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

TEL: (412) 395-3699
FAX: (412) 395-2156

Alex Bosiljevac
Environmental Coordinator

July 14, 2015

CERTIFIED MAIL # 7015 0640 0000 9694 0757

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 Permit Application
EQT Production Company
OXF-153 Natural Gas Production Site

Dear Mr. Durham,

Enclosed are two electronic and one original hard copy of a G70-A General Air Permit Application for the OXF-153 Natural Gas Production Well Site. A legal advertisement will be published in the next few days and proof of publication will be forwarded as soon as it is received. Please contact me for payment of the application fee by credit card.

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

Sincerely,

Alex Bosiljevac
EQT Corporation

Enclosures

PROJECT REPORT

EQT Production
OXF-153 Pad

G70-A Permit Application

Where energy meets innovation.

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

July 2015

Trinity Consultants

Environmental solutions delivered uncommonly well

TABLE OF CONTENTS

EQT Production Company (EQT) is submitting this Class II General Permit (G70-A) application to the West Virginia Department of Environmental Protection (WVDEP) for the OXF-153 Wellpad, an existing natural gas production well pad, located in Doddridge County, West Virginia. The OXF-153 pad is currently operating under R13 permit number R13-3052. The proposed general permit application will consolidate all authorized and proposed equipment under a single permit.

1.1. FACILITY AND PROJECT DESCRIPTION

The OXF-153 pad is a natural gas production facility that currently consists of five (5) natural gas wells. Natural gas and liquids (including water and condensate) are extracted from deposits underneath the surface. Natural gas is transported from the well to a gas line for additional processing and compression, as necessary. The liquids produced are stored in storage vessels.

This application seeks to permit the following equipment at the OXF-153 pad:

- Ten (10) 400 barrel (bbl) storage tanks for condensate/water (produced fluids) controlled by one (1) existing combustor rated at 11.66 MMBtu/hr;
- One (1) 100 bbl storage tank for sand and produced fluids from the sand separator (Vapors from this tank may be controlled by the aforementioned combustor);
- Four (4) line heaters, each rated at 1.54 MMBtu/hr (heat input);
- One (1) Thermoelectric generator, each rated at 0.013 MMBtu/hr (heat input)

Additionally, this application also seeks to remove the existing fifteen (15) 210-bbl storage tanks for produced fluids and increase the site-wide liquid throughput.

The OXF-153 pad consists of the following equipment:

- Two (2) line heaters, each rated at 1.54 MMBtu/hr (heat input);
- One (1) line heater, rated at 0.77 MMBtu/hr (heat input); and
- Two (2) thermoelectric generators, each rated at 0.013 MMBtu/hr (heat input).

A process flow diagram is included as Attachment D.

1.2. SOURCE STATUS

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

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

Other additional pollutant emitting facilities should be aggregated with the proposed OXF-153 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-153 pad is a separate stationary source when the current R-13 permit was issued. There are no Marcellus facilities within a quarter-mile radius of the OXF-153 Pad. The nearest wellpad, OXF-134, is located approximately 4,250 feet North of OXF-153. Therefore, the OXF-153 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-A APPLICATION ORGANIZATION

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

- Section 2: Sample Emission Source Calculations;
- Section 3: Regulatory Discussion;
- Section 4: G70-A Application Forms;
- Attachment A: Current Business Certificate;
- Attachment B: Process Description;
- Attachment C: Description of Fugitive Emissions;
- Attachment D: Process Flow Diagram;
- Attachment E: Plot Plan;
- Attachment F: Area Map;
- Attachment G: Emission Unit Data Sheets and G70-A Section Applicability Form;
- Attachment H: Air Pollution Control Device Sheets;
- Attachment I: Emission Calculations;
- Attachment J: Class I Legal Advertisement;
- Attachment K: Electronic Submittal;
- Attachment L: General Permit Registration Application Fee;
- Attachment M: Siting Criteria Waver (*not applicable*);
- Attachment N: Material Safety Data Sheet (*not applicable*); and
- Attachment O: Emissions Summary Sheet.

2. SAMPLE EMISSION SOURCE CALCULATIONS

The characteristics of air emissions from the existing 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 I of this application.

Emissions from this project will result from natural gas combustion in the line heaters, 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's and Line Heaters:** Potential emissions of criteria pollutants and 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] Please note that potential emissions of NO_X, CO, PM, SO_2 and GHGs from the combustor are also calculated according to the aforementioned methodologies.

- **Fugitive Equipment Leaks:** Emissions of VOC and HAPs from leaking equipment components have been estimated using facility estimated component counts and types along with *Table 2-4: Oil & Gas Production Operations Average Emission Factors, 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 in gas service at O&G Production Operations. Greenhouse gas emissions from component leaks are calculated according to the procedures in 40 CFR 98 Subpart W.[3]

- **Storage Tanks:** Working, breathing and flashing emissions of VOC and HAPs from the condensate/water stored in the tanks at the facility are calculated using API E&P TANK v2.0.

- **Tank Truck Loading:** Emissions of VOC and HAPs from the loading of organic liquids from storage tanks to tank truck are calculated using U.S. EPA's AP-42 Chapter 5 Section 2 factors.[4]

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

[1] U.S. EPA, AP 42, Fifth Edition, Volume I, Chapter 1.4, Natural Gas Combustion, Supplement D, July 1998.

[2] 40 CFR 98 Subpart C, *General Stationary Fuel combustion Sources*, Tables C-1 and C-2.

[3] 40 CFR 98 Subpart W, *Petroleum and Natural Gas Systems*, Section 98.233(r), *Population Count and Emission Factors*.

[4] U.S. EPA, AP 42, Fifth Edition, Volume I, Chapter 5.2, Transportation And Marketing Of Petroleum Liquids, June 2008.

[5] U.S. EPA, AP 42, Fifth Edition, Volume I, Section 13.2.2, Unpaved Roads, November 2006.

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

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

3.2. TITLE V OPERATING PERMIT PROGRAM

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in West Virginia Code of State Regulations (CSR) 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP and 100 tpy of all other regulated pollutants.[6] The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility after the proposed project. Therefore, the wellpad is not a major source for Title V purposes.

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

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

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.

3.3.1. NSPS Subparts D, Da, Db, and Dc

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, therefore the requirements of these subparts do not apply.

3.3.2. NSPS Subparts K, Ka, and Kb

These subparts apply to storage tanks of certain sizes constructed, reconstructed, or modified during various time periods. Subpart K applies to storage tanks constructed, reconstructed, or modified prior to 1978, and Subpart Ka applies to those constructed, reconstructed, or modified prior to 1984. Both Subparts K and Ka apply to storage tanks with a capacity greater than 40,000 gallons. Subpart Kb applies to volatile organic liquid (VOL) storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m^3 (~19,813 gallons). All of the tanks at the wellpad have a capacity of 19,813 gallons or less. As such, Subparts K, Ka, and Kb do not apply to the storage tanks at the wellpad.

3.3.3. NSPS Subpart OOOO—Crude Oil and Natural Gas Production, Transmission, and Distribution

Subpart OOOO – *Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution*, applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011. This NSPS was published in the Federal Register on August 16, 2012, and subsequently amended. The list of potentially affected facilities includes:

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

There will be ten (10) produced fluid storage vessels and one (1) sand separator storage vessel at the wellpad. Emissions from the proposed storage vessels will be controlled by one (1) enclosed combustor with a destruction efficiency greater than 95 percent. The storage vessels at the facility will each have potential VOC emissions less than 6 tpy based on the permit application materials and enforceable limits to be included in the G70-A permit. As such, per 60.5365(e), the tanks are not storage vessel affected facilities under the rule.

The pneumatic controllers were ordered and installed after August 23, 2011 and are therefore potentially subject to NSPS OOOO. Per 60.5365(d)(2), 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 OOOO.

3.3.4. Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas processing plants (Subparts OOOO) and associated equipment (Subparts D-Dc and K-Kb), the applicability of a particular NSPS to the wellpad can be readily ascertained based on the industrial source category covered. All other NSPS are categorically not applicable to the proposed project.

3.4. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (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

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

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

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

3.4.2. 40 CFR 63 Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers

This MACT standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types at area sources. The wellpad does not include any boilers, or gas fired heaters; therefore the requirements of this subpart do not apply.

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. Per 45 CSR 2-4, PM emissions from the unit will not exceed a level of 0.09 multiplied by the heat design input in MMBtu/hr of the unit.

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

According to 45 CSR 4-3:

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

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

3.5.3. 45 CSR 6: Control of Air Pollution from the Combustion of Refuse

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

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

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

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

According to 45 CSR 17-3.1:

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

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

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

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

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

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

3.5.8. Non-Applicability of Other SIP Rules

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

4. G70-A APPLICATION FORMS

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

WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street, SE
Charleston, WV 25304
Phone: (304) 926-0475 • *www.dep.wv.gov/daq*

APPLICATION FOR GENERAL PERMIT REGISTRATION

CONSTRUCT, MODIFY, RELOCATE OR ADMINISTRATIVELY UPDATE

A STATIONARY SOURCE OF AIR POLLUTANTS

☒ CONSTRUCTION ☐ MODIFICATION ☐ RELOCATION ☐ CLASS I ADMINISTRATIVE UPDATE
☐ CLASS II ADMINISTRATIVE UPDATE

CHECK WHICH TYPE OF GENERAL PERMIT REGISTRATION YOU ARE APPLYING FOR:

☐ **G10-D –** Coal Preparation and Handling
☐ **G20-B –** Hot Mix Asphalt
☐ **G30-D –** Natural Gas Compressor Stations
☐ **G33-A –** Spark Ignition Internal Combustion Engines
☐ **G35-A –** Natural Gas Compressor Stations (Flare/Glycol Dehydration Unit)
☐ **G40-C –** Nonmetallic Minerals Processing
☐ **G50-B –** Concrete Batch
☐ **G60-C** - Class II Emergency Generator
☐ **G65-C –** Class I Emergency Generator
☒ **G70-A –** Class II Oil and Natural Gas Production Facility

SECTION I. GENERAL INFORMATION

1. Name of applicant (as registered with the WV Secretary of State's Office):
EQT Production Company

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

3. Applicant's mailing address:
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

4. Applicant's physical address:
Oxford, Doddridge County

5. If applicant is a subsidiary corporation, please provide the name of parent corporation:

6. **WV BUSINESS REGISTRATION.** Is the applicant a resident of the State of West Virginia? ☒ **YES** ☐ **NO**

- IF **YES,** provide a copy of the Certificate of **Incorporation/ Organization / Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A**.
- IF **NO,** provide a copy of the **Certificate of Authority / Authority of LLC / Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A**.

SECTION II. FACILITY INFORMATION

7. Type of plant or facility (stationary source) to be constructed, modified, relocated or administratively updated (e.g., coal preparation plant, primary crusher, etc.): Natural gas production wellsite

8a. Standard Industrial Classification (SIC) code: 1311

AND

8b. North American Industry System (NAICS) code: 211111

9. DAQ Plant ID No. (for existing facilities only):
017-00053

10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only):
__R13-3052_____
_____

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site:	12A. Address of primary operating site:
OXF-153 Pad	Mailing: 625 Liberty Avenue, Suite 1700, Pittsburgh, PA 15222 Physical:

13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☒ **YES** ☐ **NO**

– IF **YES**, please explain: Property is leased and held under production rights

– IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14A. – For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;

– For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

From West Union, take US-50 west for 3 miles, turn left onto Sunnyside Road for two miles, turn left onto Oxford road for 5 miles, turn slight right on S Fork of Hughes River Rd for one mile, turn left on Taylor Drain Road for 1.5 miles. Access road on the left.

15A. Nearest city or town:	16A. County:	17A. UTM Coordinates:
Pullman	Doddridge	Northing (KM): 4,337.8731 Easting (KM): 515.746 Zone: 17

18A. Briefly describe the proposed new operation or change (s) to the facility:	19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Construction and operation of four (4) additional natural gas wellheads, ten (10) 400-bbl produced fluid storage vessel and one (1) 100-bbl sand separator storage vessel controlled by an enclosed combustion device, four (4) in-line heaters, and one (1) thermoelectric generator. Removal of fifteen (15) 210-bbl produced fluid storage vessels.	Latitude: 39.189970° Longitude: -80.817670°

B: 1ST ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits)

11B. Name of 1st alternate operating site:	12B. Address of 1st alternate operating site:
N/A	Mailing: Physical:

13B. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☐ **YES** ☐ **NO**

– IF **YES**, please explain:

– IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14B. – For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;

– For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

_____

_____

_____

15B. Nearest city or town:	16B. County:	17B. UTM Coordinates: Northing (KM): _____ Easting (KM): _____ Zone: _____
18B. Briefly describe the proposed new operation or change (s) to the facility:		19B. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: _____ Longitude: _____

C: 2ND ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits):

11C. Name of 2nd alternate operating site:	12C. Address of 2nd alternate operating site:
_N/A_____	Mailing:_____ Physical:_____
_____	_____

13C**.** Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? ☐ **YES** ☐ **NO**

– IF **YES**, please explain: _____

_____

– IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14C. – For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;

– For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP** as **Attachment F**.

_____

_____

_____

15C. Nearest city or town:	16C. County:	17C. UTM Coordinates: Northing (KM): _____ Easting (KM): _____ Zone: _____
18C. Briefly describe the proposed new operation or change (s) to the facility:		19C. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: _____ Longitude: _____

20. Provide the date of anticipated installation or change: __12___/___1__/__2015___ ☐ If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: : _____/_____/_____	21. Date of anticipated Start-up if registration is granted: ___12___/___1___/___2015___

22. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application if other than 8760 hours/year. (Note: anything other than 24/7/52 may result in a restriction to the facility's operation).

