	0.00170	8	0.12	9.4E-06	2.2E-05	<0.01	1.3E-05	3.8E-04
Connectors	All	0.00183	765	13.52	1.0E-03	2.4E-03	<0.01	1.4E-03	0.04
Intermittent Pneumatic Devices[4]	Gas	13.5	25	---	2.0E-03	4.8E-03	<0.01	2.8E-03	0.08
			Emission Totals:	**39.22**	**0.01**	**0.01**	**<0.01**	**0.01**	**0.20**

[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	9	0.01	0.01	8.9E-05	0.33
Compressor	0	4.17	---	---	---
Valves	179	0.027	0.71	4.8E-03	17.64
Pressure Relief Devices	14	0.04	0.08	5.3E-04	1.98
Open-Ended Lines	8	0.061	0.07	4.5E-04	1.67
Connectors	765	0.003	0.34	2.3E-03	8.40
Intermittent Pneumatic Devices	25	6	7.32	0.05	183.05
Total			**8.52**	**0.06**	**213.07**

[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: 79% CO_2: 0.20%

[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: OXF 121 Pad
Project Description: G70-D Application

Haul Roads

Estimated Potential Road Fugitive Emissions

Unpaved Road Emissions

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

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

Description	Weight of Empty Truck (tons)	Weight of Truck w/ Max Load (tons)	Mean Vehicle Weight (tons)	Length of Unpaved Road Traveled (mile)	Trips Per Year	Mileage Per Year	Control (%)	Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
Liquids Hauling	20	40	30	0.46	529	482	0	1.03	0.26	0.03
Employee Vehicles	3	3	3	0.46	200	182	0	0.14	0.04	0.00
Total Potential Emissions								**1.17**	**0.30**	**0.03**

Company Name: **EQT Production, LLC**
Facility Name: **OXF 121 Pad**
Project Description: **G70-D Application**

Gas Analysis

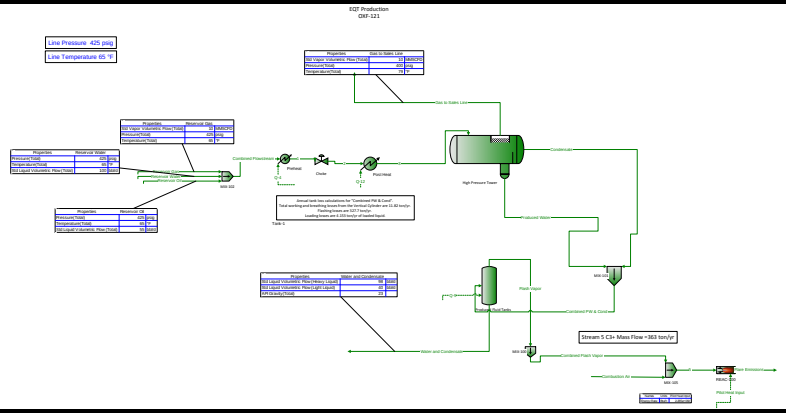
Sample Location: OXF 121 Gas Analysis
Sample Date: 5/29/2013
HHV (Btu/scf): 1,240 Note: A conservatively low BTU content of 1,050 was used for calculations.

Constituent	Natural Gas Stream Speciation (Mole %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.195	44.01	0.09	0.00	0.420
Nitrogen	0.532	28.01	0.15	0.01	0.729
Methane	78.965	16.04	12.67	0.62	61.981
Ethane	13.780	30.07	4.14	0.20	20.277
Propane	4.195	44.10	1.85	0.09	9.053
Isobutane	0.507	58.12	0.29	0.01	1.442
n-Butane	1.013	58.12	0.59	0.03	2.881
Isopentane	0.249	72.15	0.18	0.01	0.879
n-Pentane	0.240	72.15	0.17	0.01	0.847
Cyclopentane	<0.001	70.1	0.0	0.0	0.000
n-Hexane	0.073	86.18	0.06	0.00	0.308
Cyclohexane	0.011	84.16	0.01	0.00	0.045
Other Hexanes	0.113	86.18	0.10	0.00	0.477
Heptanes	0.079	100.21	0.08	0.00	0.387
Methylcyclohexane	<0.001	98.19	0.00	0.00	0.000
2,2,4-Trimethylpentane	0.031	114.23	0.04	0.00	0.173
Benzene*	0.002	78.11	0.00	0.00	0.008
Toluene*	0.004	92.14	0.00	0.00	0.018
Ethylbenzene*	<0.001	106.17	0.00	0.00	0.000
Xylenes*	0.002	106.16	0.00	0.00	0.010
C8 + Heavies	0.010	130.80	0.01	0.00	0.064
Totals	100.00		20.44	1.00	100

TOC (Total)	99.27	98.85
VOC (Total)	6.53	16.59
HAP (Total)	0.11	0.52

OXF-121
Plant Schematic

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	
Flowsheet:	OXF-121	



Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	
Flowsheet:	OXF-121	

Connections

	Combined Flash Vapor	Combined Flowstream	Combined PW & Cond	Gas to Sales Line	Reservoir Gas
From Block	MIX-100	MIX-102	MIX-101	High Pressure Tower	--
To Block	MIX-105	Preheat	Produced Fluid Tanks	--	MIX-102

