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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-115 Natural Gas Production Site
Permit No. R13-3021, Plant ID No. 017-00043

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-115 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,

R. Alex Bosiljevac
EQT Corporation

Enclosures

PROJECT REPORT

EQT Production
OXF 115 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-115, located in Doddridge County, West Virginia. The OXF 115 wellpad is currently permitted under R13-3021. This general permit application is to replace the four (4) existing 210 barrel (bbl) storage tanks with a new 400 bbl storage vessel and also convert the existing R13 permit to a G70-D.

1.1. FACILITY AND PROJECT DESCRIPTION

The OXF-115 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 115 wellpad currently consists of the following equipment

- Four (4) 210 barrel (bbl) storage tanks for condensate/water (produced fluids);
- One (1) thermoelectric generator (TEG) 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 equipment at the OXF-115 pad:

- One (1) 400 barrel (bbl) storage tank for condensate/water(produced fluids)

The proposed tank will replace the four (4) existing storage tanks located at the wellpad. Additionally, EQT requests that the department consolidate all existing equipment associated with this wellpad and their requirements under the current R13-3021 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	0.01	50
Carbon Monoxide	4.5E-03	80
Volatile Organic Compounds	0.33	80
Particulate Matter – 10/2.5	4.1E-04	20
Sulfur Dioxide	3.2E-05	20
Individual HAP (n-hexane)[1]	0.04	8
Total HAP[1]	0.10	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-115 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-115 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-115 Pad. Therefore, the OXF-115 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; **(Not Applicable)**
- Attachment T: Emission Calculations;
- Attachment U: Emission Summary Sheet;
- Attachment V: Class I Legal Advertisement; and
- Attachment W: General Permit Registration Application Fee.

2. SAMPLE EMISSION SOURCE CALCULATIONS

The characteristics of 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 TEG, 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.

- **TEG:** 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]

- **Storage Tank:** Working, breathing and flashing emissions of VOC and HAPs from the storage tank at the facility is calculated using Bryan Research & Engineering ProMax® Software. The throughput for the produced fluids tank is based on the maximum annualized monthly produced water at the OXF-115 well pad (i.e., the maximum monthly throughput for the pad times 12), and includes a safety factor of 1.90. The produced fluids throughput is calculated as follows:

$$Throughput\ \left(\frac{bbl}{day}\right) = \left(Condensate\ Throughput\ \left(\frac{bbl}{month}\right) + \left(Produced\ Water\ Throughput\ \left(\frac{bbl}{month}\right)\right)\right) * \frac{12\left(\frac{months}{year}\right)}{365\left(\frac{days}{year}\right)} \text{ x } 1.90$$

- **Tank Truck Loading:** Uncontrolled emissions of VOC and HAPs from the loading of organic liquids from storage tank to tank truck are calculated using Bryan Research Engineering ProMax® Software.

- **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.[4]

[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, 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.[5]. 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.

[5] 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 tank at the wellpad will 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 finally published 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 one (1) produced fluid storage vessel at the wellpad. The storage vessel will 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 tank will not be a 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. Since there are no line heaters at the facility, 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 heaters are fuel burning units and therefore must comply with this regulation. Per 45 CSR 2-3, opacity of emissions from units shall not exceed 10 percent.

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

According to 45 CSR 4-3:

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

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

3.5.3. 45 CSR 16: Standards of Performance for New Stationary Sources

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

3.5.4. 45 CSR 17: To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage and Other Sources of Fugitive Particulate Matter

According to 45 CSR 17-3.1:

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

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

3.5.5. 45 CSR 21-28: Petroleum Liquid Storage in Fixed Roof Tanks

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

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

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

3.5.7. Non-Applicability of Other SIP Rules

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

4. G70-D APPLICATION FORMS

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

west virginia department of environmental protection

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

G70-D GENERAL PERMIT REGISTRATION APPLICATION

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

☒CONSTRUCTION (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-115 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: 39.144750°
Longitude: -80.80653°

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities) 017-00043

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 one (1) 400 barrel condensate liquid tank.
Directions to the facility: I-79 to the Clarksburg exit 119. Turn onto Rt. 50 West and go 31.5 miles to Sunnyside Road. Turn left onto Sunnyside road and go 1.7 miles to Oxford Road (Rt.21).Turn left and go 5.3 miles and turn left onto Taylor Drain Road. Go 4.1 miles to a Y intersection and turn right. Go 1.2 miles and turn left through concrete bridge onto Straight Fork. Go 1.5 miles to lease road on the left. Go 9/10m mile to top of the hill and bear left past old pit road, continue approx. 800ft. to the pad.

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

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

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

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

This certificate is issued on: 08/4/2010

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

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

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

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

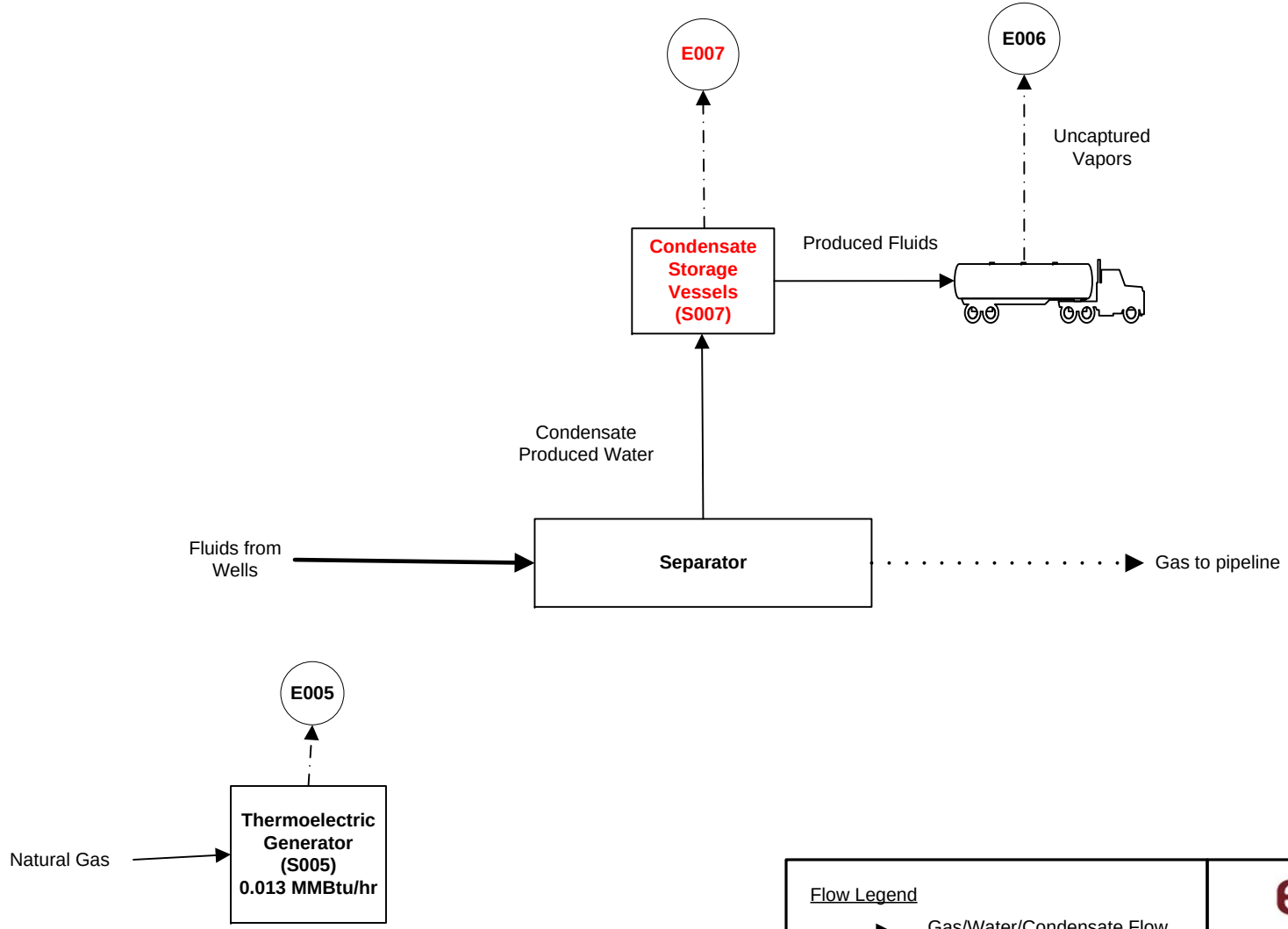
Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

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

atL006 v.3
L0553297664

ATTACHMENT D

Process Flow Diagram



EQT Where energy meets innovation.

EQT Production

Process Flow Diagram
OXF 115 Wellpad

Trinity Consultants

November 2016

ATTACHMENT E

Process Description

ATTACHMENT E – PROCESS DESCRIPTION

EQT is submitting this application to permit the installation of one (1) 400 bbl condensate tank to replace the existing four (4) condensate 210 bbl storage tanks at the wellpad. The OXF-115 wellpad is currently authorized to operate under R13-3021.

The project involves the construction and operation of support facilities associated with a natural gas production wellpad operation. The OXF115 wellpad consists of one well. The incoming gas stream from the underground well passes through a 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 tanks. Once the tank is filled, the contents are loaded into trucks for transport. Electricity is provided by a thermoelectric generator.

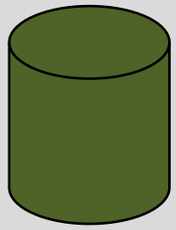
A process flow diagram is included as Attachment D.

ATTACHMENT F

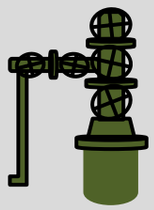
Plot Plan

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

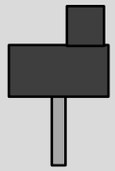
Entrance to OXF-115 pad



Produced Fluid Tanks
400 bbl (1)
S007



Wellheads (1)



Thermoelectric Generators
(1)
S005

Attachment F
OXF-115 Well Pad Plot Plan

ATTACHMENT G

Area Map

ATTACHMENT G

Figure 1 - Map of OXF115 Location

Note – Ring represents 300 ft radius around wellpad equipment

UTM Northing (KM): 4,332.857
UTM Easting (KM): 516.718
Elevation (m): 375

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	E001	Condensate Storage Tank	2009	2009	210 bbl	Existing - Removed	None	--
S002	E002	Condensate Storage Tank	2009	2009	210 bbl	Existing - Removed	None	--
S003	E003	Condensate Storage Tank	2009	2009	210 bbl	Existing - Removed	None	--
S004	E004	Condensate Storage Tank	2009	2009	210 bbl	Existing - Removed	None	--
S005	E005	Thermoelectric Generator	2009	2009	0.013 MMBtu/hr	Existing; No change	None	--
S006	S006	Uncaptured Liquid Loading	2009/2016	2009/2016	444,570 gal/yr	Modified; Increased Throughput	None	--
S007	E007	Produced Fluid Storage Tank	2016	2016	400 bbl	New	None	--

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
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	2	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☐ Gas ☒ Liquid ☐ Both	0.58	0.02	0.11
Valves	☐ Yes ☒ No	32	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	0.30	0.01	3.12
Safety Relief Valves	☐ Yes ☒ No	4	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☒ Gas ☐ Liquid ☐ Both	0.66	0.02	0.59
Open Ended Lines	☐ Yes ☒ No	2	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☐ Gas ☐ Liquid ☒ Both	4.1E-03	1.3E-04	0.34
Sampling Connections	☐ Yes ☐ No	---	N/A	☐ Gas ☐ Liquid ☐ Both	--	--	--
Connections (Not sampling)	☐ Yes ☒ No	134	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	0.39	0.01	1.47
Compressors	☐ Yes ☐ No	---	N/A	☐ Gas ☐ Liquid ☐ Both	--	--	--
Flanges	☐ Yes ☐ No	---	(included in connections)	☐ Gas ☐ Liquid ☐ Both	--	--	--
Other[1]	☐ Yes ☒ No	5	40 CFR 98 Subpart W	☒ Gas ☐ Liquid ☐ Both	0.88	0.03	36.63