Hours per day__24_____ Days per week ____7____ Weeks per year ___52_____ Percentage of operation ___100_____

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

23. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

24. Include a **Table of Contents** as the first page of your application package.

All of the required forms and additional information can be found under the Permitting Section (General Permits) of DAQ's website, or requested by phone.

25. Please check all attachments included with this permit application. Please refer to the appropriate reference document for an explanation of the attachments listed below.

- ☒ ATTACHMENT A : CURRENT BUSINESS CERTIFICATE
- ☒ ATTACHMENT B: PROCESS DESCRIPTION
- ☒ ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS
- ☒ ATTACHMENT D: PROCESS FLOW DIAGRAM
- ☒ ATTACHMENT E: PLOT PLAN
- ☒ ATTACHMENT F: AREA MAP
- ☒ ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM
- ☒ ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS
- ☒ ATTACHMENT I: EMISSIONS CALCULATIONS
- ☒ ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT
- ☒ ATTACHMENT K: ELECTRONIC SUBMITTAL
- ☒ ATTACHMENT L: GENERAL PERMIT REGISTRATION APPLICATION FEE
- ☐ ATTACHMENT M: SITING CRITERIA WAIVER *(Not Applicable)*
- ☐ ATTACHMENT N: MATERIAL SAFETY DATA SHEETS (MSDS) *(Not Applicable)*
- ☒ ATTACHMENT O: EMISSIONS SUMMARY SHEETS
- ☐ OTHER SUPPORTING DOCUMENTATION NOT DESCRIBED ABOVE (Equipment Drawings, Aggregation Discussion, etc.) *(Not Applicable)*

Please mail an original and two copies of the complete General Permit Registration Application with the signature(s) to the DAQ Permitting Section, at the address shown on the front page of this application. Please DO NOT fax permit applications. For questions regarding applications or West Virginia Air Pollution Rules and Regulations, please refer to the website shown on the front page of the application or call the phone number also provided on the front page of the application.

SECTION IV. CERTIFICATION OF INFORMATION

This 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 a 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, Emission Inventory, Certified Emission Statement, 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 Registration Application will be returned to the applicant.

FOR A CORPORATION (domestic or foreign)

☒ I certify that I am a President, Vice President, Secretary, Treasurer or in charge of a principal business function of the corporation

FOR A PARTNERSHIP

☐ I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

☐ I certify that I am a General Partner or General Manager

FOR AN ASSOCIATION

☐ I certify that I am the President or a member of the Board of Directors

FOR A JOINT VENTURE

☐ I certify that I am the President, General Partner or General Manager

FOR A SOLE PROPRIETORSHIP

☐ I certify that I am the Owner and Proprietor

☒ *I hereby certify that* (please print or type) *Kenneth Kirk*
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 Office of Air Quality immediately, and/or,

I hereby certify that all information contained in this 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

Signature _____ 7-14-15
(please use blue ink) Responsible Official Date

Name & Title Kenneth Kirk, Executive Vice President
(please print or type)

Signature _____
(please use blue ink) Authorized Representative (if applicable) Date

Applicant's Name Alex Bosiljevac – Environmental Coordinator

Phone & Fax 412-395-3699 412-395-7027
Phone Fax

Email abosiljevac@eqt.com

ATTACHMENT A

Current 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 B

Process Description

ATTACHMENT B: PROCESS DESCRIPTION

This project involves the construction and operation of ten (10) produced fluid storage tanks, one (1) sand separator storage tank, one (1) thermoelectric generator, and four (4) line heaters at an existing natural gas production wellpad operation (OXF-153).

The OXF-153 wellpad currently consists of five (5) wells, each with the same basic operation. Four (4) additional wells will be added with this project. The incoming gas stream from the underground wells passes through a sand separator, where sand, water, and residual solids are displaced and transferred to the sand separator tank. The gas then flows into a three-phase separator which separates produced water and condensate from the gas stream. The produced water and condensate are transferred to the storage tanks, where vapors are controlled by a combustor. Vapors from the sand separator tank will also be controlled by the combustor. Once the tanks are filled, the contents are loaded into trucks for transport using vapor-balanced loading. At the wellpad, heat is provided by line heaters and electricity is provided by thermoelectric generators.

A process flow diagram is included as Attachment D.

ATTACHMENT C

Description of Fugitive Emissions

G70-A FUGITIVE EMISSIONS SUMMARY SHEET

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	N/A	---	---	---	---	---
Unpaved Haul Roads	PM PM_{10} $PM_{2.5}$	7.72 1.97 0.20	33.82 8.62 0.86	7.72 1.97 0.20	33.82 8.62 0.86	O[A]
Loading/Unloading Operations	VOC HAP	0.50 0.01	2.19 0.05	0.17 <0.01	0.73 0.02	O[B]
Equipment Leaks	VOC CO_2e HAP	Does not apply	16.76 1,075 0.45	Does not apply	16.76 1,075 0.45	O[C]
Blowdown Emissions	N/A	---	---	---	---	---
Other	N/A	---	---	---	---	---

[A] AP-42, Section 13.2.2.

[B] AP-42 Section 5.2.

[C] Protocol for Equipment Leak Estimates (EPA-453/R-95-017), Table 2-1, Nov. 1995.

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. DO NOT LIST H_2, H_2O, N_2, O_2, and Noble Gases.

[2] Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[4] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; M = modeling; O = other (specify).

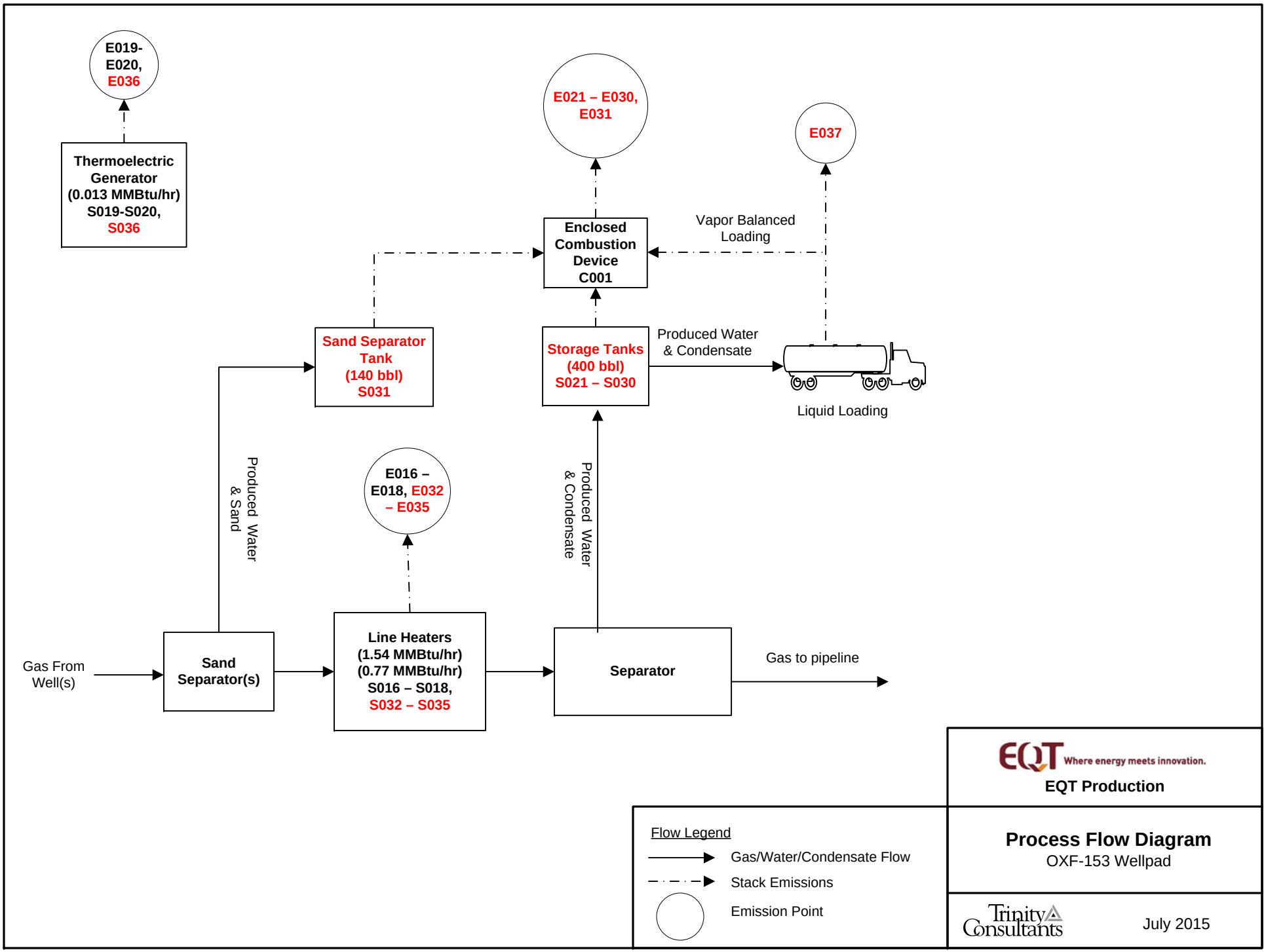
LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components	Number of Components Monitored by Frequency	Average Time to Repair (days)	Estimated Annual Emission Rate (lb/yr)[1]
Pumps	light liquid VOC	1	TBD	TBD	384
	heavy liquid VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Valves	Gas VOC	421	TBD	TBD	9,708
	Light Liquid VOC	---	TBD	TBD	---
	Heavy Liquid VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Safety Relief Valves	Gas VOC	27	TBD	TBD	10,846
	Non VOC	---	TBD	TBD	---
Open-ended Lines	VOC	19	TBD	TBD	125
	Non-VOC	---	TBD	TBD	---
Sampling Connections	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Compressors	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Flanges	VOC	1,763	TBD	TBD	12,461
	Non-VOC	---	TBD	TBD	---
Other	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---

[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

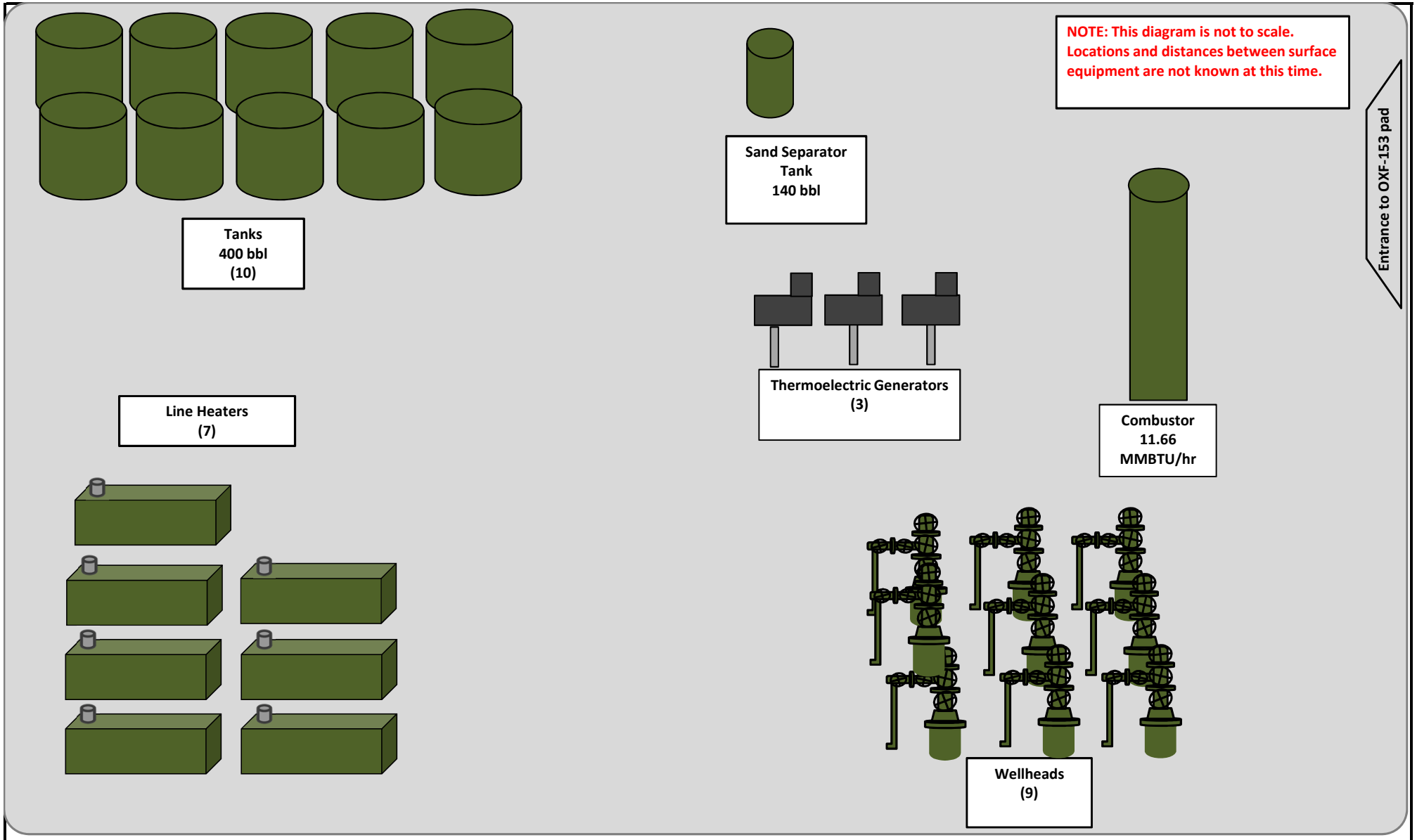
ATTACHMENT D

Process Flow Diagram


E019-E020, E036
Thermoelectric Generator (0.013 MMBtu/hr) S019-S020, S036
E021 – E030, E031
E037
Enclosed Combustion Device C001
Vapor Balanced Loading
Sand Separator Tank (140 bbl) S031
Storage Tanks (400 bbl) S021 – S030
Produced Water & Condensate
Liquid Loading
Produced Water & Sand
E016 – E018, E032 – E035
Produced Water & Condensate
Gas From Well(s)
Sand Separator(s)
Line Heaters (1.54 MMBtu/hr) (0.77 MMBtu/hr) S016 – S018, S032 – S035
Separator
Gas to pipeline
Flow Legend
Gas/Water/Condensate Flow
Stack Emissions
Emission Point
EQT Where energy meets innovation.
EQT Production
Process Flow Diagram
OXF-153 Wellpad
Trinity Consultants
July 2015