Stream Composition

Mass Flow	Combined Flash Vapor lb/h	Combined Flowstream lb/h	Combined PW & Cond lb/h	Gas to Sales Line lb/h	Reservoir Gas lb/h
Nitrogen	0.0503402	163.634	0.0504575	163.583	163.634 *
Methane	12.1835	13921.8	12.2718	13909.6	13909.2 *
CO2	0.260237	94.4766	0.267879	94.2087	94.2272 *
Ethane	18.4773	4569.37	19.2096	4550.16	4549.5 *
Propane	23.5824	2057.83	26.9038	2030.93	2031.06 *
Isobutane	7.14688	332.811	9.62373	323.188	323.553 *
n-Butane	17.9139	672.945	26.8261	646.119	646.468 *
Isopentane	8.25025	215.991	18.6482	197.343	197.253 *
n-Pentane	8.6423	212.909	22.5942	190.315	189.331 *
n-Hexane	3.82349	93.2657	25.0099	68.2558	69.0719 *
Methylcyclopentane	0	0	0	0	0 *
Benzene	0.0995755	2.40714	0.651463	1.75568	1.71531 *
Cyclohexane	0.408377	10.1646	3.05469	7.10993	10.1646 *
n-Heptane	4.46426	163.206	80.8312	82.3752	86.9158 *
n-Octane	1.02394	76.2265	55.8151	20.4115	3.76263 *
n-Nonane	0.240104	45.4661	40.319	5.1471	5.63287 *
n-Decane	0.240545	127.582	121.617	5.96441	4.68668 *
n-Undecane	0	0	0	0	0 *
Dodecane	0	0	0	0	0 *
Water	2.11307	1459.01	1432.93	26.0764	0 *
Triethylene Glycol	0	0	0	0	0 *
Oxygen	0	0	0	0	0 *
Argon	0	0	0	0	0 *
Carbon Monoxide	0	0	0	0	0 *
Cyclopentane	0	0	0	0	0 *
Isohexane	5.6128	130.844	27.5065	103.337	106.919 *
3-Methylpentane	0	0	0	0	0 *
Neohexane	0	0	0	0	0 *
2,3-Dimethylbutane	0	0	0	0	0 *
Methylcyclohexane	0	0	0	0	0 *
Isooctane	1.09689	39.0665	18.6966	20.3699	38.8805 *
Decane, 2-Methyl-	0	0	0	0	0 *
Toluene	0.229521	8.34898	4.29615	4.05283	4.04665 *
m-Xylene	0.100515	8.40178	6.45257	1.94921	2.33135 *
Ethylbenzene	0.0065356	0.511631	0.385681	0.12595	0 *

Volumetric Flow	Combined Flash Vapor ft^3/h	Combined Flowstream ft^3/h	Combined PW & Cond gpm	Gas to Sales Line ft^3/h	Reservoir Gas ft^3/h
Nitrogen	0.720426	78.2438	0.000195114	84.7382	78.3241
Methane	302.964	10575.1	0.0833275	11604.5	10578.6
CO2	2.34988	23.8905	0.000428801	26.6101	23.9166
Ethane	242.776	1487.63	0.0858216	1692.66	1487.75
Propane	209.575	366.742	0.1035	435.726	367.258
Isobutane	47.8612	36.3425	0.0342472	45.291	36.441
n-Butane	119.763	66.7099	0.0925141	85.1096	66.938
Isopentane	44.1375	12.593	0.0600365	17.2129	12.4154
n-Pentane	46.1667	11.3992	0.0721615	15.8561	11.1004
n-Hexane	16.9469	2.48552	0.075494	3.38477	1.91374
Methylcyclopentane	0	0	0	0	0

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	
Flowsheet:	OXF-121	

Volumetric Flow	Combined Flash Vapor ft^3/h	Combined Flowstream ft^3/h	Combined PW & Cond gpm	Gas to Sales Line ft^3/h	Reservoir Gas ft^3/h
Benzene	0.490262	0.0848824	0.00144108	0.122642	0.078427
Cyclohexane	1.85991	0.288926	0.00772492	0.401256	0.344784
n-Heptane	16.8772	2.8584	0.234912	2.1105	0.739678
n-Octane	3.36669	1.341	0.15624	0.188272	0.00664644
n-Nonane	0.696274	0.86626	0.109675	-0.0303132	0.0244008
n-Decane	0.623464	2.53567	0.324565	-0.103238	0.0489429
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	46.6917	33.2229	2.87143	18.7088	0
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	24.9276	4.03026	0.0839521	5.66109	3.54749
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	3.6322	0.646374	0.0530749	0.453872	0.292204
Decane, 2-Methyl-	0	0	0	0	0
Toluene	0.949529	0.15194	0.00956599	0.159275	0.0757382
m-Xylene	0.357723	0.130775	0.0143715	0.0390928	0.0176282
Ethylbenzene	0.0232794	0.00796894	0.000856286	0.00270534	0

Mole Fraction	Combined Flash Vapor	Combined Flowstream	Combined PW & Cond	Gas to Sales Line	Reservoir Gas
Nitrogen	0.000622907	0.00492733	2.09067E-05	0.00531185	0.00532 *
Methane	0.263254	0.732033	0.008879	0.788706	0.78965 *
CO2	0.00204973	0.00181085	7.0651E-05	0.00194723	0.00195 *
Ethane	0.213006	0.128186	0.00741522	0.137651	0.1378 *
Propane	0.185381	0.0393658	0.0070818	0.0418959	0.04195 *
Isobutane	0.0426234	0.00483016	0.00192189	0.00505808	0.00507 *
n-Butane	0.106837	0.00976658	0.00535724	0.0101121	0.01013 *
Isopentane	0.039638	0.00252529	0.00300009	0.00248809	0.00249 *
n-Pentane	0.0415216	0.00248926	0.00363491	0.00239947	0.00239 *
n-Hexane	0.0153798	0.000912944	0.00336864	0.000720492	0.00073 *
Methylcyclopentane	0	0	0	0	0 *
Benzene	0.000441885	2.5995E-05	9.68053E-05	2.04456E-05	2E-05 *
Cyclohexane	0.00168202	0.000101881	0.000421299	7.68484E-05	0.00011 *
n-Heptane	0.0154435	0.00137393	0.0093633	0.000747813	0.00079 *
n-Octane	0.00310723	0.000562907	0.00567157	0.000162544	3E-05 *
n-Nonane	0.000648932	0.000299032	0.0036489	3.65057E-05	4E-05 *
n-Decane	0.000586031	0.000756388	0.00992139	3.81321E-05	3E-05 *
n-Undecane	0	0	0	0	0 *
Dodecane	0	0	0	0	0 *
Water	0.0406581	0.068316	0.923233	0.00131668	0 *
Triethylene Glycol	0	0	0	0	0 *
Oxygen	0	0	0	0	0 *
Argon	0	0	0	0	0 *
Carbon Monoxide	0	0	0	0	0 *
Cyclopentane	0	0	0	0	0 *
Isohexane	0.0225772	0.00128078	0.00370492	0.0010908	0.00113 *
3-Methylpentane	0	0	0	0	0 *
Neohexane	0	0	0	0	0 *
2,3-Dimethylbutane	0	0	0	0	0 *
Methylcyclohexane	0	0	0	0	0 *
Isooctane	0.00332862	0.000288492	0.00189982	0.000162213	0.00031 *
Decane, 2-Methyl-	0	0	0	0	0 *