[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?
047-017-05790	8/7/2009	7/2/2009	Green	No

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-115 Wellpad	2. Tank Name Produced Fluid Tanks (water and condensate)
3. Emission Unit ID number S007	4. Emission Point ID number E007
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)* Changing the existing four (4) 210 barrel produced fluid tanks for one (1) 400 barrel tank.	
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]
S005	E005	Thermoelectric Generator	2009	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#: S006	Emission Point ID#: E006	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]	N/A		

Max. Collection Efficiency (%)		0%		
Max. Control Efficiency (%)		0%		
Max.VOC Emission Rate	Loading (lb/hr)	See attached emission calculations for breakdown		
	Annual (ton/yr)	See attached emission calculations for breakdown		
Max.HAP Emission Rate	Loading (lb/hr)	See attached emission calculations for breakdown		
	Annual (ton/yr)	See attached emission calculations for breakdown		
Estimation Method[5]		AP-42 Section 5.2 Methodology (via ProMax)		

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill

2 At maximum bulk liquid temperature

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

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

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

ATTACHMENT P

Glycol Dehydrator Data Sheet *(Not Applicable)*

ATTACHMENT P – GLYCOL DEHYDRATION UNIT DATA SHEET - NOT APPLICABLE

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

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

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

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

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

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

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

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

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

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

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

Control Device Technical Data

Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)

Emissions Data

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

			GHG (CO_2e)		
	Glycol Regenerator Still Vent	GRI-GlyCalc™	VOC		
		GRI-GlyCalc™	Benzene		
		GRI-GlyCalc™	Toluene		
		GRI-GlyCalc™	Ethylbenzene		
		GRI-GlyCalc™	Xylenes		
		GRI-GlyCalc™	n-Hexane		
	Glycol Flash Tank	GRI-GlyCalc™	VOC		
		GRI-GlyCalc™	Benzene		
		GRI-GlyCalc™	Toluene		
		GRI-GlyCalc™	Ethylbenzene		
		GRI-GlyCalc™	Xylenes		
		GRI-GlyCalc™	n-Hexane		

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

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

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

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

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

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

ATTACHMENT Q

Pneumatic Controller Data Sheet

ATTACHMENT Q – PNEUMATIC CONTROLLERS DATA SHEET

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

☐ Yes ☒ No

Please list approximate number.

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

☐ Yes ☒ No

Please list approximate number.

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

☐ Yes ☒ No

Please list approximate number.

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

☐ Yes ☒ No

Please list approximate number.

ATTACHMENT R

Pneumatic Pump Data Sheet

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 (Not Applicable)

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

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

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

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

VAPOR COMBUSTION – NOT APPLICABLE
(Including Enclosed Combustors)

General Information

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

Control Device Information

Type of Vapor Combustion Control?

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

Manufacturer: Model:	Hours of operation per year?

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

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

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

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

Waste Gas Information

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

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

Pilot Gas Information

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

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

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

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

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

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

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

VAPOR RECOVERY UNIT – NOT APPLICABLE

General Information

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

Device Information

Manufacturer:
Model:

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

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

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

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

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

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

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

ATTACHMENT T

Emission Calculations

Company Name: **EQT Production, LLC**
Facility Name: **OXF 115 Well Pad**
Project Description: **G70D Application**

Facility-Wide Emission Summary - Controlled

Wells	1	
Storage Tanks	1	
Sand Separator Tank	1	
Line Heaters	0	
TEGs	1	
Dehy Reboiler	0	
Glycol Dehy	0	
Dehy Drip Tank	0	
Dehy Combustor	0	
Compressor	0	
High Pressure Separator	1	
Low Pressure Separator	0	
Vapor Recovery Unit	0	
Tank Combustor	0	
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
E007	S007	Storage Vessels	---	---	---	---	0.08	0.33	---	---	---	---	---	---	0.17	0.76	4.36	19.10
E005	S005	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
E006	S006	Uncaptured Liquid Loading	---	---	---	---	1.1E-04	2.9E-05	---	---	---	---	---	---	---	---	---	---
---	---	Fugitives	---	---	---	---	---	2.82	---	---	---	---	---	---	---	1.69	---	42.24
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	0.09	---	0.01	---	---	---	---
Facility Total			1.2E-03	0.01	1.0E-03	4.5E-03	0.08	3.15	7.4E-06	3.2E-05	9.4E-05	0.09	9.4E-05	0.01	0.17	2.45	5.88	67.98
Facility Total (excluding fugitive emissions)			1.2E-03	0.01	1.0E-03	4.5E-03	0.08	0.33	7.4E-06	3.2E-05	9.4E-05	4.1E-04	9.4E-05	4.1E-04	0.17	0.76	5.88	25.74

Company Name: EQT Production, LLC
Facility Name: OXF 115 Well Pad
Project Description: G70D Application

Facility-Wide Emission Summary - Controlled

Emission Point ID #	Emission Source ID#s	Emission Source Description	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		n-Hexane		BTEX		Total HAP	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
E007	S007	Storage Vessels	---	---	6.2E-04	2.7E-03	1.2E-03	5.5E-03	8.0E-06	3.5E-05	5.8E-04	2.6E-03	2.2E-04	9.5E-04	2.5E-03	0.01	2.8E-03	0.01
E005	S005	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
E006	S006	Uncaptured Liquid Loading	---	---	1.8E-06	4.8E-07	8.1E-07	2.1E-07	1.5E-09	4.0E-10	8.7E-08	2.3E-08	1.4E-09	3.8E-10	2.7E-06	7.1E-07	2.7E-06	7.1E-07
---	---	Fugitives	---	---	---	1.1E-03	---	2.5E-03	---	<0.01	---	1.5E-03	---	0.04	<0.01	0.01	---	0.09
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Facility Total			9.3E-07	4.1E-06	6.2E-04	3.8E-03	1.3E-03	0.01	8.0E-06	3.5E-05	5.8E-04	4.0E-03	2.4E-04	0.04	2.5E-03	0.02	2.8E-03	0.10
Facility Total (excluding fugitive emissions)			9.3E-07	4.1E-06	6.2E-04	2.7E-03	1.3E-03	5.5E-03	8.0E-06	3.5E-05	5.8E-04	2.6E-03	2.4E-04	1.0E-03	2.5E-03	0.01	2.8E-03	0.01

Company Name: EQT Production, LLC
Facility Name: OXF 115 Well Pad
Project Description: G70D Application

Produced Fluids Storage Vessels

Potential Throughput

Operational Hours	8,760	hrs/yr
Maximum Condensate Throughput[1]	7	bbl/day
Maximum Produced Water Throughput[1]	22	bbl/day

[1] Based on the highest monthly throughput recorded at the site (April 2014). Includes a safety factor of 90%
Overall Control Efficiency of Combustor 0%

Storage Tanks - Uncontrolled

	Breathing		Working		Flashing		Total Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Methane	<0.001	<0.001	<0.001	<0.001	0.174	0.764	0.174	0.764
Ethane	<0.001	<0.001	<0.001	<0.001	0.067	0.292	0.067	0.292
Propane	1.1E-06	4.8E-06	6.6E-06	2.9E-05	0.050	0.221	0.050	0.221
Isobutane	2.5E-08	1.1E-07	1.5E-07	6.6E-07	0.005	0.020	0.005	0.020
n-Butane	6.3E-08	2.8E-07	3.8E-07	1.7E-06	0.013	0.057	0.013	0.057
Isopentane	2.9E-09	1.3E-08	1.7E-08	7.6E-08	0.002	0.010	0.002	0.010
n-Pentane	3.8E-10	1.7E-09	2.3E-09	9.9E-09	0.001	0.004	0.001	0.004
n-Hexane	1.6E-11	6.8E-11	9.3E-11	4.1E-10	2.2E-04	0.001	2.2E-04	0.001
Cyclohexane	4.4E-10	1.9E-09	2.7E-09	1.2E-08	5.0E-04	0.002	5.0E-04	0.002
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	2.6E-12	1.1E-11	1.5E-11	6.8E-11	1.7E-04	0.001	1.7E-04	0.001
n-Octane	1.1E-14	4.6E-14	6.3E-14	2.8E-13	5.5E-06	2.4E-05	5.5E-06	2.4E-05
n-Nonane	2.5E-15	1.1E-14	1.5E-14	6.5E-14	4.3E-06	1.9E-05	4.3E-06	1.9E-05
n-Decane	1.0E-16	4.5E-16	6.1E-16	2.7E-15	2.0E-06	8.8E-06	2.0E-06	8.8E-06
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	1.4E-10	6.0E-10	8.2E-10	3.6E-09	0.001	0.003	0.001	0.003
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	2.0E-08	8.7E-08	1.2E-07	5.2E-07	0.001	0.003	0.001	0.003
Toluene	8.7E-09	3.8E-08	5.2E-08	2.3E-07	0.001	0.005	0.001	0.005
Ethylbenzene	1.7E-11	7.3E-11	1.0E-10	4.4E-10	8.0E-06	3.5E-05	8.0E-06	3.5E-05
m-Xylene	9.4E-10	4.1E-09	5.6E-09	2.5E-08	0.001	0.003	0.001	0.003
Isooctane	2.5E-12	1.1E-11	1.5E-11	6.6E-11	9.2E-05	4.0E-04	9.2E-05	4.0E-04
Total VOC Emissions:	0.00	0.00	0.00	0.00	0.08	0.33	0.08	0.33
Total HAP Emissions:	3.0E-08	0.00	0.00	0.00	0.00	0.01	0.00	0.01

[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] Composition of condensate from OXF-115 sample from 04/10/2013.

Company Name: EQT Production, LLC
Facility Name: OXF 115 Well Pad
Project Description: G70D 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	0.174	0.764	0.174	0.764
Ethane	<0.001	<0.001	<0.001	<0.001	0.067	0.292	0.067	0.292
Propane	1.1E-06	4.8E-06	6.6E-06	2.9E-05	0.050	0.221	0.050	0.221
Isobutane	2.5E-08	1.1E-07	1.5E-07	6.6E-07	0.005	0.020	0.005	0.020
n-Butane	6.3E-08	2.8E-07	3.8E-07	1.7E-06	0.013	0.057	0.013	0.057
Isopentane	2.9E-09	1.3E-08	1.7E-08	7.6E-08	0.002	0.010	0.002	0.010
n-Pentane	3.8E-10	1.7E-09	2.3E-09	9.9E-09	0.001	0.004	0.001	0.004
n-Hexane	1.6E-11	6.8E-11	9.3E-11	4.1E-10	2.2E-04	0.001	2.2E-04	0.001
Cyclohexane	4.4E-10	1.9E-09	2.7E-09	1.2E-08	5.0E-04	0.002	5.0E-04	0.002
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	2.6E-12	1.1E-11	1.5E-11	6.8E-11	1.7E-04	0.001	1.7E-04	0.001
n-Octane	1.1E-14	4.6E-14	6.3E-14	2.8E-13	5.5E-06	2.4E-05	5.5E-06	2.4E-05
n-Nonane	2.5E-15	1.1E-14	1.5E-14	6.5E-14	4.3E-06	1.9E-05	4.3E-06	1.9E-05
n-Decane	1.0E-16	4.5E-16	6.1E-16	2.7E-15	2.0E-06	8.8E-06	2.0E-06	8.8E-06
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	1.4E-10	6.0E-10	8.2E-10	3.6E-09	0.001	0.003	0.001	0.003
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	2.0E-08	8.7E-08	1.2E-07	5.2E-07	0.001	0.003	0.001	0.003
Toluene	8.7E-09	3.8E-08	5.2E-08	2.3E-07	0.001	0.005	0.001	0.005
Ethylbenzene	1.7E-11	7.3E-11	1.0E-10	4.4E-10	8.0E-06	3.5E-05	8.0E-06	3.5E-05
m-Xylene	9.4E-10	4.1E-09	5.6E-09	2.5E-08	0.001	0.003	0.001	0.003
Isooctane	2.5E-12	1.1E-11	1.5E-11	6.6E-11	9.2E-05	4.0E-04	9.2E-05	4.0E-04
Total VOC Emissions:	1.2E-06	0.00	0.00	0.00	0.08	0.33	0.08	0.33
Total HAP Emissions:	3.0E-08	1.3E-07	1.8E-07	7.8E-07	2.8E-03	0.01	0.00	0.01