ATTACHMENT E

Plot Plan



Attachment E

OXF-153 Well Pad Plot Plan

ATTACHMENT F

Area Map

ATTACHMENT F: AREA MAP

Figure 1 - Map of OXF-153 Location

UTM Northing (KM):	4,337.8731
UTM Easting (KM):	515.746
Elevation:	~1,140 ft

ATTACHMENT G

Emission Unit Data Sheets and G70-A Section Applicability Form

General Permit G70-A Registration
Section Applicability Form

General Permit G70-A was developed to allow qualified applicants to seek registration for a variety of sources. These sources include natural gas well affected facilities, storage tanks, natural gas-fired compressor engines (RICE), natural gas producing units, natural gas-fired in-line heaters, pneumatic controllers, heater treaters, tank truck loading, glycol dehydration units, 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-A 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.

Section 5	Natural Gas Well Affected Facility	☒
Section 6	Storage Vessels*	☒
Section 7	Gas Producing Units, In-Line Heaters, Heater Treaters, and Glycol Dehydration Reboilers	☒
Section 8	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO)	☐
Section 9	*Reserved*	☐
Section 10	Natural gas-fired Compressor Engine(s) (RICE) **	☐
Section 11	Tank Truck Loading Facility ***	☒
Section 12	Standards of Performance for Storage Vessel Affected Facilities (NSPS, Subpart OOOO)	☐
Section 13	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (NSPS, Subpart JJJJ)	☐
Section 14	Control Devices not subject to NSPS, Subpart OOOO	☒
Section 15	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (40CFR63, Subpart ZZZZ)	☐
Section 16	Glycol Dehydration Units	☐
Section 17	Dehydration Units With Exemption from NESHAP Standard, Subpart HH § 63.764(d) (40CFR63, Subpart HH)	☐
Section 18	Dehydration Units Subject to NESHAP Standard, Subpart HH and Not Located Within an UA/UC (40CFR63, Subpart HH)	☐
Section 19	Dehydration Units Subject to NESHAP Standard, Subpart HH and Located Within an UA/UC (40CFR63, Subpart HH)	☐

***** *Applicants that are subject to Section 6 may also be subject to Section 12 if the applicant is subject to the NSPS, Subpart OOOO control requirements or the applicable control device requirements of Section 14.*

****** *Applicants that are subject to Section 10 may also be subject to the applicable RICE requirements of Section 13 and/or Section 15.*

******* *Applicants that are subject to Section 11 may also be subject to control device requirements of Section 14.*

Emission Units Table

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
S001	E001	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S002	E002	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S003	E003	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S004	E004	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S005	E005	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S006	E006	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S007	E0007	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S008	E008	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S009	E009	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S010	E010	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S011	E011	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S012	E012	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S013	E013	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S014	E014	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S015	E015	Produced Fluid Storage Tank	2011	210 bbl	Removed	C001
S016	E016	Line Heater	2011	1.54 MMBtu/hr	Existing; No change	None
S017	E017	Line Heater	2011	1.54 MMBtu/hr	Existing; No change	None
S018	E018	Line Heater	2011	0.77 MMBtu/hr	Existing; No change	None
S019	E019	Thermoelectric Generator	2011	0.013 MMBtu/hr	Existing; No change	None
S020	E020	Thermoelectric Generator	2011	0.013 MMBtu/hr	Existing; No change	None
S021	C001	Produced Fluid Storage Tank	TBD	400 bbl	New	C001

S022	C001	Produced Fluid Storage Tank	TBD	400 bbl	New	C001
S023	C001	Produced Fluid Storage Tank	TBD	400 bbl	New	C001
S024	C001	Produced Fluid Storage Tank	TBD	400 bbl	New	C001
S025	C001	Produced Fluid Storage Tank	TBD	400 bbl	New	C001
S026	C001	Produced Fluid Storage Tank	TBD	400 bbl	New	C001
S027	C001	Produced Fluid Storage Tank	TBD	400 bbl	New	C001
S028	C001	Produced Fluid Storage Tank	TBD	400 bbl	New	C001
S029	C001	Produced Fluid Storage Tank	TBD	400 bbl	New	C001
S030	C001	Produced Fluid Storage Tank	TBD	400 bbl	New	C001
S031	E031	Sand Separator Storage Tank	TBD	140 bbl	New	C001 (Optional)
S032	E032	Line Heater	TBD	1.54 MMBtu/hr	New	None
S033	E033	Line Heater	TBD	1.54 MMBtu/hr	New	None
S034	E034	Line Heater	TBD	1.54 MMBtu/hr	New	None
S035	E035	Line Heater	TBD	1.54 MMBtu/hr	New	None
S036	E036	Thermoelectric Generator	TBD	0.013 MMBtu/hr	New	None
S037	C001	Liquid Loading	2011	NA	Modified – Increase throughput	C001
C001	C001	Combustor	2011	11.66 MMBtu/hr	Existing; No change	NA

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

NATURAL 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).

Please provide the API number(s) for each NG well at this facility:	
47-017-05923	TBD
47-017-05927	TBD
47-017-05926	
47-017-05924	
47-017-05925	
TBD	
TBD	

Note: This is the same API 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 (American Petroleum Institute) 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.

STORAGE VESSEL EMISSION UNIT DATA SHEET

Provide the following information for each new or modified bulk liquid storage tank.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name OXF-153 Wellpad	2. Tank Name Produced Fluid Tanks
3. Emission Unit ID number S021 – S030 (new)	4. Emission Point ID number C001
5. Date Installed or Modified *(for existing tanks)* TBD	6. Type of change: ☒ New construction ☐ New stored material ☐ Other
7A. Description of Tank Modification *(if applicable)* NA	
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. Provide any limitations on source operation affecting emissions. (production variation, etc.) None	

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 400 bbl	
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 bbl	
13A. Maximum annual throughput (gal/yr) ~2,010,174 per tank	13B. Maximum daily throughput (gal/day) ~5,507 per tank
14. Number of tank turnovers per year ~120 per tank	15. Maximum tank fill rate (gal/min) TBD
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 _X__ vertical ___ horizontal ___ flat roof _X_ 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 ☐ Underground ☐ Other (describe)	

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

☐ Refer to enclosed TANKS Summary Sheets
☒ Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

☐ Refer to enclosed TANKS Summary Sheets
☒ Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

☐ Refer to enclosed TANKS Summary Sheets
☒ Refer to the responses to items 34 – 39 in section VII

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply):

☐ Does Not Apply
☐ Carbon Adsorption[1]
☒ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers)
☐ Condenser[1]
☐ Other[1] (describe)
☐ Rupture Disc (psig)
☐ Inert Gas Blanket of _____
☒ Conservation Vent (psig) – Enardo Valve
Vacuum Setting Pressure Setting
☒ Emergency Relief Valve (psig)

[1] Complete appropriate Air Pollution Control Device Sheet

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

Material Name and CAS No.	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 Emission Calculations									

[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.

SECTION VII (required if did not provide TANKS Summary Sheets)

TANK CONSTRUCTION AND OPERATION INFORMATION		
19. Tank Shell Construction: ☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☒ Other (describe) Welded		
20A. Shell Color: Gray	20B. Roof Color: Gray	20C. Year Last Painted: New
21. 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): -0.03 to 0.70 psig		
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:
SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: Elkins, WV			
28. Daily Avg. Ambient Temperature (°F): 49.06		29. Annual Avg. Maximum Temperature (°F): 61.15	
30. Annual Avg. Minimum Temperature (°F): 39.97		31. Avg. Wind Speed (mph): 6.17	
32. Annual Avg. Solar Insulation Factor (BTU/ft^2-day): 1,193.87		33. Atmospheric Pressure (psia): 13.73	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.30	34A. Minimum (°F):	34B. Maximum (°F):	
35. Avg. operating pressure range of tank (psig): -0.03 to 0.70	35A. Minimum (psig): -0.03	35B. Maximum (psig): 0.70	
36A. Minimum liquid surface temperature (°F): 46.54		36B. Corresponding vapor pressure (psia): 0.2050	
37A. Avg. liquid surface temperature (°F): 55.41		37B. Corresponding vapor pressure (psia): 0.2674	
38A. Maximum liquid surface temperature (°F): 64.27		38B. Corresponding vapor pressure (psia): 0.3466	
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	Produced Fluid		
39B. CAS number:	TBD		
39C. Liquid density (lb/gal):	TBD		
39D. Liquid molecular weight (lb/lb-mole):	TBD		
39E. Vapor molecular weight (lb/lb-mole):	25.6284		
39F. Maximum true vapor pressure (psia):	TBD		
39G. Maxim Reid vapor pressure (psia):	TBD		
39H. Months Storage per year. From: To:	12 (All year)		

STORAGE VESSEL EMISSION UNIT DATA SHEET

Provide the following information for each new or modified bulk liquid storage tank.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name OXF-153 Wellpad	2. Tank Name Sand Separator Tank
3. Emission Unit ID number S031	4. Emission Point ID number E031
5. Date Installed or Modified *(for existing tanks)* TBD	6. Type of change: ☒ New construction ☐ New stored material ☐ Other
7A. Description of Tank Modification *(if applicable)*	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.) None	

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 140 bbl	
9A. Tank Internal Diameter (ft.) ~10	9B. Tank Internal Height (ft.) ~10
10A. Maximum Liquid Height (ft.) ~10	10B. Average Liquid Height (ft.) ~5
11A. Maximum Vapor Space Height (ft.) ~10	11B. Average Vapor Space Height (ft.) ~5
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume. 140 bbl	
13A. Maximum annual throughput (gal/yr) ~100,800	13B. Maximum daily throughput (gal/day) ~276
14. Number of tank turnovers per year ~18 per tank	15. Maximum tank fill rate (gal/min) TBD
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 _X__ 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 ☐ Underground ☐ Other (describe)	

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

☐ Refer to enclosed TANKS Summary Sheets
☒ Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

☐ Refer to enclosed TANKS Summary Sheets
☒ Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

☐ Refer to enclosed TANKS Summary Sheets
☒ Refer to the responses to items 34 – 39 in section VII

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply):

☐ Does Not Apply
☐ Carbon Adsorption[1]
☒ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers) (Optional)
☐ Condenser[1]
☐ Other[1] (describe)
☐ Rupture Disc (psig)
☐ Inert Gas Blanket of _____
☐ Conservation Vent (psig)
Vacuum Setting Pressure Setting
☐ Emergency Relief Valve (psig)

[1] Complete appropriate Air Pollution Control Device Sheet

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

Material Name and CAS No.	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 Emission Calculations									

[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.

SECTION VII (required if did not provide TANKS Summary Sheets)

TANK CONSTRUCTION AND OPERATION INFORMATION

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☒ Other (describe) Welded

20A. Shell Color: Gray	20B. Roof Color: Gray	20C. Year Last Painted: New

21. 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): -0.03 to 0.70 psig

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

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

25A. Year Internal Floaters Installed:

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

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

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

25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No			
25F. Describe deck fittings:			
26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply			
26A. Deck Type: ☐ Bolted ☐ Welded		26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction: ☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: Elkins, WV			
28. Daily Avg. Ambient Temperature (°F): 49.06		29. Annual Avg. Maximum Temperature (°F): 61.15	
30. Annual Avg. Minimum Temperature (°F): 39.97		31. Avg. Wind Speed (mph): 6.17	
32. Annual Avg. Solar Insulation Factor (BTU/ft^2-day): 1,193.87		33. Atmospheric Pressure (psia): 13.73	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.30	34A. Minimum (°F):	34B. Maximum (°F):	
35. Avg. operating pressure range of tank (psig): -0.03 to 0.70	35A. Minimum (psig): -0.03	35B. Maximum (psig): 0.70	
36A. Minimum liquid surface temperature (°F): 46.54		36B. Corresponding vapor pressure (psia): 0.2050	
37A. Avg. liquid surface temperature (°F): 55.41		37B. Corresponding vapor pressure (psia): 0.2674	
38A. Maximum liquid surface temperature (°F): 64.27		38B. Corresponding vapor pressure (psia): 0.3466	
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	Produced Fluid		
39B. CAS number:	TBD		
39C. Liquid density (lb/gal):	TBD		
39D. Liquid molecular weight (lb/lb-mole):	TBD		
39E. Vapor molecular weight (lb/lb-mole):	25.6284		
39F. Maximum true vapor pressure (psia):	TBD		
39G. Maxim Reid vapor pressure (psia):	TBD		
39H. Months Storage per year. From: To:	12 (All year)		

NATURAL GAS FIRED FUEL BURNING UNITS
EMISSION DATA SHEET

Complete the information on this data for each Gas Producing Unit(s), Heater Treater(s), and in-line heater(s) at the production pad. Reboiler information should be entered on the Glycol Dehydration Emission Unit Data Sheet.