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	
Flowsheet:	OXF-121	

Mole Fraction	Combined Flash Vapor	Combined Flowstream	Combined PW & Cond	Gas to Sales Line	Reservoir Gas
Toluene	0.000863488	7.6436E-05	0.000541209	4.0012E-05	4E-05 *
m-Xylene	0.000328189	6.67567E-05	0.000705468	1.67013E-05	2E-05 *
Ethylbenzene	2.13392E-05	4.06519E-06	4.2167E-05	1.07917E-06	0 *

Stream Properties

Property	Units	Combined Flash Vapor	Combined Flowstream	Combined PW & Cond	Gas to Sales Line	Reservoir Gas
Temperature	°F	85	65.1402	79.172	79.172	65 *
Pressure	psig	0	425	400	400	425 *
Mole Fraction Vapor		1	0.923976	0	1	0.999145
Mole Fraction Light Liquid		0	0.00838238	0.0762105	0	0.000855191
Mole Fraction Heavy Liquid		0	0.0676411	0.92379	0	0
Molecular Weight	lb/lbmol	40.1982	20.5877	22.68	20.4237	20.436
Mass Density	lb/ft^3	0.102285	1.92065	54.4317	1.59931	1.771
Molar Flow	lbmol/h	2.88487	1185.48	86.1537	1099.33	1097.98
Mass Flow	lb/h	115.967	24406.3	1953.97	22452.3	22438.3
Vapor Volumetric Flow	ft^3/h	1133.76	12707.3	35.8975	14038.8	12669.9
Liquid Volumetric Flow	gpm	141.351	1584.29	4.47554	1750.29	1579.62
Std Vapor Volumetric Flow	MMSCFD	0.0262743	10.7969	0.784655	10.0123	10 *
Std Liquid Volumetric Flow	sgpm	0.474227	136.989	4.50084	132.489	132.469
Specific Gravity		1.38794		0.872737	0.705174	
API Gravity				29.5835		
Net Ideal Gas Heating Value	Btu/ft^3	2068.96	1057.01	308.821	1115.64	1117.56
Net Liquid Heating Value	Btu/lb	19374.5	19364.2	4349	20671	20695.2

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	
Flowsheet:	OXF-121	

Connections

	Reservoir Oil	Reservoir Water	Water and Condensate		
From Block	--	--	Produced Fluid Tanks		
To Block	MIX-102	MIX-102	--		

Stream Composition

Mass Flow	Reservoir Oil lb/h	Reservoir Water lb/h	Water and Condensate lb/h		
Nitrogen	0 *	0 *	0.000117358		
Methane	12.6739 *	0 *	0.0883403		
CO2	0.24935 *	0 *	0.0076422		
Ethane	19.8662 *	0 *	0.732294		
Propane	26.77 *	0 *	3.32137		
Isobutane	9.25853 *	0 *	2.47685		
n-Butane	26.4773 *	0 *	8.9122		
Isopentane	18.7382 *	0 *	10.398		
n-Pentane	23.5778 *	0 *	13.9519		
n-Hexane	24.1938 *	0 *	21.1864		
Methylcyclopentane	0 *	0 *	0		
Benzene	0.69183 *	0 *	0.551888		
Cyclohexane	0 *	0 *	2.64631		
n-Heptane	76.2907 *	0 *	76.367		
n-Octane	72.4639 *	0 *	54.7911		
n-Nonane	39.8332 *	0 *	40.0789		
n-Decane	122.895 *	0 *	121.377		
n-Undecane	0 *	0 *	0		
Dodecane	0 *	0 *	0		
Water	0 *	1459.01 *	1430.82		
Triethylene Glycol	0 *	0 *	0		
Oxygen	0 *	0 *	0		
Argon	0 *	0 *	0		
Carbon Monoxide	0 *	0 *	0		
Cyclopentane	0 *	0 *	0		
Isohexane	23.9245 *	0 *	21.8937		
3-Methylpentane	0 *	0 *	0		
Neohexane	0 *	0 *	0		
2,3-Dimethylbutane	0 *	0 *	0		
Methylcyclohexane	0 *	0 *	0		
Isooctane	0.185977 *	0 *	17.5997		
Decane, 2-Methyl-	0 *	0 *	0		
Toluene	4.30233 *	0 *	4.06663		
m-Xylene	6.07043 *	0 *	6.35205		
Ethylbenzene	0.511631 *	0 *	0.379145		

Volumetric Flow	Reservoir Oil gpm	Reservoir Water gpm	Water and Condensate gpm		
Nitrogen	0	0	3.73675E-07		
Methane	0.0848204	0	0.00051348		
CO2	0.000391807	0	1.03412E-05		
Ethane	0.0871941	0	0.00300209		
Propane	0.1013	0	0.0122587		
Isobutane	0.0324539	0	0.00867974		
n-Butane	0.0900095	0	0.0302911		
Isopentane	0.0595405	0	0.0335393		
n-Pentane	0.074348	0	0.0446317		
n-Hexane	0.0721912	0	0.0647014		
Methylcyclopentane	0	0	0		
Benzene	0.00152021	0	0.0012345		

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	
Flowsheet:	OXF-121	

Volumetric Flow	Reservoir Oil gpm	Reservoir Water gpm	Water and Condensate gpm		
Cyclohexane	0	0	0.00683422		
n-Heptane	0.219364	0	0.226152		
n-Octane	0.200827	0	0.157018		
n-Nonane	0.107333	0	0.11199		
n-Decane	0.325007	0	0.333583		
n-Undecane	0	0	0		
Dodecane	0	0	0		
Water	0	2.91744	2.8711		
Triethylene Glycol	0	0	0		
Oxygen	0	0	0		
Argon	0	0	0		
Carbon Monoxide	0	0	0		
Cyclopentane	0	0	0		
Isohexane	0.0721533	0	0.0676121		
3-Methylpentane	0	0	0		
Neohexane	0	0	0		
2,3-Dimethylbutane	0	0	0		
Methylcyclohexane	0	0	0		
Isooctane	0.000522242	0	0.0512414		
Decane, 2-Methyl-	0	0	0		
Toluene	0.00951281	0	0.00927189		
m-Xylene	0.0134273	0	0.014579		
Ethylbenzene	0.00112815	0	0.000868941		