Company Name:	**EQT Production, LLC**
Facility Name:	**OXF 115 Well Pad**
Project Description:	**G70D Application**

Thermoelectric Generators

Source Designation:	**S005**
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 115 Well Pad
Project Description: G70D Application

Thermoelectric Generators

Hazardous Air Pollutant (HAP) Potential Emissions:

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

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

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

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

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

Company Name: EQT Production, LLC
Facility Name: OXF 115 Well Pad
Project Description: G70D Application

Liquid Loading

Throughput 444,570 gal/yr
Capture Efficiency 0% non-tested tanker trucks
Control Efficiency 0% Combustor destruction efficiency

Liquid Loading Emissions

	Uncontrolled Emissions		Uncaptured Emissions		Controlled Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Propane	1.0E-04	2.6E-05	1.0E-04	2.6E-05	<0.001	<0.001
Isobutane	2.3E-06	6.1E-07	2.3E-06	6.1E-07	<0.001	<0.001
n-Butane	5.9E-06	1.5E-06	5.9E-06	1.5E-06	<0.001	<0.001
Isopentane	2.7E-07	7.0E-08	2.7E-07	7.0E-08	<0.001	<0.001
n-Pentane	3.5E-08	9.1E-09	3.5E-08	9.1E-09	<0.001	<0.001
n-Hexane	1.4E-09	3.8E-10	1.4E-09	3.8E-10	<0.001	<0.001
Cyclohexane	4.1E-08	1.1E-08	4.1E-08	1.1E-08	<0.001	<0.001
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	2.4E-10	6.2E-11	2.4E-10	6.2E-11	<0.001	<0.001
n-Octane	9.7E-13	2.5E-13	9.7E-13	2.5E-13	<0.001	<0.001
n-Nonane	2.3E-13	6.0E-14	2.3E-13	6.0E-14	<0.001	<0.001
n-Decane	9.5E-15	2.5E-15	9.5E-15	2.5E-15	<0.001	<0.001
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	1.3E-08	3.3E-09	1.3E-08	3.3E-09	<0.001	<0.001
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	1.8E-06	4.8E-07	1.8E-06	4.8E-07	<0.001	<0.001
Toluene	8.1E-07	2.1E-07	8.1E-07	2.1E-07	<0.001	<0.001
Ethylbenzene	1.5E-09	4.0E-10	1.5E-09	4.0E-10	<0.001	<0.001
m-Xylene	8.7E-08	2.3E-08	8.7E-08	2.3E-08	<0.001	<0.001
Isooctane	2.3E-10	6.1E-11	2.3E-10	6.1E-11	<0.001	<0.001
Total VOC Emissions:	1.13E-04	2.93E-05	1.13E-04	2.93E-05	<0.001	<0.001
Total HAP Emissions:	2.74E-06	7.13E-07	2.74E-06	7.13E-07	<0.001	<0.001

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

Company Name: EQT Production, LLC
Facility Name: OXF 115 Well Pad
Project Description: G70D Application

Fugitive Emissions

Fugitive Emissions from Component Leaks

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

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

Fugitive VOC/Total Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Annual Fugitive Emissions (tpy)	Weight Fraction VOC	Weight Fraction HAP	VOC Emissions[3] (tpy)	HAP Emissions[3] (tpy)
Pumps	Light Liquid	0.01990	3	0.58	1.00	0.03	0.58	0.02
Valves	Gas	0.00597	32	1.82	0.17	0.01	0.30	0.01
Pressure Relief Valves	Gas	0.10400	4	4.02	0.17	0.01	0.66	0.02
Open-Ended Lines	All	0.00170	2	0.02	0.17	0.01	4.1E-03	1.3E-04
Connectors	All	0.00183	134	2.36	0.17	0.01	0.39	0.01
Intermittent Pneumatic Devices[4]	Gas	13.5	5	---	---	---	0.88	0.03
			Emission Totals:	**8.79**	**---**	**---**	**2.82**	**0.09**

[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 115 Well Pad
Project Description: G70D Application

Fugitive Emissions

Fugitive Specific HAP Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Annual Fugitive Emissions (tpy)	Benzene Emissions[3] (tpy)	Toluene Emissions[3] (tpy)	Ethylbenzene Emissions[3] (tpy)	Xylene Emissions[3] (tpy)	n-Hexane Emissions[4] (tpy)
Pumps	Light Liquid	0.01990	3	0.58	4.4E-05	1.0E-04	---	6.0E-05	1.8E-03
Valves	Gas	0.00597	32	1.82	1.4E-04	3.3E-04	---	1.9E-04	0.01
Pressure Relief Valves	Gas	0.10400	4	4.02	3.1E-04	7.2E-04	---	4.2E-04	0.01
Open-Ended Lines	All	0.00170	2	0.02	1.9E-06	4.4E-06	---	2.6E-06	7.6E-05
Connectors	All	0.00183	134	2.36	1.8E-04	4.2E-04	---	2.4E-04	0.01
Intermittent Pneumatic Devices[4]	Gas	13.5	5	---	4.1E-04	9.6E-04	---	5.5E-04	0.02
			Emission Totals:	**8.79**	**1.1E-03**	**2.5E-03**	**---**	**1.5E-03**	**0.04**

[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	3	0.01	4.4E-03	8.1E-05	0.11
Valves	32	0.027	0.12	2.3E-03	3.12
Pressure Relief Devices	4	0.04	0.02	4.3E-04	0.59
Open-Ended Lines	2	0.061	0.01	2.5E-04	0.34
Connectors	134	0.003	0.06	1.1E-03	1.47
Intermittent Pneumatic Devices	5	6	1.46	0.03	36.63
Total			**1.69**	**0.03**	**42.24**

[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: 0.53%

[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 115 Well Pad
Project Description: G70D Application

Haul Roads

Estimated Potential Road Fugitive Emissions

Unpaved Road Emissions

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

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

Description	Weight of Empty Truck (tons)	Weight of Truck w/ Max Load (tons)	Mean Vehicle Weight (tons)	Length of Unpaved Road Traveled (mile)	Trips Per Year	Mileage Per Year	Control (%)	Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
Liquids Hauling	20	40	30	0.46	111	101	0	0.22	0.06	0.01
Employee Vehicles	3	3	3	0.46	200	182	0	0.14	0.04	0.00
Total Potential Emissions								**0.36**	**0.09**	**0.01**

Company Name: **EQT Production, LLC**
Facility Name: **OXF 115 Well Pad**
Project Description: **G70D Application**

Gas Analysis

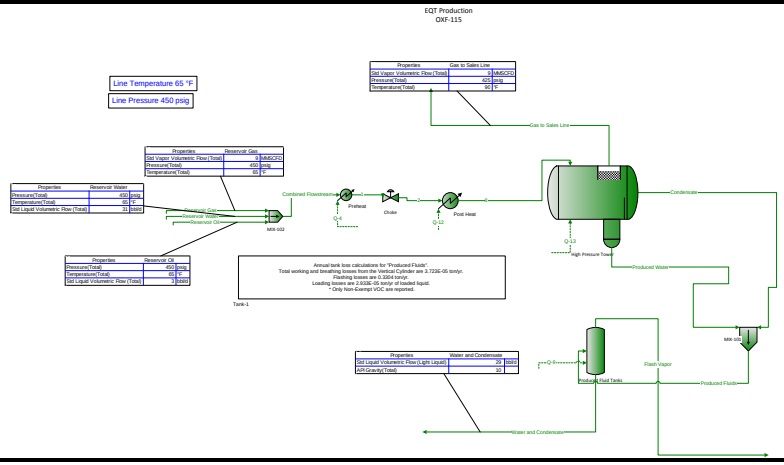
Sample Location: OXF 121 Gas Analysis
Sample Date:
HHV (Btu/scf): 1,240 Note: A conservatively low BTU content of 1,050 was used for calculations.

Constituent	Natural Gas Stream Speciation (Mole %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.532	44.01	0.23	0.01	1.143
Nitrogen	0.195	28.01	0.05	0.00	0.267
Methane	78.965	16.04	12.67	0.62	61.820
Ethane	13.780	30.07	4.14	0.20	20.224
Propane	4.195	44.10	1.85	0.09	9.029
Isobutane	0.507	58.12	0.29	0.01	1.438
n-Butane	1.013	58.12	0.59	0.03	2.874
Isopentane	0.249	72.15	0.18	0.01	0.877
n-Pentane	0.239	72.15	0.17	0.01	0.842
Cyclopentane	<0.001	70.1	0.0	0.0	0.000
n-Hexane	0.073	86.18	0.06	0.00	0.307
Cyclohexane	0.011	84.16	0.01	0.00	0.045
Other Hexanes	0.113	86.18	0.10	0.00	0.475
Heptanes	0.079	100.21	0.08	0.00	0.386
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		20.49	1.00	100

TOC (Total)	99.27	98.59
VOC (Total)	6.53	16.55
HAP (Total)	0.11	0.52

OXF-115
Plant Schematic

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	
Flowsheet:	OXF-115	



Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	
Flowsheet:	OXF-115	

Connections

	Flash Vapor	Gas to Sales Line	Produced Fluids	Reservoir Gas	Reservoir Oil
From Block	Produced Fluid Tanks	High Pressure Tower	MIX-101	--	--
To Block	--	--	Produced Fluid Tanks	MIX-102	MIX-102

Stream Composition

Mass Flow	Flash Vapor lb/h	Gas to Sales Line lb/h	Produced Fluids lb/h	Reservoir Gas lb/h	Reservoir Oil lb/h
Nitrogen	0.00111644	147.269	0.00113628	147.27 *	0 *
Methane	0.174438	12518.8	0.180809	12518.2 *	0.691921 *
CO2	0.0126667	84.7954	0.0215807	84.8045 *	0.0125123 *
Ethane	0.0665756	4095.6	0.0700584	4094.55 *	1.11737 *
Propane	0.0184157	1829.44	0.0190914	1827.95 *	1.50921 *
Isobutane	0.00169011	291.743	0.00173105	291.198 *	0.547352 *
n-Butane	0.00470377	583.263	0.00486253	581.821 *	1.44723 *
Isopentane	0.000834337	178.592	0.000853487	177.528 *	1.06513 *
n-Pentane	0.000368459	171.609	0.000372119	170.398 *	1.21125 *
n-Hexane	7.85907E-05	63.1906	7.9112E-05	62.1647 *	1.02599 *
Methylcyclopentane	0	0	0	0 *	0 *
Benzene	0.000257606	1.57694	0.00137817	1.54378 *	0.0345455 *
Cyclohexane	0.000184706	9.14795	0.000206677	9.14816 *	0 *
n-Heptane	6.14289E-05	81.3431	6.1719E-05	78.2242 *	3.11893 *
n-Octane	1.9908E-06	6.67968	1.99494E-06	3.38636 *	3.29332 *
n-Nonane	1.55439E-06	7.21196	1.55732E-06	5.06959 *	2.14237 *
n-Decane	7.33249E-07	13.1699	7.33666E-07	4.21801 *	8.95184 *
n-Undecane	0	0	0	0 *	0 *
Dodecane	0	0	0	0 *	0 *
Water	0.0106989	31.5048	420.788	0 *	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	0.0002448	97.3443	0.000248007	96.2275 *	1.11703 *
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	3.36022E-05	35.0008	3.38221E-05	34.9924 *	0.00841973 *
Decane, 2-Methyl-	0	0	0	0 *	0 *
Toluene	0.000516652	3.82605	0.00221841	3.64199 *	0.186281 *
m-Xylene	0.000235897	2.42172	0.000687183	2.09821 *	0.324194 *
Ethylbenzene	3.36974E-06	0.0309159	1.29621E-05	0 *	0.0309289 *