Emission Unit ID #[1]	Emission Point ID#[2]	Emission Unit Description (Manufacturer / Model #)	Year Installed/ Modified	Type[3] and Date of Change	Control Device[4]	Design Heat Input (mmBtu/hr)[5]	Fuel Heating Value (Btu/scf)[6]
S016	E016	Line Heater	2011	Existing; No change	None	1.54	~1,225
S017	E017	Line Heater	2011	Existing; No change	None	1.54	~1,225
S018	E018	Line Heater	2011	Existing; No change	None	0.77	~1,225
S019	E019	Thermoelectric Generator	2011	Existing; No change	None	0.013	~1,225
S020	E020	Thermoelectric Generator	2011	Existing; No change	None	0.013	~1,225
S032	E032	Line Heater	TBD	New	None	1.54	~1,225
S033	E033	Line Heater	TBD	New	None	1.54	~1,225
S034	E034	Line Heater	TBD	New	None	1.54	~1,225
S035	E035	Line Heater	TBD	New	None	1.54	~1,225
S036	E036	Thermoelectric Generator	TBD	New	None	0.013	~1,225

[1] Enter the appropriate Emission Unit (or Sources) 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 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] Complete appropriate air pollution control device sheet for any control device.

[5] Enter design heat input capacity in mmBtu/hr.

[6] Enter the fuel heating value in Btu/standard cubic foot.

TANK TRUCK LOADING
EMISSION UNIT DATA SHEET

Furnish the following information for each new or modified bulk liquid transfer area or loading rack at the natural gas production pad. This form is to be used for bulk liquid transfer operations to tank trucks.

1. Emission Unit ID: S037	2. Emission Point ID: C001	3. Year Installed/ Modified: Installed 2011
4. Emission Unit Description: Liquid Loading		
5. Loading Area Data:		
5A. Number of pumps: 1	5B. Number of liquids loaded:1	5C. Maximum number of tank trucks loading at one time:1
6. Describe cleaning location, compounds and procedure for tank trucks:		
7. Are tank trucks pressure tested for leaks at this or any other location? ☐ Yes ☒ No If YES, describe:		

8. Projected Maximum Operating Schedule (for rack or transfer point as a whole):

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	As needed	As needed	As needed	As needed
days/week	As needed	As needed	As needed	As needed

9. Bulk Liquid Data *(add pages as necessary):*

Liquid Name	Produced Fluids		
Max. daily throughput (1000 gal/day)	Variable		
Max. annual throughput (gal/yr)	20,202,538		
Loading Method [1]	SP		
Max. Fill Rate (gal/min)			
Average Fill Time (min/loading)			
Max. Bulk Liquid Temperature (°F)	51.30		
True Vapor Pressure [2]	0.3466		
Cargo Vessel Condition[3]	Unknown		
Control Equipment or Method [4]	VB		
Minimum collection efficiency (%)	70		
Minimum control efficiency (%)	95		

** Continued on next page*

Maximum Emission Rate	Loading (lb/hr)	VOC: 0.17 HAP: <0.01		
	Annual (ton/yr)	VOC: 0.73 HAP: 0.02		
Estimation Method [5]		EPA		
Notes:				
[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 as Attachment "H"*): CA = Carbon Adsorption VB = Dedicated Vapor Balance (closed system) ECD = Enclosed Combustion Device F = Flare TO = Thermal Oxidation or Incineration				
[5] EPA = EPA Emission Factor as stated in AP-42 MB = Material Balance TM = Test Measurement based upon test data submittal O = other (describe)				

10. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING *Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment operation/air pollution control device.* None	RECORDKEEPING *Please describe the proposed recordkeeping that will accompany the monitoring.* None
REPORTING *Please describe the proposed frequency of reporting of the recordkeeping.* None	TESTING *Please describe any proposed emissions testing for this process equipment/air pollution control device.* None

11. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty: N/A

ATTACHMENT H

Air Pollution Control Device Data Sheets

AIR POLLUTION CONTROL DEVICE
Vapor Combustion Control Device Sheet

Complete this vapor combustion control device sheet for each enclosed combustion device, flare, thermal oxidizer, or completion combustion device that is located at the natural gas production pad for the purpose of thermally destructing waste gas to control emissions of regulated pollutants to the atmosphere.

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.

General Information

1. Control Device ID#: C001	2. Installation Date: 2011 ☐ New	
3. Maximum Rated Total Flow Capacity: ~130 scf/min ~188,380 scfd	4. Maximum Design Heat Input: 11.66 MMBtu/hr	5. Design Heat Content: 1,050 BTU/scf

Control Device Information

6. Select the type of vapor combustion control device being used: ☒ Enclosed Combustion Device

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

7. Manufacturer: LEED Fabrication Model No.: Enclosed Combustor 48”	8. Hours of operation per year: 8760

9. List the emission units whose emissions are controlled by this vapor combustion control device: (Emission Point ID#: E021-E031, E037)

10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
S021-S030	Produced Fluid Storage Tanks		
S031	Sand Separator Storage Tank		
S037	Liquid Loading		

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

11. Assist Type	12. Flare Height	13. Tip Diameter	14. Was the design per §60.18?
☐ Steam - ☐ Air - ☐ Pressure - ☒ Non -	~25 ft	~4 ft	☐Yes ☐No **NA**

Waste Gas Information

15. Maximum waste gas flow rate (scfm):	16. Heat value of waste gas stream (BTU/ft3)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (scf/min)
~130	Variable	~70	

19. Provide an attachment with the characteristics of the waste gas stream to be burned. ***See attached emission calculations.***

Pilot Information

20. Type/Grade of pilot fuel:	21. Number of pilot lights:	22. Fuel flow rate to pilot flame per pilot (scf/hr):	23. Heat input per pilot (BTU/hr):	24. Will automatic re-ignition be used?
Pipeline quality natural gas	1	25	26,335	☐ Yes ☒ No

25. If automatic re-ignition will be used, describe the method:
NA

26. Describe the method of controlling flame:
Three flame cells to stop the main flame front; One 2" flame arrestor on piping from drip pot to burner assembly.

27. Is pilot flame equipped with a monitor to detect the presence of the flame? ☒ Yes ☐ No	28. If yes, what type? ☒ Thermocouple ☐ Infra-Red ☐ Ultra Violet ☐ Camera with monitoring control room ☐ Other, describe:

29. Pollutant(s) Controlled	30. % Capture Efficiency	31. Manufacturer's Guaranteed Control Efficiency (%)
HC	100	≥ 95
VOC	100	≥ 95
HAP	100	≥ 95

32. Has the control device been tested by the manufacturer and certified?

33. Describe all operating ranges and maintenance procedures required by the manufacturer to maintain warranty:
See attached specification sheet.

34. Additional Information Attached? ☒ **YES** ☐ **NO**

Please attach a copy of manufacturer's data sheet.
Please attach a copy of manufacturer's drawing.
Please attach a copy of the manufacturer's performance testing.

If any of the requested information is not available, please contact the manufacturer.

ATTACHMENT I

Emission Calculations

Company Name: EQT Production, LLC
Facility Name: OXF-153 Wellpad
Project Description: G-70A Permit Application

Site Wide Summary

Emission Source	Value	Units	Emission Unit ID(s)	Emission Point ID(s)	Control Device
Well(s)	9	per pad	---	---	---
Storage Tank(s)	10	per pad	S021 - S030	C001	Combustor
Sand Separator Tank	1	per pad	S031	E031	Combustor
Line Heater(s) - 0.77 MMBtu/hr	1	per pad	S018	E018	None
Line Heater(s) - 1.54 MMBtu/hr	6	per pad	S016 - S017, S032 - S035	E016 - E017, E032 - E035	None
Thermoelectric Generator(s) (TEGs)	3	per pad	S019 -S020, S036	E019-E020, E036	None
Dehydrator(s)	0	per pad	---	---	---
Reboiler(s)	0	per pad	---	---	---
Dehy Drip Tank	0	per pad	---	---	---
Tank Combustor(s)	1	per pad	C001	C001	---
Dehy Combustor(s)	0	per pad	---	---	---
Length of lease road	8,140	feet	---	---	---

Constituent	Produced Fluid Storage Tanks (includes Combustor) (tpy)	Sand Separator Tank (tpy)	Line Heaters 1.54 MMBtu/hr (tpy)	Line Heaters 0.77 MMBtu/hr (tpy)	TEGs (tpy)	Fugitive Components (tpy)	Liquid Loading (tpy)	Haul Roads (tpy)	Total Emissions (tpy)
Criteria Pollutants									
NO_X	4.18	---	3.299	0.275	0.01	---	---	---	**7.77**
CO	3.51	---	2.771	0.231	0.01	---	---	---	**6.52**
PM Total	0.32	---	0.251	0.021	1.1E-03	---	---	33.82	**34.41**
PM_{10} Total	0.32	---	0.251	0.021	1.1E-03	---	---	8.62	**9.21**
$PM_{2.5}$ Total	0.32	---	0.251	0.021	1.1E-03	---	---	0.86	**1.45**
SO_2	0.03	---	0.020	0.002	8.3E-05	---	---	---	**0.05**
VOC	50.14	0.63	0.181	0.015	7.6E-04	16.76	0.73	---	**68.46**
Greenhouse Gases									
CO_2	5,988.64	---	4,730.29	394.19	19.92	0.28	---	---	**11,133**
CH_4	11.97	0.15	0.09	0.01	3.8E-04	42.99	---	---	**55.20**
N_2O	0.01	---	0.01	0.00	3.8E-05		---	---	**0.02**
CO_2e	6,291.33	3.70	4,735.18	394.60	19.94	1,074.92	---	---	**12,520**
Hazardous Air Pollutants									
Methylnaphthalene (2-)	---	---	7.9E-07	6.6E-08	3.3E-09	---	---	---	8.6E-07
Methylchloranthrene (3-)	---	---	5.9E-08	4.9E-09	2.5E-10	---	---	---	6.5E-08
Dimethybenz(a)anthracene (7,12-)	---	---	5.3E-07	4.4E-08	2.2E-09	---	---	---	5.7E-07
Acenaphthene	---	---	5.9E-08	4.9E-09	2.5E-10	---	---	---	6.5E-08
Acenaphthylene	---	---	5.9E-08	4.9E-09	2.5E-10	---	---	---	6.5E-08
Anthracene	---	---	7.9E-08	6.6E-09	3.3E-10	---	---	---	8.6E-08
Benz(a)anthracene	---	---	5.9E-08	4.9E-09	2.5E-10	---	---	---	6.5E-08
Benzene	2.0E-02	<0.001	6.9E-05	5.8E-06	2.9E-07	8.0E-03	3.7E-04	---	2.8E-02
Benzo(a)pyrene	---	---	4.0E-08	3.3E-09	1.7E-10	---	---	---	4.3E-08
Benzo(b)fluoranthene	---	---	5.9E-08	4.9E-09	2.5E-10	---	---	---	6.5E-08
Benzo(g,h,i)perylene	---	---	4.0E-08	3.3E-09	1.7E-10	---	---	---	4.3E-08
Benzo(k)fluoranthene	---	---	5.9E-08	4.9E-09	2.5E-10	---	---	---	6.5E-08
Chrysene	---	---	5.9E-08	4.9E-09	2.5E-10	---	---	---	6.5E-08
Dibenzo(a,h)anthracene	---	---	4.0E-08	3.3E-09	1.7E-10	---	---	---	4.3E-08
Dichlorobenzene	---	---	4.0E-05	3.3E-06	1.7E-07	---	---	---	4.3E-05
Fluoranthene	---	---	9.9E-08	8.2E-09	4.2E-10	---	---	---	1.1E-07
Fluorene	---	---	9.2E-08	7.7E-09	3.9E-10	---	---	---	1.0E-07
Formaldehyde	---	---	2.5E-03	2.1E-04	1.0E-05	---	---	---	2.7E-03
Hexane, n-	0.57	7.0E-03	5.9E-02	4.9E-03	2.5E-04	0.25	1.5E-02	---	9.0E-01
Indeno(1,2,3-cd)pyrene	---	---	5.9E-08	4.9E-09	2.5E-10	---	---	---	6.5E-08
Naphthalene	---	---	2.0E-05	1.7E-06	8.5E-08	---	---	---	2.2E-05
Phenanthrene	---	---	5.6E-07	4.7E-08	2.4E-09	---	---	---	6.1E-07
Pyrene	---	---	1.6E-07	1.4E-08	6.9E-10	---	---	---	1.8E-07
Toluene	0.03	<0.001	1.1E-04	9.3E-06	4.7E-07	0.02	6.9E-04	---	4.8E-02
Arsenic	---	---	6.6E-06	5.5E-07	2.8E-08	---	---	---	7.2E-06
Beryllium	---	---	4.0E-07	3.3E-08	1.7E-09	---	---	---	4.3E-07
Cadmium	---	---	3.6E-05	3.0E-06	1.5E-07	---	---	---	3.9E-05
Chromium	---	---	4.6E-05	3.8E-06	1.9E-07	---	---	---	5.0E-05
Cobalt	---	---	2.8E-06	2.3E-07	1.2E-08	---	---	---	3.0E-06
Manganese	---	---	1.3E-05	1.0E-06	5.3E-08	---	---	---	1.4E-05
Mercury	---	---	8.6E-06	7.1E-07	3.6E-08	---	---	---	9.3E-06
Nickel	---	---	6.9E-05	5.8E-06	2.9E-07	---	---	---	7.5E-05
Selenium	---	---	7.9E-07	6.6E-08	3.3E-09	---	---	---	8.6E-07
Ethylbenzene	<0.001	<0.001	---	---	---	<0.001	3.9E-05	---	3.9E-05
Trimethylpentane (2,2,4-)	<0.001	<0.001	---	---	---	0.17	3.3E-05	---	1.7E-01
Xylene	1.0E-02	<0.001	---	---	---	8.7E-03	5.2E-04	---	1.9E-02
Total HAP	0.63	0.01	0.06	0.01	2.6E-04	0.45	0.02	---	**1.18**

Company Name: **EQT Production, LLC**
Facility Name: **OXF-153 Wellpad**
Project Description: **G-70A Permit Application**

Produced Fluid Storage Tanks

Throughput Parameter	Value	Units
Operational Hours	8,760	hrs/yr
Total Produced Fluid Throughput for E&P [1]	16	bbl/day (per tank)
Total Condensate Throughput	4,529	bbl/month
Total Produced Water Throughput	35,356	bbl/month

Description	Potential Throughput [2] (gal/yr)
Produced Water and Condensate	20,101,738

[1] For the purposes of establishing PTE, produced water is conservatively assumed to contain 1% condensate. E&P Tank throughput is on a per-tank basis.