Mole Fraction	Reservoir Oil	Reservoir Water	Water and Condensate		
Nitrogen	0 *	0 *	5.03112E-08		
Methane	0.12131 *	0 *	6.61311E-05		
CO2	0.00087 *	0 *	2.0854E-06		
Ethane	0.10145 *	0 *	0.000292472		
Propane	0.09322 *	0 *	0.000904564		
Isobutane	0.02446 *	0 *	0.00051177		
n-Butane	0.06995 *	0 *	0.00184145		
Isopentane	0.03988 *	0 *	0.00173076		
n-Pentane	0.05018 *	0 *	0.00232232		
n-Hexane	0.04311 *	0 *	0.00295251		
Methylcyclopentane	0 *	0 *	0		
Benzene	0.00136 *	0 *	8.48499E-05		
Cyclohexane	0 *	0 *	0.000377621		
n-Heptane	0.11691 *	0 *	0.00915265		
n-Octane	0.09741 *	0 *	0.00576041		
n-Nonane	0.04769 *	0 *	0.00375283		
n-Decane	0.13263 *	0 *	0.0102448		
n-Undecane	0 *	0 *	0		
Dodecane	0 *	0 *	0		
Water	0 *	1 *	0.95381		
Triethylene Glycol	0 *	0 *	0		
Oxygen	0 *	0 *	0		
Argon	0 *	0 *	0		
Carbon Monoxide	0 *	0 *	0		
Cyclopentane	0 *	0 *	0		
Isohexane	0.04263 *	0 *	0.00305109		
3-Methylpentane	0 *	0 *	0		
Neohexane	0 *	0 *	0		
2,3-Dimethylbutane	0 *	0 *	0		
Methylcyclohexane	0 *	0 *	0		
Isooctane	0.00025 *	0 *	0.00185032		
Decane, 2-Methyl-	0 *	0 *	0		
Toluene	0.00717 *	0 *	0.000530044		

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	
Flowsheet:	OXF-121	

Mole Fraction	Reservoir Oil	Reservoir Water	Water and Condensate		
m-Xylene	0.00878 *	0 *	0.000718539		
Ethylbenzene	0.00074 *	0 *	4.28886E-05		

Stream Properties

Property	Units	Reservoir Oil	Reservoir Water	Water and Condensate		
Temperature	°F	65 *	65 *	85 *		
Pressure	psig	425 *	425 *	0		
Mole Fraction Vapor		0	0	0		
Mole Fraction Light Liquid		1	1	0.0461951		
Mole Fraction Heavy Liquid		0	0	0.953805		
Molecular Weight	lb/lbmol	78.1542	18.0153	22.0731		
Mass Density	lb/ft^3	40.8595	62.35	56.5934		
Molar Flow	lbmol/h	6.51244	80.9874	83.2688		
Mass Flow	lb/h	508.975	1459.01	1838		
Vapor Volumetric Flow	ft^3/h	12.4567	23.4003	32.4773		
Liquid Volumetric Flow	gpm	1.55304	2.91744	4.04912		
Std Vapor Volumetric Flow	MMSCFD	0.0593128	0.737602	0.75838		
Std Liquid Volumetric Flow	sgpm	1.60417 *	2.91667 *	4.02661		
Specific Gravity		0.655124	0.999695	0.907395		
API Gravity		83.5662	9.94738	23.3801		
Net Ideal Gas Heating Value	Btu/ft^3	3993.39	0	247.84		
Net Liquid Heating Value	Btu/lb	19235.7	-1059.76	3400.98		

Remarks

Energy Stream Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	
Flowsheet:	OXF-121	

Energy Streams

Energy Stream	Energy Rate	Power	From Block	To Block
Pilot Heat Input	2.26501E+06 * Btu/h	890.184 * hp	--	REAC-100

Remarks

Flowsheet Environment
SRK Environment

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	
Flowsheet:	OXF-121	

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	0.01
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F	Emulsion Enabled	False

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Nitrogen	False	False	Dodecane	False	False
Methane	False	False	Water	False	True
CO2	False	False	Triethylene Glycol	False	True
Ethane	False	False	Oxygen	False	False
Propane	False	False	Argon	False	False
Isobutane	False	False	Carbon Monoxide	False	False
n-Butane	False	False	Cyclopentane	False	False
Isopentane	False	False	Isohexane	False	False
n-Pentane	False	False	3-Methylpentane	False	False
n-Hexane	False	False	Neohexane	False	False
Methylcyclopentane	False	False	2,3-Dimethylbutane	False	False
Benzene	False	False	Methylcyclohexane	False	False
Cyclohexane	False	False	Isooctane	False	False
n-Heptane	False	False	Decane, 2-Methyl-	False	False
n-Octane	False	False	Toluene	False	False
n-Nonane	False	False	m-Xylene	False	False
n-Decane	False	False	Ethylbenzene	False	False
n-Undecane	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	SRK
Stability Calculation	SRK	Vapor Package	SRK
Light Liquid Package	SRK	Heavy Liquid Package	SRK

Remarks

Environments Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	

Project-Wide Constants

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

Environment [SRK Environment]

Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	0.01
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	False
Freeze Out Temperature Threshold Difference	10 °F	Emulsion Enabled	False

Components

Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Nitrogen	False	False	Dodecane	False	False
Methane	False	False	Water	False	True
CO2	False	False	Triethylene Glycol	False	True
Ethane	False	False	Oxygen	False	False
Propane	False	False	Argon	False	False
Isobutane	False	False	Carbon Monoxide	False	False
n-Butane	False	False	Cyclopentane	False	False
Isopentane	False	False	Isohexane	False	False
n-Pentane	False	False	3-Methylpentane	False	False
n-Hexane	False	False	Neohexane	False	False
Methylcyclopentane	False	False	2,3-Dimethylbutane	False	False
Benzene	False	False	Methylcyclohexane	False	False
Cyclohexane	False	False	Isooctane	False	False
n-Heptane	False	False	Decane, 2-Methyl-	False	False
n-Octane	False	False	Toluene	False	False
n-Nonane	False	False	m-Xylene	False	False
n-Decane	False	False	Ethylbenzene	False	False
n-Undecane	False	False			