Volumetric Flow	Flash Vapor ft^3/h	Gas to Sales Line ft^3/h	Produced Fluids gpm	Reservoir Gas ft^3/h	Reservoir Oil gpm
Nitrogen	0.0158672	73.9556	3.08656E-06	67.3584	0
Methane	4.31665	9960.67	0.000896905	8876.99	0.00461038
CO2	0.113978	22.7367	3.42132E-05	19.8463	1.95388E-05
Ethane	0.87451	1436.78	0.000236933	1212.02	0.00489291
Propane	0.164283	367.235	5.51616E-05	289.498	0.00570418
Isobutane	0.0113978	37.0513	4.57043E-06	26.6387	0.00191737
n-Butane	0.0317001	70.9635	1.26744E-05	49.7406	0.00491711
Isopentane	0.00450887	12.7701	2.07023E-06	6.94209	0.00338359
n-Pentane	0.00199155	12.5402	9.04287E-07	6.9419	0.00381856
n-Hexane	0.000354235	2.68982	1.82662E-07	0.863044	0.00306143
Methylcyclopentane	0	0	0	0	0

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	
Flowsheet:	OXF-115	

Volumetric Flow	Flash Vapor ft^3/h	Gas to Sales Line ft^3/h	Produced Fluids gpm	Reservoir Gas ft^3/h	Reservoir Oil gpm
Benzene	0.00128436	0.0965094	2.58919E-06	0.0473226	7.59571E-05
Cyclohexane	0.000853369	0.430306	4.20702E-07	0.166034	0
n-Heptane	0.000237073	1.57392	1.37834E-07	-0.294779	0.00896928
n-Octane	6.71447E-06	0.0242	4.31399E-09	-0.0290779	0.00912905
n-Nonane	4.64652E-06	-0.085911	3.28756E-09	-0.0195154	0.00577418
n-Decane	1.96517E-06	-0.344344	1.52415E-09	0.0186628	0.0236801
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	0.235314	21.5305	0.844846	0	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	0.00110487	4.77404	5.73497E-07	2.00821	0.00336875
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	0.000113766	0.62673	7.23997E-08	-0.0789338	2.36482E-05
Decane, 2-Methyl-	0	0	0	0	0
Toluene	0.00217485	0.1313	4.12469E-06	0.0306902	0.000412209
m-Xylene	0.00085717	0.0220407	1.26717E-06	-0.0120879	0.000717687
Ethylbenzene	1.22499E-05	0.000331969	2.37746E-08	0	6.82585E-05

Mole Fraction	Flash Vapor	Gas to Sales Line	Produced Fluids	Reservoir Gas	Reservoir Oil
Nitrogen	0.00273504	0.00530876	1.73549E-06	0.00532 *	0 *
Methane	0.746217	0.78802	0.000482227	0.78965 *	0.12288 *
CO2	0.019752	0.00194569	2.09808E-05	0.00195 *	0.00081 *
Ethane	0.151947	0.137545	9.96882E-05	0.1378 *	0.10587 *
Propane	0.0286608	0.0418958	1.85245E-05	0.04195 *	0.09751 *
Isobutane	0.00199557	0.0050688	1.2743E-06	0.00507 *	0.02683 *
n-Butane	0.00555392	0.0101337	3.57951E-06	0.01013 *	0.07094 *
Isopentane	0.000793611	0.00249965	5.06141E-07	0.00249 *	0.04206 *
n-Pentane	0.000350474	0.00240192	2.20677E-07	0.00239 *	0.04783 *
n-Hexane	6.25869E-05	0.000740485	3.92792E-08	0.00073 *	0.03392 *
Methylcyclopentane	0	0	0	0 *	0 *
Benzene	0.000226326	2.03867E-05	7.54898E-07	2E-05 *	0.00126 *
Cyclohexane	0.000150617	0.000109766	1.05073E-07	0.00011 *	0 *
n-Heptane	4.20719E-05	0.000819768	2.6354E-08	0.00079 *	0.08868 *
n-Octane	1.19604E-06	5.90511E-05	7.47236E-10	3E-05 *	0.08214 *
n-Nonane	8.31729E-07	5.67839E-05	5.19524E-10	4E-05 *	0.04759 *
n-Decane	3.53669E-07	9.34714E-05	2.20624E-10	3E-05 *	0.17925 *
n-Undecane	0	0	0	0 *	0 *
Dodecane	0	0	0	0 *	0 *
Water	0.0407562	0.00176597	0.999369	0 *	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	0.00019495	0.00114071	1.23136E-07	0.00113 *	0.03693 *
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	2.01878E-05	0.000309421	1.26686E-08	0.00031 *	0.00021 *
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 115	
Flowsheet:	OXF-115	

Mole Fraction	Flash Vapor	Gas to Sales Line	Produced Fluids	Reservoir Gas	Reservoir Oil
Toluene	0.000384815	4.19331E-05	1.03016E-06	4E-05 *	0.00576 *
m-Xylene	0.000152488	2.3035E-05	2.76945E-07	2E-05 *	0.0087 *
Ethylbenzene	2.17826E-06	2.94068E-07	5.22393E-09	0 *	0.00083 *

Stream Properties

Property	Units	Flash Vapor	Gas to Sales Line	Produced Fluids	Reservoir Gas	Reservoir Oil
Temperature	°F	85	90 *	90	65 *	65 *
Pressure	psig	0 *	425	425	450 *	450 *
Mole Fraction Vapor		1	1	0	0.999241	0
Mole Fraction Light Liquid		0	0	1	0.000758828	1
Mole Fraction Heavy Liquid		0	0	0	0	0
Molecular Weight	lb/lbmol	20.1166	20.4525	18.017	20.436	79.3049
Mass Density	lb/ft^3	0.0507389	1.68412	62.0493	1.9126	41.0488
Molar Flow	lbmol/h	0.0145715	990.269	23.3721	988.184	0.350998
Mass Flow	lb/h	0.293129	20253.5	421.094	20194.5	27.8358
Vapor Volumetric Flow	ft^3/h	5.77721	12026.2	6.78644	10558.7	0.678115
Liquid Volumetric Flow	gpm	0.720275	1499.37	0.846101	1316.41	0.0845442
Std Vapor Volumetric Flow	MMSCFD	0.000132712	9.01899	0.212864	9 *	0.00319675
Std Liquid Volumetric Flow	sgpm	0.00169419	119.37	0.842954	119.222	0.0875 *
Compressibility		0.996813	0.905235	0.0216437	0.881842	0.159448
Specific Gravity		0.69457	0.706171	0.994874		0.658161
API Gravity				10.0514		82.5824
Net Ideal Gas Heating Value	Btu/ft^3	1023.24	1116.62	0.669991	1117.56	4051.33
Net Liquid Heating Value	Btu/lb	19211.5	20659.3	-1044.92	20695.2	19231.8

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	
Flowsheet:	OXF-115	

Connections

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

Stream Composition

Mass Flow	Reservoir Water lb/h	Water and Condensate lb/h			
Nitrogen	0 *	1.98433E-05			
Methane	0 *	0.00637073			
CO2	0 *	0.00891405			
Ethane	0 *	0.00348271			
Propane	0 *	0.000675722			
Isobutane	0 *	4.0947E-05			
n-Butane	0 *	0.000158755			
Isopentane	0 *	1.91498E-05			
n-Pentane	0 *	3.65977E-06			
n-Hexane	0 *	5.21243E-07			
Methylcyclopentane	0 *	0			
Benzene	0 *	0.00112056			
Cyclohexane	0 *	2.19703E-05			
n-Heptane	0 *	2.90132E-07			
n-Octane	0 *	4.14104E-09			
n-Nonane	0 *	2.92355E-09			
n-Decane	0 *	4.17394E-10			
n-Undecane	0 *	0			
Dodecane	0 *	0			
Water	452.293 *	420.778			
Triethylene Glycol	0 *	0			
Oxygen	0 *	0			
Argon	0 *	0			
Carbon Monoxide	0 *	0			
Cyclopentane	0 *	0			
Isohexane	0 *	3.20616E-06			
3-Methylpentane	0 *	0			
Neohexane	0 *	0			
2,3-Dimethylbutane	0 *	0			
Methylcyclohexane	0 *	0			
Isooctane	0 *	2.19945E-07			
Decane, 2-Methyl-	0 *	0			
Toluene	0 *	0.00170176			
m-Xylene	0 *	0.000451286			
Ethylbenzene	0 *	9.59238E-06			

Volumetric Flow	Reservoir Water gpm	Water and Condensate gpm			
Nitrogen	0	5.3701E-08			
Methane	0	3.14999E-05			
CO2	0	1.40903E-05			
Ethane	0	1.17489E-05			
Propane	0	1.94819E-06			
Isobutane	0	1.07897E-07			
n-Butane	0	4.13007E-07			
Isopentane	0	4.63661E-08			
n-Pentane	0	8.87769E-09			
n-Hexane	0	1.20146E-09			
Methylcyclopentane	0	0			
Benzene	0	2.1021E-06			

* 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 115	
Flowsheet:	OXF-115	

Volumetric Flow	Reservoir Water gpm	Water and Condensate gpm			
Cyclohexane	0	4.46538E-08			
n-Heptane	0	6.46874E-10			
n-Octane	0	8.94058E-12			
n-Nonane	0	6.16208E-12			
n-Decane	0	8.65773E-13			
n-Undecane	0	0			
Dodecane	0	0			
Water	0.904388	0.844385			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0	7.40126E-09			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0	4.70045E-10			
Decane, 2-Methyl-	0	0			
Toluene	0	3.15956E-06			
m-Xylene	0	8.31011E-07			
Ethylbenzene	0	1.75695E-08			

Mole Fraction	Reservoir Water		Water and Condensate			
Nitrogen	0	*	3.03265E-08			
Methane	0	*	1.70017E-05			
CO2	0	*	8.67167E-06			
Ethane	0	*	4.95875E-06			
Propane	0	*	6.56064E-07			
Isobutane	0	*	3.01616E-08			
n-Butane	0	*	1.16939E-07			
Isopentane	0	*	1.13634E-08			
n-Pentane	0	*	2.17169E-09			
n-Hexane	0	*	2.58959E-10			
Methylcyclopentane	0	*	0			
Benzene	0	*	6.14176E-07			
Cyclohexane	0	*	1.11765E-08			
n-Heptane	0	*	1.23963E-10			
n-Octane	0	*	1.55206E-12			
n-Nonane	0	*	9.75912E-13			
n-Decane	0	*	1.25595E-13			
n-Undecane	0	*	0			
Dodecane	0	*	0			
Water	1	*	0.999967			
Triethylene Glycol	0	*	0			
Oxygen	0	*	0			
Argon	0	*	0			
Carbon Monoxide	0	*	0			
Cyclopentane	0	*	0			
Isohexane	0	*	1.59285E-09			
3-Methylpentane	0	*	0			
Neohexane	0	*	0			
2,3-Dimethylbutane	0	*	0			
Methylcyclohexane	0	*	0			
Isooctane	0	*	8.24352E-11			
Decane, 2-Methyl-	0	*	0			
Toluene	0	*	7.90735E-07			

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	
Flowsheet:	OXF-115	

Mole Fraction	Reservoir Water	Water and Condensate			
m-Xylene	0 *	1.81989E-07			
Ethylbenzene	0 *	3.86829E-09			

Stream Properties

Property	Units	Reservoir Water	Water and Condensate			
Temperature	°F	65 *	85 *			
Pressure	psig	450 *	0			
Mole Fraction Vapor		0	0			
Mole Fraction Light Liquid		1	1			
Mole Fraction Heavy Liquid		0	0			
Molecular Weight	lb/lbmol	18.0153	18.0157			
Mass Density	lb/ft^3	62.3513	62.1273			
Molar Flow	lbmol/h	25.1061	23.3575			
Mass Flow	lb/h	452.293	420.801			
Vapor Volumetric Flow	ft^3/h	7.25394	6.7732			
Liquid Volumetric Flow	gpm	0.904388	0.844451			
Std Vapor Volumetric Flow	MMSCFD	0.228657	0.212731			
Std Liquid Volumetric Flow	sgpm	0.904167 *	0.84126			
Compressibility		0.0238459	0.000729069			
Specific Gravity		0.999717	0.996124			
API Gravity		9.94436	10.0021			
Net Ideal Gas Heating Value	Btu/ft^3	0	0.032063			
Net Liquid Heating Value	Btu/lb	-1059.76	-1059.03			