[2] Based on maximum historical produced water and condensate throughput for OXF-153 wellpad.

Storage Tanks (400 bbl, each) - Uncontrolled *(Per tank)*

Constituent	Total Emissions [1] lb/hr	tpy
Methane	5.417	23.726
Ethane	8.623	37.767
Propane	11.100	48.619
Isobutane	2.590	11.346
n-Butane	5.175	22.665
Isopentane	1.643	7.196
n-Pentane	1.361	5.959
n-Hexane	0.262	1.146
Cyclohexane	<0.001	<0.001
Other Hexanes	0.339	1.484
Heptanes	0.305	1.338
Benzene	0.010	0.043
Toluene	0.012	0.051
Ethylbenzene	<0.001	0.002
Xylenes	0.003	0.015
2,2,4-Trimethylpentane	0.001	0.003
C8+ Heavies	0.097	0.423
Total Emissions:	37.049	162.275
Total VOC Emissions:	22.897	100.289
Total HAP Emissions:	0.288	1.260

[1] E&P TANK v2.0 calculates working, breathing and flashing losses and reports the sum as one total.

[2] E&P TANK v2.0 emission calculations are based on 5/14/2013 condensate sample from OXF-44 wellpad.

Control Efficiency of Combustor	95%	Guaranteed efficiency for Leed Enclosed Combustor
Pilot Rating	0.03 MMBtu/hr	Max. pilot fuel usage for Leed Enclosed Combustor
Combustor Rating	11.66 MMBtu/hr	Max. input from Leed Enclosed Combustor Operations Manual

Company Name: EQT Production, LLC
Facility Name: OXF-153 Wellpad
Project Description: G-70A Permit Application

Produced Fluid Storage Tanks

Storage Tanks (400 bbl, each) - Controlled *(Per tank)*

Constituent	Total Emissions lb/hr	Total Emissions tpy
Methane	0.271	1.186
Ethane	0.431	1.888
Propane	0.555	2.431
Isobutane	0.130	0.567
n-Butane	0.259	1.133
Isopentane	0.082	0.360
n-Pentane	0.068	0.298
n-Hexane	0.013	0.057
Cyclohexane	<0.001	<0.001
Other Hexanes	0.017	0.074
Heptanes	0.015	0.067
Benzene	<0.001	0.002
Toluene	0.001	0.003
Ethylbenzene	<0.001	<0.001
Xylenes	<0.001	0.001
2,2,4-Trimethylpentane	<0.001	<0.001
C8+ Heavies	0.004	0.021
Total Emissions:	1.852	8.114
Total VOC Emissions:	1.145	5.014
Total HAP Emissions:	0.014	0.063

Enclosed Combustor Emissions [1]

Pollutant [2]	Emission Factor (lb/MMBtu)	Combustor Potential Emissions (lb/hr)	Combustor Potential Emissions (tpy)	Pilot Potential Emissions (lb/hr)	Pilot Potential Emissions (tpy)
NO_x	0.082	0.951	4.168	0.002	0.009
CO	0.069	0.799	3.501	0.002	0.008
PM/PM_{10}	0.006	0.072	0.317	1.6E-04	0.001
SO_2	4.9E-04	0.006	0.025	1.3E-05	5.65E-05
CO_2 (Natural Gas Firing)	116.997	1364.189	5975.146	3.081	13.495
CH_4 (Natural Gas Firing)	0.002	0.026	0.113	5.8E-05	2.54E-04
N_2O (Natural Gas Firing)	2.2E-04	0.003	0.011	5.8E-06	2.54E-05

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

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

Company Name: **EQT Production, LLC**
Facility Name: **OXF-153 Wellpad**
Project Description: **G-70A Permit Application**

Sand Separator Tank

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

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

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

Sand Separator Tank (140 bbl) - Uncontrolled *(Per tank)*

Constituent	Total Emissions [1] lb/hr	tpy
Methane	0.034	0.148
Ethane	0.054	0.236
Propane	0.069	0.304
Isobutane	0.016	0.071
n-Butane	0.032	0.142
Isopentane	0.010	0.045
n-Pentane	0.008	0.037
n-Hexane	0.002	0.007
Cyclohexane	<0.001	<0.001
Other Hexanes	0.002	0.009
Heptanes	0.002	0.008
Benzene	<0.001	<0.001
Toluene	<0.001	<0.001
Ethylbenzene	<0.001	<0.001
Xylenes	<0.001	<0.001
2,2,4-Trimethylpentane	<0.001	<0.001
C8+ Heavies	<0.001	0.002
Total Emissions:	0.231	1.012
Total VOC Emissions:	0.143	0.627
Total HAP Emissions:	0.002	0.010

[1] E&P TANK 2.0 calculates working, breathing and flashing losses and reports the sum as one total.

[2] E&P TANK v2.0 emission calculations are based on 5/14/2013 condensate sample from OXF-44 wellpad.

Company Name: **EQT Production, LLC**
Facility Name: **OXF-153 Wellpad**
Project Description: **G-70A Permit Application**

Line Heaters

Parameter	Value	Units
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,225	BTU/scf
Heat Input	1.54	MMBtu/hr (each)
Fuel Consumption	1.26E-03	MMscf/hr (each)
Potential Annual Hours of Operation	8,760	hr/yr

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
NO_x	100	1.3E-01	5.5E-01
CO	84	1.1E-01	4.6E-01
SO_2	0.6	7.5E-04	3.3E-03
PM Total	7.6	9.5E-03	4.2E-02
PM Condensable	5.7	7.2E-03	3.1E-02
PM_{10} (Filterable)	1.9	2.4E-03	1.0E-02
$PM_{2.5}$ (Filterable)	1.9	2.4E-03	1.0E-02
VOC	5.5	6.9E-03	3.0E-02
Lead	5.0E-04	6.3E-07	2.7E-06
CO_2 (Natural Gas Firing)[4]	143,374	180	788
CH_4 (Natural Gas Firing)[4]	2.7	3.4E-03	1.5E-02
N_2O (Natural Gas Firing)[4]	0.27	3.4E-04	1.5E-03

Company Name: **EQT Production, LLC**
Facility Name: **OXF-153 Wellpad**
Project Description: **G-70A Permit Application**

Line Heaters

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
HAPs:			
Methylnaphthalene (2-)	2.4E-05	3.0E-08	1.3E-07
3-Methylchloranthrene	1.8E-06	2.3E-09	9.9E-09
7,12-Dimethylbenz(a)anthracene	1.6E-05	2.0E-08	8.8E-08
Acenaphthene	1.8E-06	2.3E-09	9.9E-09
Acenaphthylene	1.8E-06	2.3E-09	9.9E-09
Anthracene	2.4E-06	3.0E-09	1.3E-08
Benz(a)anthracene	1.8E-06	2.3E-09	9.9E-09
Benzene	2.1E-03	2.6E-06	1.2E-05
Benzo(a)pyrene	1.2E-06	1.5E-09	6.6E-09
Benzo(b)fluoranthene	1.8E-06	2.3E-09	9.9E-09
Benzo(g,h,i)perylene	1.2E-06	1.5E-09	6.6E-09
Benzo(k)fluoranthene	1.8E-06	2.3E-09	9.9E-09
Chrysene	1.8E-06	2.3E-09	9.9E-09
Dibenzo(a,h) anthracene	1.2E-06	1.5E-09	6.6E-09
Dichlorobenzene	1.2E-03	1.5E-06	6.6E-06
Fluoranthene	3.0E-06	3.8E-09	1.6E-08
Fluorene	2.8E-06	3.5E-09	1.5E-08
Formaldehyde	7.5E-02	9.4E-05	4.1E-04
Hexane	1.8E+00	2.3E-03	9.9E-03
Indo(1,2,3-cd)pyrene	1.8E-06	2.3E-09	9.9E-09
Naphthalene	6.1E-04	7.7E-07	3.4E-06
Phenanthrene	1.7E-05	2.1E-08	9.3E-08
Pyrene	5.0E-06	6.3E-09	2.7E-08
Toluene	3.4E-03	4.3E-06	1.9E-05
Arsenic	2.0E-04	2.5E-07	1.1E-06
Beryllium	1.2E-05	1.5E-08	6.6E-08
Cadmium	1.1E-03	1.4E-06	6.0E-06
Chromium	1.4E-03	1.8E-06	7.7E-06
Cobalt	8.4E-05	1.1E-07	4.6E-07
Manganese	3.8E-04	4.8E-07	2.1E-06
Mercury	2.6E-04	3.3E-07	1.4E-06
Nickel	2.1E-03	2.6E-06	1.2E-05
Selenium	2.4E-05	3.0E-08	1.3E-07
Total HAP		**2.4E-03**	**1.0E-02**

[1] Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

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

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

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

Company Name: **EQT Production, LLC**
Facility Name: **OXF-153 Wellpad**
Project Description: **G-70A Permit Application**

Line Heaters

Parameter	Value	Units
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,225	BTU/scf
Heat Input	0.77	MMBtu/hr (each)
Fuel Consumption	6.28E-04	MMscf/hr (each)
Potential Annual Hours of Operation	8,760	hr/yr

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
NO_x	100	6.3E-02	2.7E-01
CO	84	5.3E-02	2.3E-01
SO_2	0.6	3.8E-04	1.6E-03
PM Total	7.6	4.8E-03	2.1E-02
PM Condensable	5.7	3.6E-03	1.6E-02
PM_{10} (Filterable)	1.9	1.2E-03	5.2E-03
$PM_{2.5}$ (Filterable)	1.9	1.2E-03	5.2E-03
VOC	5.5	3.5E-03	1.5E-02
Lead	5.0E-04	3.1E-07	1.4E-06
CO_2 (Natural Gas Firing)[4]	143,374	90	394
CH_4 (Natural Gas Firing)[4]	2.7	1.7E-03	7.4E-03
N_2O (Natural Gas Firing)[4]	0.27	1.7E-04	7.4E-04

Company Name: **EQT Production, LLC**
Facility Name: **OXF-153 Wellpad**
Project Description: **G-70A Permit Application**

Line Heaters

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
HAPs:			
Methylnaphthalene (2-)	2.4E-05	1.5E-08	6.6E-08
3-Methylchloranthrene	1.8E-06	1.1E-09	4.9E-09
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.0E-08	4.4E-08
Acenaphthene	1.8E-06	1.1E-09	4.9E-09
Acenaphthylene	1.8E-06	1.1E-09	4.9E-09
Anthracene	2.4E-06	1.5E-09	6.6E-09
Benz(a)anthracene	1.8E-06	1.1E-09	4.9E-09
Benzene	2.1E-03	1.3E-06	5.8E-06
Benzo(a)pyrene	1.2E-06	7.5E-10	3.3E-09
Benzo(b)fluoranthene	1.8E-06	1.1E-09	4.9E-09
Benzo(g,h,i)perylene	1.2E-06	7.5E-10	3.3E-09
Benzo(k)fluoranthene	1.8E-06	1.1E-09	4.9E-09
Chrysene	1.8E-06	1.1E-09	4.9E-09
Dibenzo(a,h) anthracene	1.2E-06	7.5E-10	3.3E-09
Dichlorobenzene	1.2E-03	7.5E-07	3.3E-06
Fluoranthene	3.0E-06	1.9E-09	8.2E-09
Fluorene	2.8E-06	1.8E-09	7.7E-09
Formaldehyde	7.5E-02	4.7E-05	2.1E-04
Hexane	1.8E+00	1.1E-03	4.9E-03
Indo(1,2,3-cd)pyrene	1.8E-06	1.1E-09	4.9E-09
Naphthalene	6.1E-04	3.8E-07	1.7E-06
Phenanthrene	1.7E-05	1.1E-08	4.7E-08
Pyrene	5.0E-06	3.1E-09	1.4E-08
Toluene	3.4E-03	2.1E-06	9.3E-06
Arsenic	2.0E-04	1.3E-07	5.5E-07
Beryllium	1.2E-05	7.5E-09	3.3E-08
Cadmium	1.1E-03	6.9E-07	3.0E-06
Chromium	1.4E-03	8.8E-07	3.8E-06
Cobalt	8.4E-05	5.3E-08	2.3E-07
Manganese	3.8E-04	2.4E-07	1.0E-06
Mercury	2.6E-04	1.6E-07	7.1E-07
Nickel	2.1E-03	1.3E-06	5.8E-06
Selenium	2.4E-05	1.5E-08	6.6E-08
Total HAP		**1.2E-03**	**5.2E-03**