Physical Property Method Sets

Liquid Molar Volume	COSTALD	Overall Package	SRK
Stability Calculation	SRK	Vapor Package	SRK
Light Liquid Package	SRK	Heavy Liquid Package	SRK

Remarks

Calculator Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	

Simple Specifier 1

Source Code

CV1 = O2Reqd * 3.0 / O2Frac

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!PStreams!Combustion Air!Phases!Total!Properties!Molar Flow
Value	185.044
Unit	

Measured Variable [O2Reqd]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!PStreams!Combined Flash Vapor!Analyses!Combustion Analysis 1!Properties!Required Combustion Oxygen
Value	12.9204
Unit	

Measured Variable [O2Frac]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!PStreams!Combustion Air!Phases!Total!Composition!Mole Fraction!Oxygen
Value	0.20947
Unit	

Remarks

Simple Specifier 2

Source Code

CV1 = FV*HV

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!QStreams!Pilot Heat Input!Energy Rate
Value	2.26501E+06
Unit	

Measured Variable [FV]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!PStreams!Flash Vapor!Phases!Total!Properties!Std Vapor Volumetric Flow
Value	1094.76
Unit	

Measured Variable [HV]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!PStreams!Flash Vapor!Phases!Total!Properties!Net Ideal Gas Heating Value
Value	2068.96
Unit	

Remarks

Simple Specifier 3

Source Code

CV1 = Pin

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!PStreams!Reservoir Gas!Phases!Total!Properties!Pressure
Value	425
Unit	

Calculator Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	

Measured Variable [Pin]

Source Moniker	ProMax:ProMax!Project!User Value Sets!Parameters!Line Pressure!Properties!Parameter
Value	425
Unit	

Remarks

Simple Specifier 4

Source Code

CV1 = Tin

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!PStreams!Reservoir Gas!Phases!Total!Properties!Temperature
Value	65
Unit	

Measured Variable [Tin]

Source Moniker	ProMax:ProMax!Project!User Value Sets!Parameters!Line Temperature!Properties!Parameter
Value	65
Unit	

Remarks

Simple Specifier 5

Source Code

CV1 = Tin

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!PStreams!Reservoir Oil!Phases!Total!Properties!Temperature
Value	65
Unit	

Measured Variable [Tin]

Source Moniker	ProMax:ProMax!Project!User Value Sets!Parameters!Line Temperature!Properties!Parameter
Value	65
Unit	

Remarks

Simple Specifier 6

Source Code

CV1 = Pin

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!PStreams!Reservoir Oil!Phases!Total!Properties!Pressure
Value	425

Calculator Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	

Unit

Measured Variable [Pin]

Source Moniker	ProMax:ProMax!Project!User Value Sets!Parameters!Line Pressure!Properties!Parameter
Value	425
Unit	

Remarks

Simple Specifier 7

Source Code

CV1 = Tin

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!PStreams!Reservoir Water!Phases!Total!Properties!Temperature
Value	65
Unit	

Measured Variable [Tin]

Source Moniker	ProMax:ProMax!Project!User Value Sets!Parameters!Line Temperature!Properties!Parameter
Value	65
Unit	

Remarks

Simple Specifier 8

Source Code

CV1 = Pin

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-121!PStreams!Reservoir Water!Phases!Total!Properties!Pressure
Value	425
Unit	

Measured Variable [Pin]

Source Moniker	ProMax:ProMax!Project!User Value Sets!Parameters!Line Pressure!Properties!Parameter
Value	425
Unit	

Remarks

User Value Sets Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	

Cn+ Flow/Frac.55

User Value [CnPlusSum]

* Parameter	363.024	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={6F8309F1-C05A-4942-A867-311E1532159F}

Tank-1

User Value [BlockReady]

* Parameter	1		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [ShellLength]

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

User Value [ShellDiam]

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

User Value [BreatherVP]

* Parameter	0.875	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

User Value [BreatherVacP]

* Parameter	-0.03125	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

User Value [DomeRadius]

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

User Value [OpPress]

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

User Value [AvgPercentLiq]

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

User Value [MaxPercentLiq]

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

User Value [AnnNetTP]

* Parameter	138.881	bbl/day	Upper Bound	bbl/day
* Lower Bound	0	bbl/day	* Enforce Bounds	False

User Value [OREff]

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

User Value Sets Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	

User Value [MaxAvgT]

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

User Value [MinAvgT]

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

User Value [BulkLiqT]

* Parameter	59.09	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [AvgP]

* Parameter	14.2535	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [Therml]

* Parameter	1123	Btu/ft^2/day	Upper Bound	Btu/ft^2/day
Lower Bound		Btu/ft^2/day	* Enforce Bounds	False

User Value [AvgWindSpeed]

* Parameter	6.3	mi/h	Upper Bound	mi/h
Lower Bound		mi/h	* Enforce Bounds	False

User Value [MaxHourlyLoadingRate]

* Parameter	5.7867	bbl/hr	Upper Bound	bbl/hr
* Lower Bound	0	bbl/hr	* Enforce Bounds	False

User Value [EntrainedOilFrac]

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

User Value [TurnoverRate]

* Parameter	23.2987		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [LLossSatFactor]

* Parameter	0.5		Upper Bound	
Lower Bound			* Enforce Bounds	False

User Value [AtmPressure]

* Parameter	14.2535	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [TVP]

* Parameter	5.74452	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

* Parameter	65.0762	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value [MaxLiqSurfaceT]

* Parameter	75.9425	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value Sets Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	

User Value [TotalLosses]

* Parameter	11.8221	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	1.25867	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	0.711687	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]

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

User Value [WithdrawalLoss]

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

User Value [LoadingLosses]

* Parameter	4.15299	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [MaxHourlyLoadingLoss]