Remarks

Process Streams Report
Stream: Flash Vapor
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:12 PM, 7/25/2016	
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016	

Connections

From:	To:
Produced Fluid Tanks	--

Composition

Mass Flow	Total lb/h	Vapor lb/h			
Nitrogen	0.00111644	0.00111644			
Methane	0.174438	0.174438			
CO2	0.0126667	0.0126667			
Ethane	0.0665756	0.0665756			
Propane	0.0184157	0.0184157			
Isobutane	0.00169011	0.00169011			
n-Butane	0.00470377	0.00470377			
Isopentane	0.000834337	0.000834337			
n-Pentane	0.000368459	0.000368459			
n-Hexane	7.85907E-05	7.85907E-05			
Methylcyclopentane	0	0			
Benzene	0.000257606	0.000257606			
Cyclohexane	0.000184706	0.000184706			
n-Heptane	6.14289E-05	6.14289E-05			
n-Octane	1.9908E-06	1.9908E-06			
n-Nonane	1.55439E-06	1.55439E-06			
n-Decane	7.33249E-07	7.33249E-07			
n-Undecane	0	0			
Dodecane	0	0			
Water	0.0106989	0.0106989			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.0002448	0.0002448			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	3.36022E-05	3.36022E-05			
Decane, 2-Methyl-	0	0			
Toluene	0.000516652	0.000516652			
m-Xylene	0.000235897	0.000235897			
Ethylbenzene	3.36974E-06	3.36974E-06			

Volumetric Flow	Total ft^3/h	Vapor ft^3/h			
Nitrogen	0.0158672	0.0158672			
Methane	4.31665	4.31665			
CO2	0.113978	0.113978			
Ethane	0.87451	0.87451			
Propane	0.164283	0.164283			
Isobutane	0.0113978	0.0113978			
n-Butane	0.0317001	0.0317001			
Isopentane	0.00450887	0.00450887			
n-Pentane	0.00199155	0.00199155			
n-Hexane	0.000354235	0.000354235			
Methylcyclopentane	0	0			
Benzene	0.00128436	0.00128436			
Cyclohexane	0.000853369	0.000853369			
n-Heptane	0.000237073	0.000237073			
n-Octane	6.71447E-06	6.71447E-06			
n-Nonane	4.64652E-06	4.64652E-06			
n-Decane	1.96517E-06	1.96517E-06			
n-Undecane	0	0			

Process Streams Report
Stream: Flash Vapor
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:12 PM, 7/25/2016	
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016	

Volumetric Flow	Total ft^3/h	Vapor ft^3/h			
Dodecane	0	0			
Water	0.235314	0.235314			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.00110487	0.00110487			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0.000113766	0.000113766			
Decane, 2-Methyl-	0	0			
Toluene	0.00217485	0.00217485			
m-Xylene	0.00085717	0.00085717			
Ethylbenzene	1.22499E-05	1.22499E-05			

Mole Fraction	Total	Vapor			
Nitrogen	0.00273504	0.00273504			
Methane	0.746217	0.746217			
CO2	0.019752	0.019752			
Ethane	0.151947	0.151947			
Propane	0.0286608	0.0286608			
Isobutane	0.00199557	0.00199557			
n-Butane	0.00555392	0.00555392			
Isopentane	0.000793611	0.000793611			
n-Pentane	0.000350474	0.000350474			
n-Hexane	6.25869E-05	6.25869E-05			
Methylcyclopentane	0	0			
Benzene	0.000226326	0.000226326			
Cyclohexane	0.000150617	0.000150617			
n-Heptane	4.20719E-05	4.20719E-05			
n-Octane	1.19604E-06	1.19604E-06			
n-Nonane	8.31729E-07	8.31729E-07			
n-Decane	3.53669E-07	3.53669E-07			
n-Undecane	0	0			
Dodecane	0	0			
Water	0.0407562	0.0407562			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.00019495	0.00019495			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	2.01878E-05	2.01878E-05			
Decane, 2-Methyl-	0	0			
Toluene	0.000384815	0.000384815			
m-Xylene	0.000152488	0.000152488			
Ethylbenzene	2.17826E-06	2.17826E-06			

Properties

Property	Units	Total	Vapor			
Temperature	°F	85	85			
Pressure	psig	0 *	0			

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
Stream: Flash Vapor
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	Modified: 1:12 PM, 7/25/2016
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016

Properties

Property	Units	Total	Vapor			
Mole Fraction Vapor		1	1			
Mole Fraction Light Liquid		0	0			
Mole Fraction Heavy Liquid		0	0			
Molecular Weight	lb/lbmol	20.1166	20.1166			
Mass Density	lb/ft^3	0.0507389	0.0507389			
Molar Flow	lbmol/h	0.0145715	0.0145715			
Mass Flow	lb/h	0.293129	0.293129			
Vapor Volumetric Flow	ft^3/h	5.77721	5.77721			
Liquid Volumetric Flow	gpm	0.720275	0.720275			
Std Vapor Volumetric Flow	MMSCFD	0.000132712	0.000132712			
Std Liquid Volumetric Flow	sgpm	0.00169419	0.00169419			
Compressibility		0.996813	0.996813			
Specific Gravity		0.69457	0.69457			
API Gravity						
Net Ideal Gas Heating Value	Btu/ft^3	1023.24	1023.24			
Net Liquid Heating Value	Btu/lb	19211.5	19211.5			

Remarks

Process Streams Report
Stream: Gas to Sales Line
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	Modified: 1:10 PM, 7/25/2016
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016

Connections

From:	To:
High Pressure Tower	--

Composition

Mass Flow	Total lb/h	Vapor lb/h			
Nitrogen	147.269	147.269			
Methane	12518.8	12518.8			
CO2	84.7954	84.7954			
Ethane	4095.6	4095.6			
Propane	1829.44	1829.44			
Isobutane	291.743	291.743			
n-Butane	583.263	583.263			
Isopentane	178.592	178.592			
n-Pentane	171.609	171.609			
n-Hexane	63.1906	63.1906			
Methylcyclopentane	0	0			
Benzene	1.57694	1.57694			
Cyclohexane	9.14795	9.14795			
n-Heptane	81.3431	81.3431			
n-Octane	6.67968	6.67968			
n-Nonane	7.21196	7.21196			
n-Decane	13.1699	13.1699			
n-Undecane	0	0			
Dodecane	0	0			
Water	31.5048	31.5048			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	97.3443	97.3443			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	35.0008	35.0008			
Decane, 2-Methyl-	0	0			
Toluene	3.82605	3.82605			
m-Xylene	2.42172	2.42172			
Ethylbenzene	0.0309159	0.0309159			

Volumetric Flow	Total ft^3/h	Vapor ft^3/h			
Nitrogen	73.9556	73.9556			
Methane	9960.67	9960.67			
CO2	22.7367	22.7367			
Ethane	1436.78	1436.78			
Propane	367.235	367.235			
Isobutane	37.0513	37.0513			
n-Butane	70.9635	70.9635			
Isopentane	12.7701	12.7701			
n-Pentane	12.5402	12.5402			
n-Hexane	2.68982	2.68982			
Methylcyclopentane	0	0			
Benzene	0.0965094	0.0965094			
Cyclohexane	0.430306	0.430306			
n-Heptane	1.57392	1.57392			
n-Octane	0.0242	0.0242			
n-Nonane	-0.085911	-0.085911			
n-Decane	-0.344344	-0.344344			
n-Undecane	0	0			

Process Streams Report
Stream: Gas to Sales Line
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:10 PM, 7/25/2016	
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016	

Volumetric Flow	Total ft^3/h	Vapor ft^3/h			
Dodecane	0	0			
Water	21.5305	21.5305			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	4.77404	4.77404			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0.62673	0.62673			
Decane, 2-Methyl-	0	0			
Toluene	0.1313	0.1313			
m-Xylene	0.0220407	0.0220407			
Ethylbenzene	0.000331969	0.000331969			

Mole Fraction	Total	Vapor			
Nitrogen	0.00530876	0.00530876			
Methane	0.78802	0.78802			
CO2	0.00194569	0.00194569			
Ethane	0.137545	0.137545			
Propane	0.0418958	0.0418958			
Isobutane	0.0050688	0.0050688			
n-Butane	0.0101337	0.0101337			
Isopentane	0.00249965	0.00249965			
n-Pentane	0.00240192	0.00240192			
n-Hexane	0.000740485	0.000740485			
Methylcyclopentane	0	0			
Benzene	2.03867E-05	2.03867E-05			
Cyclohexane	0.000109766	0.000109766			
n-Heptane	0.000819768	0.000819768			
n-Octane	5.90511E-05	5.90511E-05			
n-Nonane	5.67839E-05	5.67839E-05			
n-Decane	9.34714E-05	9.34714E-05			
n-Undecane	0	0			
Dodecane	0	0			
Water	0.00176597	0.00176597			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.00114071	0.00114071			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0.000309421	0.000309421			
Decane, 2-Methyl-	0	0			
Toluene	4.19331E-05	4.19331E-05			
m-Xylene	2.3035E-05	2.3035E-05			
Ethylbenzene	2.94068E-07	2.94068E-07			

Properties

Property	Units	Total	Vapor			
Temperature	°F	90 *	90			
Pressure	psig	425	425			

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
Stream: Gas to Sales Line
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:10 PM, 7/25/2016	
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016	

Properties

Property	Units	Total	Vapor			
Mole Fraction Vapor		1	1			
Mole Fraction Light Liquid		0	0			
Mole Fraction Heavy Liquid		0	0			
Molecular Weight	lb/lbmol	20.4525	20.4525			
Mass Density	lb/ft^3	1.68412	1.68412			
Molar Flow	lbmol/h	990.269	990.269			
Mass Flow	lb/h	20253.5	20253.5			
Vapor Volumetric Flow	ft^3/h	12026.2	12026.2			
Liquid Volumetric Flow	gpm	1499.37	1499.37			
Std Vapor Volumetric Flow	MMSCFD	9.01899	9.01899			
Std Liquid Volumetric Flow	sgpm	119.37	119.37			
Compressibility		0.905235	0.905235			
Specific Gravity		0.706171	0.706171			
API Gravity						
Net Ideal Gas Heating Value	Btu/ft^3	1116.62	1116.62			
Net Liquid Heating Value	Btu/lb	20659.3	20659.3			

Remarks

Process Streams Report
Stream: Produced Fluids
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	Modified: 2:47 PM, 1/5/2016
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016

Connections

From:	To:
MIX-101	Produced Fluid Tanks

Composition

Mass Flow	Total lb/h	Light Liquid lb/h			
Nitrogen	0.00113628	0.00113628			
Methane	0.180809	0.180809			
CO2	0.0215807	0.0215807			
Ethane	0.0700584	0.0700584			
Propane	0.0190914	0.0190914			
Isobutane	0.00173105	0.00173105			
n-Butane	0.00486253	0.00486253			
Isopentane	0.000853487	0.000853487			
n-Pentane	0.000372119	0.000372119			
n-Hexane	7.9112E-05	7.9112E-05			
Methylcyclopentane	0	0			
Benzene	0.00137817	0.00137817			
Cyclohexane	0.000206677	0.000206677			
n-Heptane	6.1719E-05	6.1719E-05			
n-Octane	1.99494E-06	1.99494E-06			
n-Nonane	1.55732E-06	1.55732E-06			
n-Decane	7.33666E-07	7.33666E-07			
n-Undecane	0	0			
Dodecane	0	0			
Water	420.788	420.788			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.000248007	0.000248007			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	3.38221E-05	3.38221E-05			
Decane, 2-Methyl-	0	0			
Toluene	0.00221841	0.00221841			
m-Xylene	0.000687183	0.000687183			
Ethylbenzene	1.29621E-05	1.29621E-05			