[1] Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

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

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

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

Company Name: **EQT Production, LLC**
Facility Name: **OXF-153 Wellpad**
Project Description: **G-70A Permit Application**

Thermoelectric Generators (TEGs)

Parameter	Value	Units
Manufacturer	Global Thermoelectric	
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,225	BTU/scf
Heat Input	0.013	MMBtu/hr (each)
Fuel Consumption [1]	1.06E-05	MMscf/hr (each)
Potential Annual Hours of Operation	8,760	hr/yr

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

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
NO_x	100	1.1E-03	4.6E-03
CO	84	8.9E-04	3.9E-03
SO_2	0.6	6.3E-06	2.8E-05
PM Total	7.6	8.0E-05	3.5E-04
PM Condensable	5.7	6.0E-05	2.6E-04
PM_{10} (Filterable)	1.9	2.0E-05	8.8E-05
$PM_{2.5}$ (Filterable)	1.9	2.0E-05	8.8E-05
VOC	5.5	5.8E-05	2.5E-04
Lead	5.00E-04	5.3E-09	2.3E-08
CO_2 (Natural Gas Firing)[4]	143,374	2	7
CH_4 (Natural Gas Firing)[4]	2.7	2.9E-05	1.3E-04
N_2O (Natural Gas Firing)[4]	0.27	2.9E-06	1.3E-05

Company Name: EQT Production, LLC
Facility Name: OXF-153 Wellpad
Project Description: G-70A Permit Application

Thermoelectric Generators (TEGs)

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
HAPs:			
Methylnaphthalene (2-)	2.4E-05	2.5E-10	1.1E-09
3-Methylchloranthrene	1.8E-06	1.9E-11	8.3E-11
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.7E-10	7.4E-10
Acenaphthene	1.8E-06	1.9E-11	8.3E-11
Acenaphthylene	1.8E-06	1.9E-11	8.3E-11
Anthracene	2.4E-06	2.5E-11	1.1E-10
Benz(a)anthracene	1.8E-06	1.9E-11	8.3E-11
Benzene	2.1E-03	2.2E-08	9.7E-08
Benzo(a)pyrene	1.2E-06	1.3E-11	5.6E-11
Benzo(b)fluoranthene	1.8E-06	1.9E-11	8.3E-11
Benzo(g,h,i)perylene	1.2E-06	1.3E-11	5.6E-11
Benzo(k)fluoranthene	1.8E-06	1.9E-11	8.3E-11
Chrysene	1.8E-06	1.9E-11	8.3E-11
Dibenzo(a,h) anthracene	1.2E-06	1.3E-11	5.6E-11
Dichlorobenzene	1.2E-03	1.3E-08	5.6E-08
Fluoranthene	3.0E-06	3.2E-11	1.4E-10
Fluorene	2.8E-06	3.0E-11	1.3E-10
Formaldehyde	7.5E-02	7.9E-07	3.5E-06
Hexane	1.8E+00	1.9E-05	8.3E-05
Indo(1,2,3-cd)pyrene	1.8E-06	1.9E-11	8.3E-11
Naphthalene	6.1E-04	6.5E-09	2.8E-08
Phenanthrene	1.7E-05	1.8E-10	7.9E-10
Pyrene	5.0E-06	5.3E-11	2.3E-10
Toluene	3.4E-03	3.6E-08	1.6E-07
Arsenic	2.0E-04	2.1E-09	9.3E-09
Beryllium	1.2E-05	1.3E-10	5.6E-10
Cadmium	1.1E-03	1.2E-08	5.1E-08
Chromium	1.4E-03	1.5E-08	6.5E-08
Cobalt	8.4E-05	8.9E-10	3.9E-09
Manganese	3.8E-04	4.0E-09	1.8E-08
Mercury	2.6E-04	2.7E-09	1.2E-08
Nickel	2.1E-03	2.2E-08	9.7E-08
Selenium	2.4E-05	2.5E-10	1.1E-09
Total HAP		**2.0E-05**	**8.7E-05**

[1] Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, 1.4-3, & 1.4-4.

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

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

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

Company Name: **EQT Production, LLC**
Facility Name: **OXF-153 Wellpad**
Project Description: **G-70A Permit Application**

Fugitive Components

Component Counts

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 Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Total Fugitive Emissions (lb/hr)	TOC Annual Fugitive Emissions (tpy)
Valves	Gas	5.97E-03	421	5.54	24.27
Pump Seals	Light Liquid	1.99E-02	1	0.04	0.19
Pressure Relief Valves	Gas	1.04E-01	27	6.19	27.11
Connectors	All	1.83E-03	1,763	7.11	31.15
Open-Ended Lines	All	1.70E-03	19	0.07	0.31
			Emission Totals:	**18.96**	**83.04**

[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.
[2] Assumes one pump for liquid loading, no compressors or dehydrators, and one meter per wellhead. Pressure relief valves count includes an Enardo valve and Emergency Pressure Relief valve for each storage tank.

VOC and HAP Weight Fractions [1]

Service	Weight Fraction VOC	Weight Fraction Hexane	Weight Fraction Benzene	Weight Fraction Toluene	Weight Fraction Ethylbenzene	Weight Fraction 2,2,4-trimethylpentane	Weight Fraction Xylene
Gas	0.200	3.0E-03	9.7E-05	2.1E-04	<0.001	2.1E-03	1.1E-04
Light Liquid	1.000	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
All	0.200	3.0E-03	9.7E-05	2.1E-04	<0.001	2.1E-03	1.1E-04

[1] All weight fractions are based on a representative gas analysis.

Company Name: **EQT Production, LLC**
Facility Name: **OXF-153 Wellpad**
Project Description: **G-70A Permit Application**

Fugitive Components

VOC and HAP Fugitive Emissions

Pollutant	Hourly Fugitive Emissions (lb/hr)	Annual Fugitive Emissions (tpy)
VOC	3.827	16.76
Hexane	5.7E-02	2.5E-01
Benzene	1.8E-03	8.0E-03
Toluene	3.9E-03	1.7E-02
Ethylbenzene	<0.001	<0.001
2,2,4-trimethylpentane	3.9E-02	1.7E-01
Xylene	2.0E-03	8.7E-03
Total HAP	1.0E-01	4.5E-01

GHG Fugitive Emissions from Component Leaks

Component	Component Count[1]	GHG Emission Factor[2] (scf/hr/component)	CH_4 Emissions[3,4] (tpy)	CO_2 Emissions[3,4] (tpy)	CO_2e Emissions[5] (tpy)
Connectors	1,763	3.0E-03	7.9E-01	5.1E-03	2.0E+01
Open-Ended Lines	19	6.1E-02	1.7E-01	1.1E-03	4.3E+00
Pressure Relief Devices	27	4.0E-02	1.6E-01	1.0E-03	4.0E+00
Pneumatic Devices	45	6.0E+00	4.0E+01	2.6E-01	1.0E+03
Valves	421	2.7E-02	1.7E+00	1.1E-02	4.2E+01
Total			**43.0**	**0.278**	**1075**

[1] The component count for pneumatics assumes 5 pneumatics per well.
[2] 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, except for pneumatics, which are set at NSPS OOOO limits.
[3] Calculated in accordance with Equations W-31, W-35 and W-36 in Subpart W of 40 CFR 98.
[4] Mole fractions of CH_4 and CO_2 based on gas analysis:

CH_4: 80.26% CO_2: 0.19%

[5] 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-153 Wellpad**
Project Description: **G-70A Permit Application**

Liquid Loading

Liquid Loading Losses:

Uncontrolled Loading Losses: L_L (lb/10^3 gal) = 12.46 (SPM)/T

Controlled Loading Losses: L_L (lb/10^3 gal) = 12.46 (SPM)/T * (1 - collection efficiency * control efficiency)

Parameter	Value	Description
S	1.00	saturation factor for vapor balancing (AP-42 Table 5.2-1)
Collection Efficiency	70%	collection efficiency for non-NSPS/MACT annual leak tested trucks
Control Efficiency	95%	control efficiency of combustor
P	0.35	max true vapor pressure of liquid loaded (psia) - EPA TANKS Data
M	25.63	molecular weight of vapors (lb/lb-mol) - EPA TANKS Data
T	511.0	temperature of liquids loaded (deg R) - EPA TANKS Data

Description	Loading Losses (lb/10^3 gal)	Maximum Throughput[1] (gal)	VOC Emissions Total Uncontrolled (tpy)	VOC Emissions Uncontrolled Uncaptured (tpy)	VOC Emissions Controlled[2] Captured (tpy)
Liquids Hauling	0.2	20,202,538	2.19	0.66	0.08

[1] Sum of the annual throughput from each well at the pad including the sand separator tank.

[2] Represents all vapors captured during liquid loading operations that are routed to the combustor for control.

Speciated HAP Emission Potential:

Constituent	mol%[1]	True Vapor Pressure of Organic Compounds in liquid (psia)[2]	Partial Vapor Pressure (psia)	Mole Fraction	Molecular Weight	VOC Vapor Weight	Speciated Weight Fraction	Controlled Speciated Liquid Loading Emissions (tpy) [3]
Methane	0.095	---	---	---	---	---	---	---
Ethane	0.602	---	---	---	---	---	---	---
Propane	1.646	127.310	2.1E+00	3.2E-01	4.4E+01	1.4E+01	2.0E-01	1.5E-02
Isobutane	0.867	46.110	4.0E-01	6.1E-02	5.8E+01	3.6E+00	4.9E-02	3.8E-03
n-Butane	2.986	32.045	9.6E-01	1.5E-01	5.8E+01	8.5E+00	1.2E-01	9.0E-03
Isopentane	3.103	12.530	3.9E-01	5.9E-02	7.2E+01	4.3E+00	5.9E-02	4.6E-03
n-Pentane	3.943	8.433	3.3E-01	5.1E-02	7.2E+01	3.7E+00	5.1E-02	3.9E-03
n-Hexane	4.692	2.436	1.1E-01	1.7E-02	8.6E+01	1.5E+00	2.1E-02	1.6E-03
Other Hexanes	4.939	2.436	1.2E-01	1.8E-02	8.6E+01	1.6E+00	2.2E-02	1.7E-03
Heptanes	14.686	0.735	1.1E-01	1.7E-02	9.8E+01	1.6E+00	2.2E-02	1.7E-03
Benzene	0.200	1.508	3.0E-03	4.6E-04	7.8E+01	3.6E-02	5.0E-04	3.8E-05
Toluene	1.138	0.425	4.8E-03	7.4E-04	9.2E+01	6.8E-02	9.4E-04	7.2E-05
Ethylbenzene	0.155	0.151	2.3E-04	3.6E-05	1.1E+02	3.8E-03	5.3E-05	4.0E-06
Xylenes	1.763	0.180	3.2E-03	4.8E-04	1.1E+02	5.1E-02	7.1E-04	5.5E-05
2,2,4-Trimethylpentane	0.031	0.596	1.8E-04	2.8E-05	1.1E+02	3.2E-03	4.5E-05	3.4E-06
C8+ Heavies	59.154	3.400	2.0E+00	3.1E-01	1.1E+02	3.3E+01	4.6E-01	3.5E-02
	100.0		6.54			72.15	1.00	
Total Emissions:								0.08
Total HAP Emissions:								0.002

[1] An atmospheric analysis of a representative condensate sample (from wellpad OXF-131, Well #512441) is utilized to estimate the composition.

[2] Emission factors from AP-42 Section 7.1 "Liquid Storage Tanks" Tables 7.1-2, 7.1-3 and 7.1-5 (at 70 deg F or ~21 deg C) and Handbook of Chemistry and Physics: 84th Edition (at 295 K)

[3] Speciated emissions (tpy) = Speciated Weight Fraction x Calculated Controlled Liquid Loading Emissions (tpy). As methane and ethane will flash off prior to loading, the emissions from these constituents are not included in the speciation.