* Parameter	0.948171	lb/hr	Upper Bound	lb/hr
Lower Bound		lb/hr	* Enforce Bounds	False

User Value [DeckFittingLosses]

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

User Value [DeckSeamLosses]

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

User Value [FlashingLosses]

* Parameter	327.739	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [GasMoleWeight]

* Parameter	0.0572024	kg/mol	Upper Bound	kg/mol
Lower Bound		kg/mol	* Enforce Bounds	False

Remarks

This User Value Set was programmatically generated. GUID={0511AF0C-026D-4690-8095-2CBDEB1C7684}

Parameters

User Value [Line Temperature]

* Parameter	65	°F	Upper Bound	°F
Lower Bound		°F	* Enforce Bounds	False

User Value Sets Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 121 Wellpad	

User Value [Line Pressure]

* Parameter	425	psig	Upper Bound	psig
Lower Bound		psig	* Enforce Bounds	False

Remarks

LAFAYETTE LABORATORY
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA 70583-1790
PHONE (337) 237-4775
FAX (337) 237-8005

Certificate of Analysis Number: 2011080059-001A

FOR: Gas Analytical Services
Chuck Honaker
PO Box 1028

Bridgeport, WV 26330

CUSTOMER: Gas Analytical Services
FIELD : EQT Production
LOCATION : 512432
SAMPLE POINT: Wellhead
REPORT DATE: 8/13/2011
SAMPLE DATE: 07/30/2011 08:00
SAMPLED BY: SA - GAS
MEMO:

TYPE: Gas
REPORT: C10+ (GPA Method 2286)
CYLINDER: GAS
PRESSURE: 340
TEMPERATURE: N.G.

COMPONENT	MOL %	WEIGHT %	GPM's @ 14.73
N2	0.500	0.678	
METHANE	78.009	60.646	
CO2	0.212	0.451	
ETHANE	14.476	21.095	3.870
PROPANE	4.405	9.411	1.213
I-BUTANE	0.525	1.478	0.172
N-BUTANE	1.069	3.009	0.337
I-PENTANE	0.225	0.785	0.082
N-PENTANE	0.240	0.838	0.087
I-HEXANES	0.099	0.413	0.040
N-HEXANE	0.083	0.291	0.029
BENZENE	0.002	0.009	0.001
CYCLOHEXANE	0.011	0.044	0.004
I-HEPTANES	0.049	0.241	0.022
N-HEPTANE	0.023	0.111	0.010
TOLUENE	0.005	0.022	0.002
I-OCTANES	0.033	0.192	0.017
N-OCTANE	0.006	0.036	0.003
*E-BENZENE	NIL	0.002	NIL
*m,o,&p-XYLENE	0.002	0.016	0.001
I-NONANES	0.004	0.049	0.004
N-NONANE	0.002	0.011	0.001
I-DECANES	NIL	0.015	0.001
N-DECANE	0.001	0.005	NIL
I-UNDECANES +	0.019	0.152	0.013
TOTALS	100.000	100.000	5.909

LAFAYETTE LABORATORY
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA 70583-1790
PHONE (337) 237-4775
FAX (337) 237-8005

Certificate of Analysis Number: **2011080059-001A**

FOR: Gas Analytical Services
Chuck Honaker
PO Box 1028

Bridgeport, WV 26330

CUSTOMER: Gas Analytical Services
FIELD : EQT Production
LOCATION : 512432
SAMPLE POINT: Wellhead
REPORT DATE: 8/13/2011
SAMPLE DATE: 07/30/2011 08:00
SAMPLED BY: SA - GAS
MEMO:

TYPE: Gas
REPORT: C6+
CYLINDER: GAS
PRESSURE: 340
TEMPERATURE: N.G.

COMPONENT	MOL %	WEIGHT %	GPM's @ 14.73
N2	0.500	0.678	
METHANE	78.009	60.646	
CO2	0.212	0.451	
ETHANE	14.476	21.095	3.870
PROPANE	4.405	9.411	1.213
I-BUTANE	0.525	1.478	0.172
N-BUTANE	1.069	3.009	0.337
I-PENTANE	0.225	0.785	0.082
N-PENTANE	0.240	0.838	0.087
HEXANES PLUS	0.339	1.609	0.148
TOTALS	100.000	100.000	5.909

CALCULATED VALUES	TOTAL	C6+	C7+	C8+	C9+	C10+
MOLECULAR WEIGHT	20.635	97.847	110.216	144.593	162.9	160.328
REAL DRY BTU AT 14.73 PSIA, 60°F	1250.7	5312.0	5893.1	7469.7	8394.5	8699.1
REAL WET BTU AT 14.73 PSIA, 60°F	1229.8	5220.4	5791.4	7340.6	8249.3	8548.6
RELATIVE DENSITY	0.7145	3.3622	3.7657	4.7889	5.3493	5.526

	C2+	IC5+
GPM's AT 14.73	5.909	0.317
COMPRESSIBILITY FACTOR	0.9965	

LAFAYETTE LABORATORY
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA 70583-1790
PHONE (337) 237-4775
FAX (337) 237-8005

Certificate of Analysis Number: 2011080059-001A

FOR: Gas Analytical Services
Chuck Honaker
PO Box 1028

Bridgeport, WV 26330

CUSTOMER: Gas Analytical Services
FIELD : EQT Production
LOCATION : 512432
SAMPLE POINT: Wellhead
REPORT DATE: 8/13/2011
SAMPLE DATE: 07/30/2011 08:00
SAMPLED BY: SA - GAS
MEMO:

TYPE: Gas
REPORT: C7+
CYLINDER: GAS
PRESSURE: 340
TEMPERATURE: N.G.