Volumetric Flow	Total gpm	Light Liquid gpm			
Nitrogen	3.08656E-06	3.08656E-06			
Methane	0.000896905	0.000896905			
CO2	3.42132E-05	3.42132E-05			
Ethane	0.000236933	0.000236933			
Propane	5.51616E-05	5.51616E-05			
Isobutane	4.57043E-06	4.57043E-06			
n-Butane	1.26744E-05	1.26744E-05			
Isopentane	2.07023E-06	2.07023E-06			
n-Pentane	9.04287E-07	9.04287E-07			
n-Hexane	1.82662E-07	1.82662E-07			
Methylcyclopentane	0	0			
Benzene	2.58919E-06	2.58919E-06			
Cyclohexane	4.20702E-07	4.20702E-07			
n-Heptane	1.37834E-07	1.37834E-07			
n-Octane	4.31399E-09	4.31399E-09			
n-Nonane	3.28756E-09	3.28756E-09			
n-Decane	1.52415E-09	1.52415E-09			
n-Undecane	0	0			

Process Streams Report
Stream: Produced Fluids
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 2:47 PM, 1/5/2016	
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016	

Volumetric Flow	Total gpm	Light Liquid gpm			
Dodecane	0	0			
Water	0.844846	0.844846			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	5.73497E-07	5.73497E-07			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	7.23997E-08	7.23997E-08			
Decane, 2-Methyl-	0	0			
Toluene	4.12469E-06	4.12469E-06			
m-Xylene	1.26717E-06	1.26717E-06			
Ethylbenzene	2.37746E-08	2.37746E-08			

Mole Fraction	Total	Light Liquid			
Nitrogen	1.73549E-06	1.73549E-06			
Methane	0.000482227	0.000482227			
CO2	2.09808E-05	2.09808E-05			
Ethane	9.96882E-05	9.96882E-05			
Propane	1.85245E-05	1.85245E-05			
Isobutane	1.2743E-06	1.2743E-06			
n-Butane	3.57951E-06	3.57951E-06			
Isopentane	5.06141E-07	5.06141E-07			
n-Pentane	2.20677E-07	2.20677E-07			
n-Hexane	3.92792E-08	3.92792E-08			
Methylcyclopentane	0	0			
Benzene	7.54898E-07	7.54898E-07			
Cyclohexane	1.05073E-07	1.05073E-07			
n-Heptane	2.6354E-08	2.6354E-08			
n-Octane	7.47236E-10	7.47236E-10			
n-Nonane	5.19524E-10	5.19524E-10			
n-Decane	2.20624E-10	2.20624E-10			
n-Undecane	0	0			
Dodecane	0	0			
Water	0.999369	0.999369			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	1.23136E-07	1.23136E-07			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	1.26686E-08	1.26686E-08			
Decane, 2-Methyl-	0	0			
Toluene	1.03016E-06	1.03016E-06			
m-Xylene	2.76945E-07	2.76945E-07			
Ethylbenzene	5.22393E-09	5.22393E-09			

Properties

Property	Units	Total	Light Liquid			
Temperature	°F	90	90			
Pressure	psig	425	425			

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
Stream: Produced Fluids
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 2:47 PM, 1/5/2016	
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016	

Properties

Property	Units	Total	Light Liquid			
Mole Fraction Vapor		0	0			
Mole Fraction Light Liquid		1	1			
Mole Fraction Heavy Liquid		0	0			
Molecular Weight	lb/lbmol	18.017	18.017			
Mass Density	lb/ft^3	62.0493	62.0493			
Molar Flow	lbmol/h	23.3721	23.3721			
Mass Flow	lb/h	421.094	421.094			
Vapor Volumetric Flow	ft^3/h	6.78644	6.78644			
Liquid Volumetric Flow	gpm	0.846101	0.846101			
Std Vapor Volumetric Flow	MMSCFD	0.212864	0.212864			
Std Liquid Volumetric Flow	sgpm	0.842954	0.842954			
Compressibility		0.0216437	0.0216437			
Specific Gravity		0.994874	0.994874			
API Gravity		10.0514	10.0514			
Net Ideal Gas Heating Value	Btu/ft^3	0.669991	0.669991			
Net Liquid Heating Value	Btu/lb	-1044.92	-1044.92			

Remarks

Process Streams Report
Stream: Reservoir Gas
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:30 PM, 7/27/2016	
Flowsheet:	OXF-115	Status: Solved 1:11 PM, 7/27/2016	

Connections

From: --	To: MIX-102

Composition

Mass Flow	Total lb/h	Vapor lb/h	Light Liquid lb/h		
Nitrogen	147.27 *	147.264	0.00645956		
Methane	12518.2 *	12516.6	1.60455		
CO2	84.8045 *	84.7776	0.0269378		
Ethane	4094.55 *	4091.84	2.71039		
Propane	1827.95 *	1824.24	3.71344		
Isobutane	291.198 *	289.857	1.34079		
n-Butane	581.821 *	578.03	3.79115		
Isopentane	177.528 *	175.025	2.50305		
n-Pentane	170.398 *	167.255	3.14354		
n-Hexane	62.1647 *	58.7057	3.45902		
Methylcyclopentane	0 *	0	0		
Benzene	1.54378 *	1.45733	0.086447		
Cyclohexane	9.14816 *	8.53367	0.614486		
n-Heptane	78.2242 *	67.4768	10.7474		
n-Octane	3.38636 *	2.34619	1.04018		
n-Nonane	5.06959 *	2.19317	2.87642		
n-Decane	4.21801 *	0.970943	3.24707		
n-Undecane	0 *	0	0		
Dodecane	0 *	0	0		
Water	0 *	0	0		
Triethylene Glycol	0 *	0	0		
Oxygen	0 *	0	0		
Argon	0 *	0	0		
Carbon Monoxide	0 *	0	0		
Cyclopentane	0 *	0	0		
Isohexane	96.2275 *	92.2531	3.97445		
3-Methylpentane	0 *	0	0		
Neohexane	0 *	0	0		
2,3-Dimethylbutane	0 *	0	0		
Methylcyclohexane	0 *	0	0		
Isooctane	34.9924 *	30.4936	4.49883		
Decane, 2-Methyl-	0 *	0	0		
Toluene	3.64199 *	3.10497	0.537015		
m-Xylene	2.09821 *	1.39792	0.700294		
Ethylbenzene	0 *	0	0		

Volumetric Flow	Total ft^3/h	Vapor ft^3/h	Light Liquid gpm		
Nitrogen	67.3584	67.3582	2.69936E-05		
Methane	8876.99	8876.9	0.0114801		
CO2	19.8463	19.846	4.62634E-05		
Ethane	1212.02	1211.92	0.0123017		
Propane	289.498	289.384	0.0142649		
Isobutane	26.6387	26.6009	0.00472168		
n-Butane	49.7406	49.637	0.0129232		
Isopentane	6.94209	6.87855	0.0079221		
n-Pentane	6.9419	6.86275	0.0098672		
n-Hexane	0.863044	0.780992	0.0102298		
Methylcyclopentane	0	0	0		
Benzene	0.0473226	0.0458282	0.000186313		
Cyclohexane	0.166034	0.153907	0.0015119		
n-Heptane	-0.294779	-0.539712	0.0305371		
n-Octane	-0.0290779	-0.0518823	0.00284314		
n-Nonane	-0.0195154	-0.0807499	0.00763443		
n-Decane	0.0186628	-0.0491295	0.00845203		
n-Undecane	0	0	0		

Process Streams Report
Stream: Reservoir Gas
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:30 PM, 7/27/2016	
Flowsheet:	OXF-115	Status: Solved 1:11 PM, 7/27/2016	

Volumetric Flow	Total ft^3/h	Vapor ft^3/h	Light Liquid gpm		
Dodecane	0	0	0		
Water	0	0	0		
Triethylene Glycol	0	0	0		
Oxygen	0	0	0		
Argon	0	0	0		
Carbon Monoxide	0	0	0		
Cyclopentane	0	0	0		
Isohexane	2.00821	1.91285	0.0118886		
3-Methylpentane	0	0	0		
Neohexane	0	0	0		
2,3-Dimethylbutane	0	0	0		
Methylcyclohexane	0	0	0		
Isooctane	-0.0789338	-0.178964	0.0124713		
Decane, 2-Methyl-	0	0	0		
Toluene	0.0306902	0.0213817	0.00116053		
m-Xylene	-0.0120879	-0.0242141	0.00151184		
Ethylbenzene	0	0	0		

Mole Fraction	Total		Vapor	Light Liquid		
Nitrogen	0.00532	*	0.00532381	0.000307508		
Methane	0.78965	*	0.790148	0.133383		
CO2	0.00195	*	0.00195086	0.000816271		
Ethane	0.1378	*	0.137813	0.120207		
Propane	0.04195	*	0.0418966	0.112305		
Isobutane	0.00507	*	0.00505049	0.0307637		
n-Butane	0.01013	*	0.0100716	0.0869856		
Isopentane	0.00249	*	0.00245676	0.0462657		
n-Pentane	0.00239	*	0.00234769	0.0581044		
n-Hexane	0.00073	*	0.000689904	0.053529		
Methylcyclopentane	0	*	0	0		
Benzene	2E-05	*	1.88944E-05	0.00147588		
Cyclohexane	0.00011	*	0.000102689	0.00973705		
n-Heptane	0.00079	*	0.000681978	0.143036		
n-Octane	3E-05	*	2.08008E-05	0.0121437		
n-Nonane	4E-05	*	1.73176E-05	0.0299086		
n-Decane	3E-05	*	6.91093E-06	0.0304342		
n-Undecane	0	*	0	0		
Dodecane	0	*	0	0		
Water	0	*	0	0		
Triethylene Glycol	0	*	0	0		
Oxygen	0	*	0	0		
Argon	0	*	0	0		
Carbon Monoxide	0	*	0	0		
Cyclopentane	0	*	0	0		
Isohexane	0.00113	*	0.00108415	0.0615054		
3-Methylpentane	0	*	0	0		
Neohexane	0	*	0	0		
2,3-Dimethylbutane	0	*	0	0		
Methylcyclohexane	0	*	0	0		
Isooctane	0.00031	*	0.00027035	0.0525223		
Decane, 2-Methyl-	0	*	0	0		
Toluene	4E-05	*	3.41279E-05	0.00777256		
m-Xylene	2E-05	*	1.3335E-05	0.00879666		
Ethylbenzene	0	*	0	0		

Properties

Property	Units	Total		Vapor	Light Liquid		
Temperature	°F	65	*	65	65		
Pressure	psig	450	*	450	450		

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
Stream: Reservoir Gas
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:30 PM, 7/27/2016	
Flowsheet:	OXF-115	Status: Solved 1:11 PM, 7/27/2016	

Properties

Property	Units	Total	Vapor	Light Liquid		
Mole Fraction Vapor		0.999241	1	0		
Mole Fraction Light Liquid		0.000758828	0	1		
Mole Fraction Heavy Liquid		0	0	0		
Molecular Weight	lb/lbmol	20.436	20.4002	67.5083		
Mass Density	lb/ft^3	1.9126	1.90804	38.9632		
Molar Flow	lbmol/h	988.184	987.434	0.749862		
Mass Flow	lb/h	20194.5	20143.9	50.6219		
Vapor Volumetric Flow	ft^3/h	10558.7	10557.4	1.29922		
Liquid Volumetric Flow	gpm	1316.41	1316.24	0.161981		
Std Vapor Volumetric Flow	MMSCFD	9 *	8.99317	0.00682945		
Std Liquid Volumetric Flow	sgpm	119.222	119.054	0.167296		
Compressibility		0.881842	0.882403	0.142995		
Specific Gravity			0.704364	0.624721		
API Gravity				93.8981		
Net Ideal Gas Heating Value	Btu/ft^3	1117.56	1115.78	3461.93		
Net Liquid Heating Value	Btu/lb	20695.2	20698.7	19308.9		

Remarks

Process Streams Report
Stream: Reservoir Oil
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	Modified: 1:32 PM, 7/27/2016
Flowsheet:	OXF-115	Status: Solved 1:11 PM, 7/27/2016