Company Name: **EQT Production, LLC**
Facility Name: **OXF-153 Wellpad**
Project Description: **G-70A Permit 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/trip)	Trips Per Year	Mileage Per Year	Control (%)	Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
Liquids Hauling	20	40	30	3.08	5,051	15,573	0	33.35	8.50	0.850
Employee Vehicles	3	3	3	3.08	200	617	0	0.47	0.12	0.012
Total Potential Emissions								**33.82**	**8.62**	**0.86**

Company Name: EQT Production, LLC
Facility Name: OXF-153 Wellpad
Project Description: G-70A Permit Application

Combustor Flow Rate Calculations

TANK GAS STREAM (FROM E&P TANK v2.0)

Component	lb/hr	lb-mol/hr	mol%	MW lb/lb-mol	MW in Mixture
Carbon Dioxide	0.113	0.003	0.000	44.01	0.01
Nitrogen	<0.001	<0.001	<0.001	28.00	<0.001
Methane	54.204	3.379	0.318	16.04	5.10
Ethane	86.284	2.869	0.270	30.07	8.11
Propane	111.069	2.519	0.237	44.10	10.44
Isobutane	25.916	0.446	0.042	58.12	2.44
n-Butane	51.782	0.891	0.084	58.12	4.87
Isopentane	16.440	0.228	0.021	72.15	1.55
n-Pentane	13.618	0.189	0.018	72.15	1.28
n-Hexane	2.622	0.031	0.003	85.67	0.25
Cyclohexane	<0.001	<0.001	<0.001	84.16	<0.001
Other Hexanes	3.392	0.039	0.004	86.18	0.32
Heptanes	3.052	0.031	0.003	97.88	0.29
2,2,4-Trimethylpentane	0.010	0.000	0.000	114.23	0.00
Benzene	0.100	1.3E-03	1.2E-04	78.11	0.01
Toluene	0.120	0.001	1.2E-04	92.14	0.01
Ethylbenzene	<0.001	<0.001	<0.001	106.17	<0.001
Xylenes	0.030	2.8E-04	2.7E-05	106.17	0.00
C8 + Heavies	0.970	0.009	0.001	107.73	0.091
Total	369.72	10.64		34.76	lb/lbmole

1. Representative gas stream from the produced water storage tanks, sand separator tank, and dehy tank flowing to the combustor.

C001

Combustor Rating	11.66	MMBtu/hr	Max. input from Leed Enclosed Combustor Operations Manual
Pilot Rating	0.03	MMBtu/hr	Max. pilot fuel usage for Leed Enclosed Combustor
Pilot Rating	26,335	btu/hr	
Pilot Fuel Usage	21	scf/hr	
Combustor Flow Capacity	188.38	MSCFD	Max. flowrate from LEED Combustor Operations Manual
	7,849	scf/hr	
	131	scf/min	

Enclosed Combustor Mass Flow Rate (C001)

$$\frac{7{,}849\ \text{scf}}{\text{hr}} * \frac{1\ \text{lbmole}}{379\ \text{scf}} * \frac{34.76\ \text{lb}}{\text{lbmole}} = \frac{720\ \text{lb}}{\text{hr}}$$

Mass flow rate (lb/hr) = Maximum Rated total flow capacity (scf/hr) * Vapor Molecular Weight (lb/lbmole) / Molar Gas Volume (scf/lbmole)

Company Name: **EQT Production, LLC**
Facility Name: **OXF-153 Wellpad**
Project Description: **G-70A Permit Application**

Gas Analysis

Sample Location: Average of OXF-121 and OXF-136
Sample Date: 5/30/2013
HHV (Btu/scf): 1,225

Constituent	Natural Gas Stream Speciation (Mole %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.190	44.01	8.3E-02	4.1E-03	4.1E-01
Nitrogen	0.524	28.01	1.5E-01	7.3E-03	7.3E-01
Methane	80.257	16.04	1.3E+01	6.4E-01	6.4E+01
Ethane	12.984	30.07	3.9E+00	1.9E-01	1.9E+01
Propane	3.842	44.10	1.7E+00	8.4E-02	8.4E+00
Isobutane	0.490	58.12	2.8E-01	1.4E-02	1.4E+00
n-Butane	0.918	58.12	5.3E-01	2.6E-02	2.6E+00
Isopentane	0.243	72.15	1.8E-01	8.7E-03	8.7E-01
n-Pentane	0.217	72.15	1.6E-01	7.7E-03	7.7E-01
n-Hexane	0.070	86.18	6.0E-02	3.0E-03	3.0E-01
Cyclohexane	0.011	84.16	9.3E-03	4.6E-04	4.6E-02
Other Hexanes	0.114	86.18	9.8E-02	4.8E-03	4.8E-01
Heptanes	0.080	100.21	8.0E-02	4.0E-03	4.0E-01
2,2,4-Trimethylpentane	0.037	114.23	4.2E-02	2.1E-03	2.1E-01
Benzene*	0.003	78.11	2.0E-03	9.7E-05	9.7E-03
Toluene*	0.005	92.14	4.1E-03	2.1E-04	2.1E-02
Ethylbenzene*	<0.001	106.17	<0.001	<0.001	<0.001
Xylenes*	0.002	106.16	2.1E-03	1.1E-04	1.1E-02
C8 + Heavies	0.017	114.23	1.9E-02	9.6E-04	9.6E-02
Totals	100		20.17	1.00	100

TOC (Total)	99.29	98.86
VOC (Total)	6.05	15.67
HAP (Total)	0.12	0.55

****
* Project Setup Information *
****
Project File : \\tsclient\Z\Client\EQT Corporation\West Virginia\WV Production Wells\153901.0056 WV Wellpads 2015\OXF 153\02 Draft\2015-0602_EQT_OXF-153_G-70 Application\Attach I - Emission Calcs\E&P TANK\20150602_EQT_OXF-153 Wellpad_Prod Fluid Tanks_E&P Tank Run.ept
Flowsheet Selection : Oil Tank with Separator
Calculation Method : RVP Distillation
Control Efficiency : 95.0%
Known Separator Stream : Low Pressure Oil
Entering Air Composition : No

Filed Name : OXF-153 Wellpad
Well Name : OXF-153 Wellpad
Well ID : Condensate Analysis from OXF-152
Date : 2015.05.13

****
* Data Input *
****

Separator Pressure : 435.00[psig]
Separator Temperature : 60.00[F]
Ambient Pressure : 14.70[psia]
Ambient Temperature : 70.00[F]
C10+ SG : 0.8021
C10+ MW : 161.72

-- Low Pressure Oil ----------

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.0970
4	N2	0.0000
5	C1	12.8280
6	C2	10.8960
7	C3	10.1160
8	i-C4	2.9350
9	n-C4	7.8300
10	i-C5	4.7390
11	n-C5	5.4330
12	C6	3.7190
13	C7	10.1120
14	C8	9.5450
15	C9	1.9010
16	C10+	14.3130
17	Benzene	0.1700
18	Toluene	0.7300
19	E-Benzene	0.0750
20	Xylenes	0.7800
21	n-C6	3.7570

22 224Trimethylp 0.0240

-- Sales Oil ----------
Production Rate : 16[bbl/day]
Days of Annual Operation : 365 [days/year]
API Gravity : 59.11
Reid Vapor Pressure : 10.60[psia]

****
* Calculation Results *
****

-- Emission Summary ----------
Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
Page 1---------- E&P TANK				
Total HAPs	1.260	0.288	0.063	0.014
Total HC	161.782	36.937	8.089	1.847
VOCs, C2+	138.056	31.520	6.903	1.576
VOCs, C3+	100.289	22.897	5.014	1.145

Uncontrolled Recovery Info.
Vapor 9.6900 [MSCFD]
HC Vapor 9.6700 [MSCFD]
GOR 605.63 [SCF/bbl]

-- Emission Composition ----------
No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
1	H2S	0.000	0.000	0.000	0.000
2	O2	0.000	0.000	0.000	0.000
3	CO2	0.492	0.112	0.492	0.112
4	N2	0.000	0.000	0.000	0.000
5	C1	23.726	5.417	1.186	0.271
6	C2	37.767	8.623	1.888	0.431
7	C3	48.619	11.100	2.431	0.555
8	i-C4	11.346	2.590	0.567	0.130
9	n-C4	22.665	5.175	1.133	0.259
10	i-C5	7.196	1.643	0.360	0.082
11	n-C5	5.959	1.361	0.298	0.068
12	C6	1.484	0.339	0.074	0.017
13	C7	1.338	0.305	0.067	0.015
14	C8	0.385	0.088	0.019	0.004
15	C9	0.025	0.006	0.001	0.000
16	C10+	0.013	0.003	0.001	0.000
17	Benzene	0.043	0.010	0.002	0.000
18	Toluene	0.051	0.012	0.003	0.001
19	E-Benzene	0.002	0.000	0.000	0.000
20	Xylenes	0.015	0.003	0.001	0.000
21	n-C6	1.146	0.262	0.057	0.013
22	224Trimethylp	0.003	0.001	0.000	0.000
	Total	162.275	37.049	8.114	1.852

-- Stream Data ----------

No.	Component	MW	LP Oil mol %	Flash Oil mol %	Sale Oil mol %	Flash Gas mol %	W&S Gas mol %	Total Emissions mol %
1	H2S	34.80	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	CO2	44.01	0.0970	0.0061	0.0000	0.2612	0.0812	0.2397
4	N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	C1	16.04	12.8280	0.2395	0.0000	35.5618	3.1891	31.6964
6	C2	30.07	10.8960	1.4469	0.0030	27.9602	19.2333	26.9182
7	C3	44.10	10.1160	4.5631	0.9282	20.1441	49.3376	23.6299
8	i-C4	58.12	2.9350	2.5000	2.0862	3.7206	7.5978	4.1835
9	n-C4	58.12	7.8300	7.9180	7.4715	7.6711	13.4193	8.3575
10	i-C5	72.15	4.7390	6.2459	6.5077	2.0177	3.0211	2.1375
11	n-C5	72.15	5.4330	7.5168	7.9233	1.6698	2.5098	1.7701
12	C6	86.16	3.7190	5.5819	5.9901	0.3548	0.5538	0.3785
13	C7	100.20	10.1120	15.5597	16.7858	0.2739	0.4562	0.2957
14	C8	114.23	9.5450	14.7928	15.9838	0.0679	0.1220	0.0744
15	C9	128.28	1.9010	2.9515	3.1904	0.0039	0.0081	0.0044
16	C10+	161.72	14.3130	22.2378	24.0427	0.0015	0.0037	0.0018
17	Benzene	78.11	0.1700	0.2581	0.2776	0.0109	0.0175	0.0117
18	Toluene	92.13	0.7300	1.1282	1.2182	0.0109	0.0189	0.0119
19	E-Benzene	106.17	0.0750	0.1164	0.1258	0.0003	0.0006	0.0003
20	Xylenes	106.17	0.7800	1.2104	1.3083	0.0027	0.0051	0.0030
21	n-C6	86.18	3.7570	5.6900	6.1175	0.2662	0.4240	0.2850
22	224Trimethylp	114.24	0.0240	0.0370	0.0399	0.0005	0.0009	0.0006

MW	77.47	101.93	106.49	33.29	45.76	34.78
Stream Mole Ratio	1.0000	0.6436	0.5953	0.3564	0.0483	0.4047
Heating Value [BTU/SCF]			1929.89	2602.02	2010.15	
Gas Gravity [Gas/Air]			1.15	1.58	1.20	
Bubble Pt. @ 100F [psia]	513.68	34.37	11.37			

RVP @ 100F [psia]	151.15	22.18	10.56
Spec. Gravity @ 100F	0.643	0.694	0.700

****
* Project Setup Information *
****
Project File : C:\Users\kconnolly\Documents\E&P Tanks\20150513_EQT_OXF-153 Wellpad_Sand Separator Tank_E&P Tank Run.ept
Flowsheet Selection : Oil Tank with Separator
Calculation Method : RVP Distillation
Control Efficiency : 95.0%
Known Separator Stream : Low Pressure Oil
Entering Air Composition : No

Filed Name : OXF-153 Wellpad
Well Name : OXF-153 Wellpad
Well ID : Condensate Analysis from OXF-152
Date : 2015.05.13

****
* Data Input *
****

Separator Pressure : 435.00[psig]
Separator Temperature : 60.00[F]
Ambient Pressure : 14.70[psia]
Ambient Temperature : 70.00[F]
C10+ SG : 0.8021
C10+ MW : 161.72

-- Low Pressure Oil ----------

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.0970
4	N2	0.0000
5	C1	12.8280
6	C2	10.8960
7	C3	10.1160
8	i-C4	2.9350
9	n-C4	7.8300
10	i-C5	4.7390
11	n-C5	5.4330
12	C6	3.7190
13	C7	10.1120
14	C8	9.5450
15	C9	1.9010
16	C10+	14.3130
17	Benzene	0.1700
18	Toluene	0.7300
19	E-Benzene	0.0750
20	Xylenes	0.7800
21	n-C6	3.7570
22	224Trimethylp	0.0240

-- Sales Oil ----------
Production Rate : 0.1[bbl/day]
Days of Annual Operation : 365 [days/year]
API Gravity : 59.11
Reid Vapor Pressure : 10.60[psia]

****
* Calculation Results *
****

-- Emission Summary ----------

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
Page 1----------				E&P TANK
Total HAPs	0.010	0.002	0.001	0.000
Total HC	1.011	0.231	0.051	0.012
VOCs, C2+	0.863	0.197	0.043	0.010
VOCs, C3+	0.627	0.143	0.031	0.007

Uncontrolled Recovery Info.
Vapor 60.5600 x1E-3 [MSCFD]
HC Vapor 60.4200 x1E-3 [MSCFD]
GOR 605.60 [SCF/bbl]