COMPONENT	MOL %	WEIGHT %	GPM's @ 14.73
N2	0.500	0.678	
METHANE	78.009	60.646	
CO2	0.212	0.451	
ETHANE	14.476	21.095	3.870
PROPANE	4.405	9.411	1.213
I-BUTANE	0.525	1.478	0.172
N-BUTANE	1.069	3.009	0.337
I-PENTANE	0.225	0.785	0.082
N-PENTANE	0.240	0.838	0.087
HEXANES	0.182	0.704	0.069
HEPTANES PLUS	0.157	0.905	0.079
TOTALS	100.000	100.000	5.909

CALCULATED VALUES	TOTAL	C6+	C7+
MOLECULAR WEIGHT	20.635	97.847	110.216
REAL DRY BTU AT 14.73 PSIA, 60°F	1250.7	5312.0	5893.1
REAL WET BTU AT 14.73 PSIA, 60°F	1229.8	5220.4	5791.4
RELATIVE DENSITY	0.7145	3.3622	3.7657

	C2+	IC5+
GPM's AT 14.73	5.909	0.317
COMPRESSIBILITY FACTOR	0.9965	

LAFAYETTE LABORATORY
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA 70583-1790
PHONE (337) 237-4775
FAX (337) 237-8005

Certificate of Analysis Number: 2011080059-002A

FOR: Gas Analytical Services
Chuck Honaker
PO Box 1028

Bridgeport, WV 26330

CUSTOMER: Gas Analytical Services
FIELD : EQT Production
LOCATION : 512447
SAMPLE POINT: Wellhead
REPORT DATE: 8/13/2011
SAMPLE DATE: 07/28/2011 11:15
SAMPLED BY: SA - GAS
MEMO:

TYPE: Gas
REPORT: C10+ (GPA Method 2286)
CYLINDER: GAS
PRESSURE: 356
TEMPERATURE: N.G.

COMPONENT	MOL %	WEIGHT %	GPM's @ 14.73
N2	0.500	0.686	
METHANE	78.384	61.628	
CO2	0.172	0.372	
ETHANE	14.497	21.365	3.876
PROPANE	4.366	9.435	1.203
I-BUTANE	0.494	1.407	0.162
N-BUTANE	1.005	2.862	0.317
I-PENTANE	0.198	0.701	0.072
N-PENTANE	0.201	0.711	0.073
I-HEXANES	0.068	0.282	0.027
N-HEXANE	0.049	0.179	0.018
BENZENE	0.001	0.005	NIL
CYCLOHEXANE	0.006	0.023	0.002
I-HEPTANES	0.025	0.122	0.011
N-HEPTANE	0.010	0.049	0.005
TOLUENE	0.002	0.009	0.001
I-OCTANES	0.012	0.075	0.007
N-OCTANE	0.003	0.015	0.001
*E-BENZENE	NIL	0.001	NIL
*m,o,&p-XYLENE	0.002	0.007	NIL
I-NONANES	0.001	0.023	0.002
N-NONANE	0.001	0.006	0.001
I-DECANES	NIL	0.007	0.001
N-DECANE	NIL	0.003	NIL
I-UNDECANES +	0.004	0.027	0.002
TOTALS	100.000	100.000	5.781

LAFAYETTE LABORATORY
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA 70583-1790
PHONE (337) 237-4775
FAX (337) 237-8005

Certificate of Analysis Number: **2011080059-002A**

FOR: Gas Analytical Services
Chuck Honaker
PO Box 1028

Bridgeport, WV 26330

CUSTOMER: Gas Analytical Services
FIELD : EQT Production
LOCATION : 512447
SAMPLE POINT: Wellhead
REPORT DATE: 8/13/2011
SAMPLE DATE: 07/28/2011 11:15
SAMPLED BY: SA - GAS
MEMO:

TYPE: Gas
REPORT: C6+
CYLINDER: GAS
PRESSURE: 356
TEMPERATURE: N.G.

COMPONENT	MOL %	WEIGHT %	GPM's @ 14.73
N2	0.500	0.686	
METHANE	78.384	61.628	
CO2	0.172	0.372	
ETHANE	14.497	21.365	3.876
PROPANE	4.366	9.435	1.203
I-BUTANE	0.494	1.407	0.162
N-BUTANE	1.005	2.862	0.317
I-PENTANE	0.198	0.701	0.072
N-PENTANE	0.201	0.711	0.073
HEXANES PLUS	0.183	0.833	0.078
TOTALS	100.000	100.000	5.781

CALCULATED VALUES	TOTAL	C6+	C7+	C8+	C9+	C10+
MOLECULAR WEIGHT	20.403	93.11	104.877	132.026	149.9	151.609
REAL DRY BTU AT 14.73 PSIA, 60°F	1239.3	5084.0	5636.6	6980.4	7943.9	8571.2
REAL WET BTU AT 14.73 PSIA, 60°F	1218.6	4996.4	5539.4	6859.8	7806.5	8422.9
RELATIVE DENSITY	0.7064	3.2106	3.6041	4.4966	5.0861	5.4445

	C2+	IC5+
GPM's AT 14.73	5.781	0.223
COMPRESSIBILITY FACTOR	0.9966	

LAFAYETTE LABORATORY
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA 70583-1790
PHONE (337) 237-4775
FAX (337) 237-8005

Certificate of Analysis Number: **2011080059-002A**

FOR: Gas Analytical Services
Chuck Honaker
PO Box 1028

Bridgeport, WV 26330

CUSTOMER: Gas Analytical Services
FIELD : EQT Production
LOCATION : 512447
SAMPLE POINT: Wellhead
REPORT DATE: 8/13/2011
SAMPLE DATE: 07/28/2011 11:15
SAMPLED BY: SA - GAS
MEMO:

TYPE: Gas
REPORT: C7+
CYLINDER: GAS
PRESSURE: 356
TEMPERATURE: N.G.

COMPONENT	MOL %	WEIGHT %	GPM's @ 14.73
N2	0.500	0.686	
METHANE	78.384	61.628	
CO2	0.172	0.372	
ETHANE	14.497	21.365	3.876
PROPANE	4.366	9.435	1.203
I-BUTANE	0.494	1.407	0.162
N-BUTANE	1.005	2.862	0.317
I-PENTANE	0.198	0.701	0.072
N-PENTANE	0.201	0.711	0.073
HEXANES	0.116	0.461	0.045
HEPTANES PLUS	0.067	0.372	0.033
TOTALS	100.000	100.000	5.781

CALCULATED VALUES	TOTAL	C6+	C7+
MOLECULAR WEIGHT	20.403	93.11	104.877
REAL DRY BTU AT 14.73 PSIA, 60°F	1239.3	5084.0	5636.6
REAL WET BTU AT 14.73 PSIA, 60°F	1218.6	4996.4	5539.4
RELATIVE DENSITY	0.7064	3.2106	3.6041

	C2+	IC5+
GPM's AT 14.73	5.781	0.223
COMPRESSIBILITY FACTOR	0.9966	

20110800019

Gas Analytical Services, Inc.