Connections

From: --	To: MIX-102

Composition

Mass Flow	Total lb/h	Light Liquid lb/h
Nitrogen	0 *	0
Methane	0.691921 *	0.691921
CO2	0.0125123 *	0.0125123
Ethane	1.11737 *	1.11737
Propane	1.50921 *	1.50921
Isobutane	0.547352 *	0.547352
n-Butane	1.44723 *	1.44723
Isopentane	1.06513 *	1.06513
n-Pentane	1.21125 *	1.21125
n-Hexane	1.02599 *	1.02599
Methylcyclopentane	0 *	0
Benzene	0.0345455 *	0.0345455
Cyclohexane	0 *	0
n-Heptane	3.11893 *	3.11893
n-Octane	3.29332 *	3.29332
n-Nonane	2.14237 *	2.14237
n-Decane	8.95184 *	8.95184
n-Undecane	0 *	0
Dodecane	0 *	0
Water	0 *	0
Triethylene Glycol	0 *	0
Oxygen	0 *	0
Argon	0 *	0
Carbon Monoxide	0 *	0
Cyclopentane	0 *	0
Isohexane	1.11703 *	1.11703
3-Methylpentane	0 *	0
Neohexane	0 *	0
2,3-Dimethylbutane	0 *	0
Methylcyclohexane	0 *	0
Isooctane	0.00841973 *	0.00841973
Decane, 2-Methyl-	0 *	0
Toluene	0.186281 *	0.186281
m-Xylene	0.324194 *	0.324194
Ethylbenzene	0.0309289 *	0.0309289

Volumetric Flow	Total gpm	Light Liquid gpm
Nitrogen	0	0
Methane	0.00461038	0.00461038
CO2	1.95388E-05	1.95388E-05
Ethane	0.00489291	0.00489291
Propane	0.00570418	0.00570418
Isobutane	0.00191737	0.00191737
n-Butane	0.00491711	0.00491711
Isopentane	0.00338359	0.00338359
n-Pentane	0.00381856	0.00381856
n-Hexane	0.00306143	0.00306143
Methylcyclopentane	0	0
Benzene	7.59571E-05	7.59571E-05
Cyclohexane	0	0
n-Heptane	0.00896928	0.00896928
n-Octane	0.00912905	0.00912905
n-Nonane	0.00577418	0.00577418
n-Decane	0.0236801	0.0236801
n-Undecane	0	0

Process Streams Report
Stream: Reservoir Oil
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:32 PM, 7/27/2016	
Flowsheet:	OXF-115	Status: Solved 1:11 PM, 7/27/2016	

Volumetric Flow	Total gpm	Light Liquid gpm			
Dodecane	0	0			
Water	0	0			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.00336875	0.00336875			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	2.36482E-05	2.36482E-05			
Decane, 2-Methyl-	0	0			
Toluene	0.000412209	0.000412209			
m-Xylene	0.000717687	0.000717687			
Ethylbenzene	6.82585E-05	6.82585E-05			

Mole Fraction	Total		Light Liquid			
Nitrogen	0	*	0			
Methane	0.12288	*	0.12288			
CO2	0.00081	*	0.00081			
Ethane	0.10587	*	0.10587			
Propane	0.09751	*	0.09751			
Isobutane	0.02683	*	0.02683			
n-Butane	0.07094	*	0.07094			
Isopentane	0.04206	*	0.04206			
n-Pentane	0.04783	*	0.04783			
n-Hexane	0.03392	*	0.03392			
Methylcyclopentane	0	*	0			
Benzene	0.00126	*	0.00126			
Cyclohexane	0	*	0			
n-Heptane	0.08868	*	0.08868			
n-Octane	0.08214	*	0.08214			
n-Nonane	0.04759	*	0.04759			
n-Decane	0.17925	*	0.17925			
n-Undecane	0	*	0			
Dodecane	0	*	0			
Water	0	*	0			
Triethylene Glycol	0	*	0			
Oxygen	0	*	0			
Argon	0	*	0			
Carbon Monoxide	0	*	0			
Cyclopentane	0	*	0			
Isohexane	0.03693	*	0.03693			
3-Methylpentane	0	*	0			
Neohexane	0	*	0			
2,3-Dimethylbutane	0	*	0			
Methylcyclohexane	0	*	0			
Isooctane	0.00021	*	0.00021			
Decane, 2-Methyl-	0	*	0			
Toluene	0.00576	*	0.00576			
m-Xylene	0.0087	*	0.0087			
Ethylbenzene	0.00083	*	0.00083			

Properties

Property	Units	Total		Light Liquid			
Temperature	°F	65	*	65			
Pressure	psig	450	*	450			

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
Stream: Reservoir Oil
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:32 PM, 7/27/2016	
Flowsheet:	OXF-115	Status: Solved 1:11 PM, 7/27/2016	

Properties

Property	Units	Total	Light Liquid			
Mole Fraction Vapor		0	0			
Mole Fraction Light Liquid		1	1			
Mole Fraction Heavy Liquid		0	0			
Molecular Weight	lb/lbmol	79.3049	79.3049			
Mass Density	lb/ft^3	41.0488	41.0488			
Molar Flow	lbmol/h	0.350998	0.350998			
Mass Flow	lb/h	27.8358	27.8358			
Vapor Volumetric Flow	ft^3/h	0.678115	0.678115			
Liquid Volumetric Flow	gpm	0.0845442	0.0845442			
Std Vapor Volumetric Flow	MMSCFD	0.00319675	0.00319675			
Std Liquid Volumetric Flow	sgpm	0.0875 *	0.0875			
Compressibility		0.159448	0.159448			
Specific Gravity		0.658161	0.658161			
API Gravity		82.5824	82.5824			
Net Ideal Gas Heating Value	Btu/ft^3	4051.33	4051.33			
Net Liquid Heating Value	Btu/lb	19231.8	19231.8			

Remarks

Process Streams Report
Stream: Reservoir Water
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	Modified: 1:33 PM, 7/27/2016
Flowsheet:	OXF-115	Status: Solved 1:11 PM, 7/27/2016

Connections

From: --	To: MIX-102

Composition

Mass Flow	Total lb/h	Light Liquid lb/h			
Nitrogen	0 *	0			
Methane	0 *	0			
CO2	0 *	0			
Ethane	0 *	0			
Propane	0 *	0			
Isobutane	0 *	0			
n-Butane	0 *	0			
Isopentane	0 *	0			
n-Pentane	0 *	0			
n-Hexane	0 *	0			
Methylcyclopentane	0 *	0			
Benzene	0 *	0			
Cyclohexane	0 *	0			
n-Heptane	0 *	0			
n-Octane	0 *	0			
n-Nonane	0 *	0			
n-Decane	0 *	0			
n-Undecane	0 *	0			
Dodecane	0 *	0			
Water	452.293 *	452.293			
Triethylene Glycol	0 *	0			
Oxygen	0 *	0			
Argon	0 *	0			
Carbon Monoxide	0 *	0			
Cyclopentane	0 *	0			
Isohexane	0 *	0			
3-Methylpentane	0 *	0			
Neohexane	0 *	0			
2,3-Dimethylbutane	0 *	0			
Methylcyclohexane	0 *	0			
Isooctane	0 *	0			
Decane, 2-Methyl-	0 *	0			
Toluene	0 *	0			
m-Xylene	0 *	0			
Ethylbenzene	0 *	0			

Volumetric Flow	Total gpm	Light Liquid gpm			
Nitrogen	0	0			
Methane	0	0			
CO2	0	0			
Ethane	0	0			
Propane	0	0			
Isobutane	0	0			
n-Butane	0	0			
Isopentane	0	0			
n-Pentane	0	0			
n-Hexane	0	0			
Methylcyclopentane	0	0			
Benzene	0	0			
Cyclohexane	0	0			
n-Heptane	0	0			
n-Octane	0	0			
n-Nonane	0	0			
n-Decane	0	0			
n-Undecane	0	0			

Process Streams Report
Stream: Reservoir Water
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:33 PM, 7/27/2016	
Flowsheet:	OXF-115	Status: Solved 1:11 PM, 7/27/2016	

Volumetric Flow	Total gpm	Light Liquid gpm			
Dodecane	0	0			
Water	0.904388	0.904388			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0	0			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0	0			
Decane, 2-Methyl-	0	0			
Toluene	0	0			
m-Xylene	0	0			
Ethylbenzene	0	0			

Mole Fraction	Total	Light Liquid			
Nitrogen	0 *	0			
Methane	0 *	0			
CO2	0 *	0			
Ethane	0 *	0			
Propane	0 *	0			
Isobutane	0 *	0			
n-Butane	0 *	0			
Isopentane	0 *	0			
n-Pentane	0 *	0			
n-Hexane	0 *	0			
Methylcyclopentane	0 *	0			
Benzene	0 *	0			
Cyclohexane	0 *	0			
n-Heptane	0 *	0			
n-Octane	0 *	0			
n-Nonane	0 *	0			
n-Decane	0 *	0			
n-Undecane	0 *	0			
Dodecane	0 *	0			
Water	1 *	1			
Triethylene Glycol	0 *	0			
Oxygen	0 *	0			
Argon	0 *	0			
Carbon Monoxide	0 *	0			
Cyclopentane	0 *	0			
Isohexane	0 *	0			
3-Methylpentane	0 *	0			
Neohexane	0 *	0			
2,3-Dimethylbutane	0 *	0			
Methylcyclohexane	0 *	0			
Isooctane	0 *	0			
Decane, 2-Methyl-	0 *	0			
Toluene	0 *	0			
m-Xylene	0 *	0			
Ethylbenzene	0 *	0			

Properties

Property	Units	Total	Light Liquid			
Temperature	°F	65 *	65			
Pressure	psig	450 *	450			

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
Stream: Reservoir Water
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:33 PM, 7/27/2016	
Flowsheet:	OXF-115	Status: Solved 1:11 PM, 7/27/2016	

Properties

Property	Units	Total	Light Liquid			
Mole Fraction Vapor		0	0			
Mole Fraction Light Liquid		1	1			
Mole Fraction Heavy Liquid		0	0			
Molecular Weight	lb/lbmol	18.0153	18.0153			
Mass Density	lb/ft^3	62.3513	62.3513			
Molar Flow	lbmol/h	25.1061	25.1061			
Mass Flow	lb/h	452.293	452.293			
Vapor Volumetric Flow	ft^3/h	7.25394	7.25394			
Liquid Volumetric Flow	gpm	0.904388	0.904388			
Std Vapor Volumetric Flow	MMSCFD	0.228657	0.228657			
Std Liquid Volumetric Flow	sgpm	0.904167 *	0.904167			
Compressibility		0.0238459	0.0238459			
Specific Gravity		0.999717	0.999717			
API Gravity		9.94436	9.94436			
Net Ideal Gas Heating Value	Btu/ft^3	0	0			
Net Liquid Heating Value	Btu/lb	-1059.76	-1059.76			

Remarks

Process Streams Report
Stream: Water and Condensate
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	Modified: 1:13 PM, 7/25/2016
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016

Connections

From:	To:
Produced Fluid Tanks	--

Composition

Mass Flow	Total lb/h	Light Liquid lb/h			
Nitrogen	1.98433E-05	1.98433E-05			
Methane	0.00637073	0.00637073			
CO2	0.00891405	0.00891405			
Ethane	0.00348271	0.00348271			
Propane	0.000675722	0.000675722			
Isobutane	4.0947E-05	4.0947E-05			
n-Butane	0.000158755	0.000158755			
Isopentane	1.91498E-05	1.91498E-05			
n-Pentane	3.65977E-06	3.65977E-06			
n-Hexane	5.21243E-07	5.21243E-07			
Methylcyclopentane	0	0			
Benzene	0.00112056	0.00112056			
Cyclohexane	2.19703E-05	2.19703E-05			
n-Heptane	2.90132E-07	2.90132E-07			
n-Octane	4.14104E-09	4.14104E-09			
n-Nonane	2.92355E-09	2.92355E-09			
n-Decane	4.17394E-10	4.17394E-10			
n-Undecane	0	0			
Dodecane	0	0			
Water	420.778	420.778			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	3.20616E-06	3.20616E-06			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	2.19945E-07	2.19945E-07			
Decane, 2-Methyl-	0	0			
Toluene	0.00170176	0.00170176			
m-Xylene	0.000451286	0.000451286			
Ethylbenzene	9.59238E-06	9.59238E-06			