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

No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
1	H2S	0.000	0.000	0.000	0.000
2	O2	0.000	0.000	0.000	0.000
3	CO2	0.003	0.001	0.003	0.001
4	N2	0.000	0.000	0.000	0.000
5	C1	0.148	0.034	0.007	0.002
6	C2	0.236	0.054	0.012	0.003
7	C3	0.304	0.069	0.015	0.003
8	i-C4	0.071	0.016	0.004	0.001
9	n-C4	0.142	0.032	0.007	0.002
10	i-C5	0.045	0.010	0.002	0.001
11	n-C5	0.037	0.008	0.002	0.000
12	C6	0.009	0.002	0.000	0.000
13	C7	0.008	0.002	0.000	0.000
14	C8	0.002	0.000	0.000	0.000
15	C9	0.000	0.000	0.000	0.000
16	C10+	0.000	0.000	0.000	0.000
17	Benzene	0.000	0.000	0.000	0.000
18	Toluene	0.000	0.000	0.000	0.000
19	E-Benzene	0.000	0.000	0.000	0.000
20	Xylenes	0.000	0.000	0.000	0.000
21	n-C6	0.007	0.002	0.000	0.000
22	224Trimethylp	0.000	0.000	0.000	0.000
	Total	1.012	0.231	0.051	0.012

-- Stream Data ----------

No.	Component	MW	LP Oil	Flash Oil	Sale Oil	Flash Gas	W&S Gas	Total Emissions
			mol %	mol %	mol %	mol %	mol %	mol %
1	H2S	34.80	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	CO2	44.01	0.0970	0.0061	0.0000	0.2612	0.0812	0.2397
4	N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	C1	16.04	12.8280	0.2395	0.0000	35.5618	3.1891	31.6964
6	C2	30.07	10.8960	1.4469	0.0030	27.9602	19.2333	26.9182
7	C3	44.10	10.1160	4.5631	0.9282	20.1441	49.3376	23.6299
8	i-C4	58.12	2.9350	2.5000	2.0862	3.7206	7.5978	4.1835
9	n-C4	58.12	7.8300	7.9180	7.4715	7.6711	13.4193	8.3575
10	i-C5	72.15	4.7390	6.2459	6.5077	2.0177	3.0211	2.1375
11	n-C5	72.15	5.4330	7.5168	7.9233	1.6698	2.5098	1.7701
12	C6	86.16	3.7190	5.5819	5.9901	0.3548	0.5538	0.3785
13	C7	100.20	10.1120	15.5597	16.7858	0.2739	0.4562	0.2957
14	C8	114.23	9.5450	14.7928	15.9838	0.0679	0.1220	0.0744
15	C9	128.28	1.9010	2.9515	3.1904	0.0039	0.0081	0.0044
16	C10+	161.72	14.3130	22.2378	24.0427	0.0015	0.0037	0.0018
17	Benzene	78.11	0.1700	0.2581	0.2776	0.0109	0.0175	0.0117
18	Toluene	92.13	0.7300	1.1282	1.2182	0.0109	0.0189	0.0119
19	E-Benzene	106.17	0.0750	0.1164	0.1258	0.0003	0.0006	0.0003
20	Xylenes	106.17	0.7800	1.2104	1.3083	0.0027	0.0051	0.0030
21	n-C6	86.18	3.7570	5.6900	6.1175	0.2662	0.4240	0.2850
22	224Trimethylp	114.24	0.0240	0.0370	0.0399	0.0005	0.0009	0.0006

MW	77.47	101.93	106.49	33.29	45.76	34.78
Stream Mole Ratio	1.0000	0.6436	0.5953	0.3564	0.0483	0.4047
Heating Value [BTU/SCF]			1929.89	2602.02	2010.15	
Gas Gravity [Gas/Air]			1.15	1.58	1.20	
Bubble Pt. @ 100F [psia]	513.68	34.37	11.37			

RVP @ 100F [psia]	151.15	22.18	10.56
Spec. Gravity @ 100F	0.643	0.694	0.700

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

Identification

User Identification:	OXF-153 Liquid Loading
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	Liquid Loading parameters for OXF-153 wellpads using OXF-131 atmospheric condensate analysis.

Tank Dimensions

Shell Height (ft):	20.00
Diameter (ft):	12.00
Liquid Height (ft) :	20.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	16,800.00
Turnovers:	1,202.53
Net Throughput(gal/yr):	20,202,538.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.00

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.70

Meterological Data used in Emissions Calculations: Elkins, West Virginia (Avg Atmospheric Pressure = 13.73 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

OXF-153 Liquid Loading - Vertical Fixed Roof Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Produced Fluid	All	55.41	46.54	64.27	51.30	0.2674	0.2050	0.3466	25.6284			19.92	
2,2,4-Trimethylpentane						0.5211	0.3991	0.6729	114.2300	0.0000	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.0267	0.7943	1.3132	78.1100	0.0002	0.0005	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Butane (-n)						0.4614	0.3889	0.5438	58.1200	0.0022	0.0029	58.12	Option 2: A=5.09536, B=935.86, C=238.73
Decane (-n)						0.0301	0.0245	0.0369	142.2900	0.0497	0.0043	142.29	Option 1: VP50 = .026411 VP60 = .033211
Ethylbenzene						0.0923	0.0669	0.1257	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Heptane (-n)						0.5323	0.4043	0.6943	100.2000	0.0139	0.0215	100.20	Option 3: A=37358, B=8.2585
Hexane (-n)						1.6957	1.3330	2.1360	86.1700	0.0080	0.0393	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopentane						9.0329	7.1932	11.0836	72.1500	0.0022	0.0570	72.15	Option 1: VP50 = 7.889 VP60 = 10.005
methane						100.7917	87.8791	115.0985	44.0956	0.0000	0.0029	44.10	Option 2: A=7.3408624923, B=1104.2267744, C=291.70993941
Nonane (-n)						0.0588	0.0475	0.0729	128.2600	0.0156	0.0027	128.26	Option 1: VP50 = .051285 VP60 = .065278
Octane (-n)						0.1303	0.1035	0.1637	114.2300	0.0151	0.0057	114.23	Option 1: VP50 = .112388 VP60 = .145444
Pentane (-n)						6.1673	5.0301	7.5097	72.1500	0.0028	0.0493	72.15	Option 3: A=27691, B=7.558
Propane (-n)						100.7917	87.8791	115.0985	44.0956	0.0009	0.2578	44.10	Option 2: A=7.340862493, B=1104.2267744, C=291.70993941
Toluene						0.2857	0.2141	0.3766	92.1300	0.0011	0.0009	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2153	0.1602	0.2863	18.0150	0.8865	0.5547	18.02	Option 1: VP50 = .178 VP60 = .247
Xylene (-o)						0.0601	0.0431	0.0827	106.1700	0.0018	0.0003	106.17	Option 2: A=6.998, B=1474.679, C=213.69

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

OXF-153 Liquid Loading - Vertical Fixed Roof Tank

Annual Emission Calcaulations	
Standing Losses (lb):	11.2748
Vapor Space Volume (cu ft):	1,130.9734
Vapor Density (lb/cu ft):	0.0012
Vapor Space Expansion Factor:	0.0251
Vented Vapor Saturation Factor:	0.8759
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,130.9734
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	10.0000
Tank Shell Height (ft):	20.0000
Average Liquid Height (ft):	10.0000
Roof Outage (ft):	0.0000
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.0000
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0000
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0012
Vapor Molecular Weight (lb/lb-mole):	25.6284
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2674
Daily Avg. Liquid Surface Temp. (deg. R):	515.0759
Daily Average Ambient Temp. (deg. F):	49.0583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	510.9683
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,193.8870
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0251
Daily Vapor Temperature Range (deg. R):	35.4636
Daily Vapor Pressure Range (psia):	0.1416
Breather Vent Press. Setting Range(psia):	0.7300
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2674
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.2050
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3466
Daily Avg. Liquid Surface Temp. (deg R):	515.0759
Daily Min. Liquid Surface Temp. (deg R):	506.2100
Daily Max. Liquid Surface Temp. (deg R):	523.9417
Daily Ambient Temp. Range (deg. R):	24.1833
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8759
Vapor Pressure at Daily Average Liquid:	
Surface Temperature (psia):	0.2674
Vapor Space Outage (ft):	10.0000
Working Losses (lb):	631.7219
Vapor Molecular Weight (lb/lb-mole):	25.6284
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2674
Annual Net Throughput (gal/yr.):	20,202,538.0000
Annual Turnovers:	1,202.5320
Turnover Factor:	0.1916
Maximum Liquid Volume (gal):	16,800.0000
Maximum Liquid Height (ft):	20.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	642.9967

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

Emissions Report for: Annual

OXF-153 Liquid Loading - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Produced Fluid	631.72	11.27	643.00
methane	1.85	0.03	1.88
Propane (-n)	162.85	2.91	165.76
Butane (-n)	1.84	0.03	1.87
Isopentane	35.99	0.64	36.63
Pentane (-n)	31.14	0.56	31.70
Hexane (-n)	24.84	0.44	25.29
2,2,4-Trimethylpentane	0.03	0.00	0.03
Benzene	0.30	0.01	0.31
Heptane (-n)	13.61	0.24	13.86
Toluene	0.58	0.01	0.59
Octane (-n)	3.62	0.06	3.69
Ethylbenzene	0.02	0.00	0.02
Xylene (-o)	0.20	0.00	0.20
Nonane (-n)	1.69	0.03	1.72
Decane (-n)	2.75	0.05	2.79
Water	350.42	6.25	356.67

ATTACHMENT J

Class I Legal Advertisement

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that EQT Production has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Class II General Permit (G70-A) for an existing natural gas production wellpad. The facility is located in Doddridge County, West Virginia approximately 8.1 miles Southwest of New Milton, WV at 39.189970, -80.817670

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

Pollutant	Emissions (tons per year)
NO_X	7.77
CO	6.52
VOC	68.46
SO_2	0.05
PM	34.41
Total HAPs	1.18
Carbon Dioxide Equivalents (CO_2e)	12,520

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 XX day of July, 2015.

By: EQT Production
Kenneth Kirk, Executive Vice President
625 Liberty Ave Suite 1700
Pittsburgh, PA 15222

ATTACHMENT L

General Permit Registration Application Fee

ATTACHMENT O

Emission Summary Sheet

G70-A EMISSIONS SUMMARY SHEET

Emission Point ID No.	Emission Point Type[1]	Emission Unit Vented Through This Point		Air Pollution Control Device		All Regulated Pollutants - Chemical Name/CAS[2] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [3]		Maximum Potential Controlled Emissions [4]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [5]
		ID No.	Source	ID No.	Device Type		lb/hr	ton/yr	lb/hr	ton/yr		
C001 (Total-All Tanks)	Upward vertical stack	S021 – S030	Produced Fluids Tanks	C001	Combustor	VOC HAPs	228.97 2.88	1,002.89 12.60	11.45 0.14	50.14 0.63	Gas/Vapor	E&P Tank v2.0
E031	Upward vertical stack	S031	Sand Separator Tank	None	---	VOC HAPS	0.14 <0.01	0.63 0.01	0.14 <0.01	0.63 0.01	Gas/Vapor	E&P Tank v2.0
E018	Upward vertical stack	S018	Line Heaters (0.77 MMBtu/hr)	None	---	NO_X CO $PM/PM_{10}/PM_{2.5}$ SO_2 VOC CO_{2e} HAPs	0.06 0.05 <0.01 <0.01 <0.01 90 <0.01	0.27 0.23 0.02 <0.01 0.02 395 0.01	0.06 0.05 <0.01 <0.01 <0.01 90 <0.01	0.27 0.23 0.02 <0.01 0.02 395 0.01	Gas/Vapor	AP-42
E016 – E017, E032 – E035 (Total – All units)	Upward vertical stack	S016 – S017, S032 – S035	Line Heaters (1.54 MMBtu/hr)	None	---	NO_X CO $PM/PM_{10}/PM_{2.5}$ SO_2 VOC CO_{2e} HAPs	0.75 0.63 0.06 <0.01 0.04 1,081 0.01	3.30 2.77 0.25 0.02 0.18 4,735 0.06	0.75 0.63 0.06 <0.01 0.04 1,081 0.01	3.30 2.77 0.25 0.02 0.18 4,735 0.06	Gas/Vapor	AP-42
E019-E020, E036 (Total – All units)	Upward vertical stack	S019-S020, S036	TEGs	None	---	NO_X CO $PM/PM_{10}/PM_{2.5}$ SO_2 VOC CO_{2e} HAPs	<0.01 <0.01 <0.01 <0.01 <0.01 5 <0.01	0.01 <0.01 <0.01 <0.01 <0.01 20 <0.01	<0.01 <0.01 <0.01 <0.01 <0.01 5 <0.01	0.01 <0.01 <0.01 <0.01 <0.01 20 <0.01	Gas/Vapor	AP-42
E037 (Uncaptured - Uncontrolled)	Upward vertical stack	Fugitive	Liquid Loading	None	---	VOC HAPs	0.50 0.01	2.19 0.05	0.15 <0.01	0.66 0.02	Gas/Vapor	AP-42
C001 (Controlled)	Upward vertical stack	S021 – S030	Liquid Loading	C001	Combustor	VOC HAPs	0.50 0.01	2.19 0.05	0.02 <0.01	0.08 0.002	Gas/Vapor	AP-42
C001	Upward vertical stack	C001	Combustor	NA	---	NO_X CO $PM/PM_{10}/PM_{2.5}$ SO_2 CO_{2e}	0.95 0.80 0.07 0.01 1,436	4.18 3.51 0.32 0.03 6,291	0.95 0.80 0.07 0.01 1,436	4.18 3.51 0.32 0.03 6,291	Gas/Vapor	AP-42

The EMISSION SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSIONS SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases

[3] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[4] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[5] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; M = modeling; O = other (specify).