P.O. Box 1028, Bridgeport, WV 26330
205 Water Street, Stonewood, WV 26301
(304) 623-0020 fax: (304) 624-8076
email: lab@gasana.com

RUSH

Referred to: Southern Petroleum Labs
500 Ambassador Caffery Parkway
Scott, LA 70583
attn: Patti Petro

Date: 8/2/2011

**24 Hr. T/A

Testing Requested

** SCF Base Conditions: P_b 14.73 psia / T_b: 60 Df

	Client	Location	Date of Collection	Sulfur Speciation (GPA-2199)	Total Sulfur (GPA-2199)	Extended Hydrocarbon C1..C10 (GPA-2286)	Hydrocarbon Dewpoint	Gas Temperature
1	EQT Production	512432	7/30/2011			X		
2	EQT Production	512447	7/28/2011			X		
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

Please email results to:
lab@gasana.com

Honaker

Submitted by:
Chuck Honaker, Manager
Laboratory Services

Received by: 8/5/11

Gas Analytical Services

Telephone: 304-623-0020
205 Water Street
Stonewood, WV 26301

Date of Collection: 7/30/11
Time of Collection: 8:00 PM
Meter ID Number: 512432

Company Name: EQT Prod
Sample Source: 512432
Sample Pressure: 340 psi.

Sample Type:
☒ Wellhead ☐ Submeter ☐ Master Meter ☐ Alternative Fuel ☐ Source Analysis

Sampled By: Scott Andrew
Who declares that this sample was obtained from the source indicated above.

Comments: Extended Analysis 24 Hr Turnaround
Results to Greg Shockley

20110800059-001A

Gas Analytical Services

Telephone: 304-623-0020
205 Water Street
Stonewood, WV 26301

Date of Collection: 7/28/11
Time of Collection: 11:15 AM
Meter ID Number: 512447

Company Name: EQT Prod.
Sample Source: 512447
Sample Pressure: 356 psi.

Sample Type:
☒ Wellhead ☐ Submeter ☐ Master Meter ☐ Alternative Fuel ☐ Source Analysis

Sampled By: Rob Carter
Who declares that this sample was obtained from the source indicated above.

Comments: Extended Analysis 24 Hr Turnaround
Results to Greg Shockley

001A

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
C001 (S020-S025, S019)	1.15	5.03	0.96	4.22	1.77	6.85	0.01	0.03	0.09	0.38	0.09	0.38	0.17	0.72	1,375.24	6,023.53
E016	0.11	0.48	0.09	0.40	0.01	0.03	6.6E-04	2.9E-03	0.01	0.04	0.01	0.04	0.00	0.01	135.14	591.90
E017	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	0.00	0.00	1.52	6.64
E018	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	0.00	0.00	1.52	6.64
E019	---	---	---	---	4.79	1.25	---	---	---	---	---	---	---	---	---	---
Fugitives	---	---	---	---	---	12.36	---	---	---	---	---	---	---	---	---	213.07
Haul Roads	---	---	---	---	---	---	---	---	---	0.30	---	0.03	---	8.52	---	---
Facility Total	1.26	5.52	1.06	4.64	6.57	20.48	0.01	0.03	0.10	0.72	0.10	0.45	0.17	9.26	1,513.41	6,841.79
Facility Total (excl. fugitives)	1.26	5.52	1.06	4.64	6.57	8.12	0.01	0.03	0.10	0.42	0.10	0.42	0.17	0.74	1,513.41	6,628.72

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
C001 (S020-S025, S019)	---	---	1.8E-03	7.2E-03	3.8E-03	1.6E-02	1.1E-04	4.3E-04	1.7E-03	6.6E-03	0.07	0.28	0.10	0.38
E016	8.2E-05	3.6E-04	2.3E-06	1.0E-05	3.7E-06	1.6E-05	---	---	---	---	2.0E-03	0.01	2.1E-03	0.01
E017	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
E018	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
E019	---	---	2.9E-03	7.4E-04	0.01	1.5E-03	1.8E-04	4.8E-05	3.6E-03	9.5E-04	0.18	0.05	0.24	0.06
Fugitives	---	---	---	0.01	---	0.01	---	0.0E+00	---	0.01	---	0.20	---	0.39
Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Facility Total	8.4E-05	3.7E-04	4.6E-03	0.01	0.01	0.03	2.9E-04	4.7E-04	0.01	0.01	0.25	0.53	0.34	0.84
Facility Total (excl. fugitives)	8.4E-05	3.7E-04	4.6E-03	0.01	9.7E-03	1.7E-02	2.9E-04	4.7E-04	5.3E-03	7.6E-03	0.25	0.33	0.34	0.45

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

ATTACHMENT V – CLASS I LEGAL ADVERTISEMENT

Publication of a proper Class I legal advertisement is a requirement of the G70-D registration process. In the event the applicant's legal advertisement fails to follow the requirements of 45CSR13, Section 8 or the requirements of Chapter 59, Article 3, of the West Virginia Code, the application will be considered incomplete and no further review of the application will occur until this is corrected.

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

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

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

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

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

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

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

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 the natural gas production facility OXF-121 located off Straight Fork Road in Doddridge County, West Virginia. The latitude and longitude coordinates are: 39°8'8.34''N, -80°49'14.36''W. The project includes the installation of six (6) 400 bbl storage tanks which will replace the existing storage tanks at the site.

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

Pollutant	Emissions in tpy (tons per year)
NOx	5.52
CO	4.64
VOC	6.88
SO_2	0.03
PM	0.42
Formaldehyde	3.7E-04
BTEX	0.06
n-Hexane	0.04
Total HAPs	0.53
Carbon Dioxide Equivalents (CO_2e)	6,628.72

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)**, 2016.

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

ATTACHMENT W

General Permit Registration Application Fee