Volumetric Flow	Total gpm	Light Liquid gpm			
Nitrogen	5.3701E-08	5.3701E-08			
Methane	3.14999E-05	3.14999E-05			
CO2	1.40903E-05	1.40903E-05			
Ethane	1.17489E-05	1.17489E-05			
Propane	1.94819E-06	1.94819E-06			
Isobutane	1.07897E-07	1.07897E-07			
n-Butane	4.13007E-07	4.13007E-07			
Isopentane	4.63661E-08	4.63661E-08			
n-Pentane	8.87769E-09	8.87769E-09			
n-Hexane	1.20146E-09	1.20146E-09			
Methylcyclopentane	0	0			
Benzene	2.1021E-06	2.1021E-06			
Cyclohexane	4.46538E-08	4.46538E-08			
n-Heptane	6.46874E-10	6.46874E-10			
n-Octane	8.94058E-12	8.94058E-12			
n-Nonane	6.16208E-12	6.16208E-12			
n-Decane	8.65773E-13	8.65773E-13			
n-Undecane	0	0			

Process Streams Report
Stream: Water and Condensate
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:13 PM, 7/25/2016	
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016	

Volumetric Flow	Total gpm	Light Liquid gpm			
Dodecane	0	0			
Water	0.844385	0.844385			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	7.40126E-09	7.40126E-09			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	4.70045E-10	4.70045E-10			
Decane, 2-Methyl-	0	0			
Toluene	3.15956E-06	3.15956E-06			
m-Xylene	8.31011E-07	8.31011E-07			
Ethylbenzene	1.75695E-08	1.75695E-08			

Mole Fraction	Total	Light Liquid			
Nitrogen	3.03265E-08	3.03265E-08			
Methane	1.70017E-05	1.70017E-05			
CO2	8.67167E-06	8.67167E-06			
Ethane	4.95875E-06	4.95875E-06			
Propane	6.56064E-07	6.56064E-07			
Isobutane	3.01616E-08	3.01616E-08			
n-Butane	1.16939E-07	1.16939E-07			
Isopentane	1.13634E-08	1.13634E-08			
n-Pentane	2.17169E-09	2.17169E-09			
n-Hexane	2.58959E-10	2.58959E-10			
Methylcyclopentane	0	0			
Benzene	6.14176E-07	6.14176E-07			
Cyclohexane	1.11765E-08	1.11765E-08			
n-Heptane	1.23963E-10	1.23963E-10			
n-Octane	1.55206E-12	1.55206E-12			
n-Nonane	9.75912E-13	9.75912E-13			
n-Decane	1.25595E-13	1.25595E-13			
n-Undecane	0	0			
Dodecane	0	0			
Water	0.999967	0.999967			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	1.59285E-09	1.59285E-09			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	8.24352E-11	8.24352E-11			
Decane, 2-Methyl-	0	0			
Toluene	7.90735E-07	7.90735E-07			
m-Xylene	1.81989E-07	1.81989E-07			
Ethylbenzene	3.86829E-09	3.86829E-09			

Properties

Property	Units	Total	Light Liquid			
Temperature	°F	85 *	85			
Pressure	psig	0	0			

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
Stream: Water and Condensate
Phases Grouped by Columns

Client Name:	EQT Production	Job: V1.0	
Location:	OXF 115	Modified: 1:13 PM, 7/25/2016	
Flowsheet:	OXF-115	Status: Solved 1:33 PM, 7/27/2016	

Properties

Property	Units	Total	Light Liquid			
Mole Fraction Vapor		0	0			
Mole Fraction Light Liquid		1	1			
Mole Fraction Heavy Liquid		0	0			
Molecular Weight	lb/lbmol	18.0157	18.0157			
Mass Density	lb/ft^3	62.1273	62.1273			
Molar Flow	lbmol/h	23.3575	23.3575			
Mass Flow	lb/h	420.801	420.801			
Vapor Volumetric Flow	ft^3/h	6.7732	6.7732			
Liquid Volumetric Flow	gpm	0.844451	0.844451			
Std Vapor Volumetric Flow	MMSCFD	0.212731	0.212731			
Std Liquid Volumetric Flow	sgpm	0.84126	0.84126			
Compressibility		0.000729069	0.000729069			
Specific Gravity		0.996124	0.996124			
API Gravity		10.0021	10.0021			
Net Ideal Gas Heating Value	Btu/ft^3	0.032063	0.032063			
Net Liquid Heating Value	Btu/lb	-1059.03	-1059.03			

Remarks

Flowsheet Environment
SRK Environment

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	
Flowsheet:	OXF-115	

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	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

Environments Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	

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	Peng-Robinson
Stability Calculation	Peng-Robinson	Vapor Package	Peng-Robinson
Light Liquid Package	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

Remarks

Calculator Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	

Simple Specifier 1

Source Code

CV1 = MV1

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-115!PStreams!Reservoir Water!Phases!Total!Properties!Pressure
Value	450
Unit	

Measured Variable [MV1]

Source Moniker	ProMax:ProMax!Project!User Value Sets!Parameters!Line Pressure!Properties!Parameter
Value	450
Unit	

Remarks

Simple Specifier 2

Source Code

CV1 = MV1

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-115!PStreams!Reservoir Water!Phases!Total!Properties!Temperature
Value	65
Unit	

Measured Variable [MV1]

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

Remarks

Simple Specifier 3

Source Code

CV1 = Pin

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-115!PStreams!Reservoir Gas!Phases!Total!Properties!Pressure
Value	450
Unit	

Measured Variable [Pin]

Source Moniker	ProMax:ProMax!Project!User Value Sets!Parameters!Line Pressure!Properties!Parameter
Value	450
Unit	

Remarks

Calculator Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	

Simple Specifier 4

Source Code

CV1 = Tin

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-115!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 = Pin

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-115!PStreams!Reservoir Oil!Phases!Total!Properties!Pressure
Value	450
Unit	

Measured Variable [Pin]

Source Moniker	ProMax:ProMax!Project!User Value Sets!Parameters!Line Pressure!Properties!Parameter
Value	450
Unit	

Remarks

Simple Specifier 6

Source Code

CV1 = Tin

Calculated Variable [CV1]

Source Moniker	ProMax:ProMax!Project!Flowsheets!OXF-115!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

20160725_EQT_OXF115 Wellpad Calculation.pmx
Project Warnings Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	

ProMax:ProMax!Project!Flowsheets!OXF-115!PStreams!Combined Flowstream
Warning: The temperature of 64.1858 °F is within 10 °F of hydrate formation.

User Value Sets Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	

Parameters

User Value [Line Temperature]

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

User Value [Line Pressure]

* Parameter	450	psig	Upper Bound		psig
Lower Bound		psig	* Enforce Bounds	False	

Remarks

Tank-1

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	0.78125	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 Sets Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	

User Value [MaxPercentLiq]

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

User Value [AnnNetTP]

* Parameter	79.3652	bbl/day	Upper Bound	bbl/day
* Lower Bound	0	bbl/day	* Enforce Bounds	False

User Value [OREff]

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

User Value [MaxAvgT]

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

User Value [MinAvgT]

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

User Value [BulkLiqT]

* Parameter	59.09	°F	Upper Bound	°F
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	3.30688	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	79.886		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 Sets Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	

User Value [TVP]

* Parameter	0.32853	psia	Upper Bound	psia
Lower Bound		psia	* Enforce Bounds	False

User Value [AvgLiqSurfaceT]

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

User Value [MaxLiqSurfaceT]

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

User Value [TotalLosses]

* Parameter	0.0561089	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [WorkingLosses]

* Parameter	0.0480691	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [StandingLosses]

* Parameter	0.00803975	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [RimSealLosses]

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

User Value [WithdrawalLoss]

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

User Value [LoadingLosses]

* Parameter	0.0442072	ton/yr	Upper Bound	ton/yr
Lower Bound		ton/yr	* Enforce Bounds	False

User Value [MaxHourlyLoadingLoss]

* Parameter	0.010093	lb/hr	Upper Bound	lb/hr
Lower Bound		lb/hr	* Enforce Bounds	False

User Value [PStar]

Parameter			Upper Bound	
Lower Bound			* 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	3.48572	ton/yr	Upper Bound	ton/yr

User Value Sets Report

Client Name:	EQT Production	Job: V1.0
Location:	OXF 115	

User Value [FlashingLosses]

Lower Bound	ton/yr	* Enforce Bounds	False

User Value [TotalResidual]

* Parameter	5068.35 ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	* Enforce Bounds	False

User Value [GasMoleWeight]

* Parameter	0.018631 kg/mol	Upper Bound	kg/mol
Lower Bound	kg/mol	* Enforce Bounds	False

User Value [VapReportableFrac]

* Parameter	0.066357 %	Upper Bound	%
Lower Bound	%	* Enforce Bounds	False

User Value [LiqReportableFrac]

* Parameter	0.0010483 %	Upper Bound	%
Lower Bound	%	* Enforce Bounds	False

User Value [FlashReportableFrac]

* Parameter	9.47805 %	Upper Bound	%
Lower Bound	%	* Enforce Bounds	False

User Value [BlockReady]

* Parameter	1	Upper Bound	
Lower Bound		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={1B247BE0-99DC-4C0D-BB06-EC49C6A88A63}

Tank Losses.66

User Value [BlockReady]

* Parameter	1	Upper Bound	
Lower Bound		* Enforce Bounds	False

Remarks
This User Value Set was programmatically generated. GUID={1B247BE0-99DC-4C0D-BB06-EC49C6A88A63}

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

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
E007	---	---	---	---	0.08	0.33	---	---	---	---	---	---	0.17	0.76	4.36	19.10
E005	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
E006	---	---	---	---	1.1E-04	2.9E-05	---	---	---	---	---	---	---	---	---	---
Fugitives	---	---	---	---	---	2.82	---	---	---	---	---	---	---	1.69	---	42.24
Haul Roads	---	---	---	---	---	---	---	---	---	0.09	---	0.01	---	---	---	---
Facility Total	1.2E-03	0.01	1.0E-03	4.5E-03	0.08	3.15	7.4E-06	3.2E-05	9.4E-05	0.09	9.4E-05	0.01	0.17	2.45	5.88	67.98
Facility Total (excluding fugitive emissions)	1.2E-03	0.01	1.0E-03	4.5E-03	0.08	0.33	7.4E-06	3.2E-05	9.4E-05	4.1E-04	9.4E-05	4.1E-04	0.17	0.76	5.88	25.74

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
E007	---	---	6.2E-04	2.7E-03	1.2E-03	5.5E-03	8.0E-6	3.5E-05	5.8E-04	2.6E-03	2.2E-04	9.5E-04	2.8E-03	0.01
E005	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
E006	---	---	1.8E-06	4.8E-07	8.1E-07	2.1E-07	1.5E-09	4.01E-10	8.7E-08	2.3E-08	1.4E-09	3.8E-10	2.7E-06	7.1E-07
Fugitives	---	---	---	1.1E-03	---	2.5E-03	---	0.0E+00	---	1.5E-03	---	0.04	---	0.09
Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Facility Total	9.3E-07	4.1E-06	6.2E-04	3.8E-03	1.3E-03	0.01	8.0E-06	3.5E-05	5.8E-04	4.0E-03	2.4E-04	0.04	2.8E-03	0.10
Facility Total (excluding fugitive emissions)	9.3E-07	4.1E-06	6.2E-04	2.7E-03	1.3E-03	5.5E-03	8.0E-06	3.5E-05	5.8E-04	2.6E-03	2.4E-04	1.0E-03	2.8E-03	0.01

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

ATTACHMENT V

Class I Legal Advertisement

RECOMMENDED PUBLIC NOTICE TEMPLATE

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that EQT Production Company has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-D General Permit Registration for the natural gas production facility OXF-115 located off Straight Fork Rd in Doddridge County, West Virginia. The latitude and longitude coordinates are: 39.144514° N, -80.805915° W. The project includes the installation of one condensate storage tank 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	0.01
CO	4.5E-03
VOC	0.33
SO_2	3.2E-05
PM	4.1E-04
Formaldehyde	4.1E-06
BTEX	0.02
n-Hexane	0.04
Total HAPs	0.10
Carbon Dioxide Equivalents (CO_2e)	67.98

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