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Pittsburgh PA 15222
www.eqt.com

TEL: (412) 395-3699
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Alex Bosiljevac
Environmental Coordinator

May 6, 2015

CERTIFIED MAIL # 7014 2120 0002 1164 5297

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
PET-35 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 PET-35 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
PET-35 Pad

G70-A Permit Application

Where energy meets innovation.

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

May 2015

Trinity Consultants

Environmental solutions delivered uncommonly well

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ATTACHMENT O: EMISSION SUMMARY SHEET

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 PET-35 facility, a natural gas production well pad, located in Lewis County, West Virginia.

1.1. FACILITY AND PROJECT DESCRIPTION

The PET-35 Wellpad is a new natural gas production facility that will consist of six (6) natural gas well. Natural gas and liquids (including water and condensate) will be extracted from deposits underneath the surface. Natural gas will be transported from the well to a gas line for additional processing and compression, as necessary. The liquids produced will be stored in storage vessels.

This application seeks to permit the following equipment at the PET-35 pad:

- Six (6) 400 barrel (bbl) storage tanks for condensate/water (produced fluids) controlled by one (1) combustor rated at 11.66 MMBtu/hr;
- One (1) 140 bbl storage tank for sand and produced fluids from the sand separator (Vapors from this tank may be controlled by the aforementioned combustor. For emission calculation purposes, no control is assumed.);
- Six (6) line heaters, each rated at 1.54 MMBtu/hr (heat input); and
- Two (2) thermoelectric generators (TEGs), 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 PET-35 Pad for air permitting purposes if, and only if, all three elements of the "stationary source" definition above are fulfilled.

There are no Marcellus facilities within a quarter-mile radius of the PET-35 Pad. Therefore, the PET-35 Pad should be considered a separate stationary source with respect to permitting programs, including Title V and Prevention of Significant Deterioration (PSD). As discussed in this application, the facility is a minor source of air emissions with respect to New Source Review (NSR) and Title V permitting.

1.3. G70-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 and TEGs, as well as storage of organic liquids in storage tanks and loading of organic liquids into tank trucks. In addition, fugitive emissions will result from component leaks from the operation of the station. The methods by which emissions from each of these source types, as well as the existing source types, are calculated are summarized below.

- **Line Heaters and TEGs:** 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 combustors 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 amended in the Federal Register on September 23, 2013[7]. 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 six (6) produced fluids storage vessels and one (1) sand separator storage vessel at the wellpad. Emissions from the proposed produced fluids 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.

[7] 78 FR 54816 (*http://www.gpo.gov/fdsys/pkg/FR-2013-09-23/pdf/2013-22010.pdf*)

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

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

According to 45 CSR 17-3.1:

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

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

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

45 CSR 21-28 applies to any fixed roof petroleum liquid storage tank with a capacity greater than 40,000 gallons. The capacity of each storage tank 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 CPR Parts 61 and 63 by reference. As such, by complying with all applicable requirements of 40 CFR Parts 61 and 63 at the wellpad, EQT will be complying with 45 CSR 34. Note that there are no applicable requirements under 40 CFR Parts 61 and 63 for the wellpad.

3.5.8. 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:

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):

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

_____

_____

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site:	12A. Address of primary operating site:
PET-35 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**.

Take Interstate 79 S to Exit 96 toward W. Virginia 30/ S. Weston. Turn right onto Skin Creek Road (signs for S. Weston/US-19) and continue for ~0.4 miles. Turn left onto US-19 S and continue for ~3.6 miles. Turn right onto Copley Road. The wellpad will be located approximately 500 ft. up the hill on the right hand side.

15A. Nearest city or town:	16A. County:	17A. UTM Coordinates:
Weston	Lewis	Northing (KM): 4,314.806 Easting (KM): 540.419 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 a natural gas wellpad.	Latitude: 38.981317° Longitude: -80.533338°

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: _N/A_____ _____	12C. Address of 2nd alternate operating site: 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: __9___/__22___/__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: ___9___/___22___/___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)

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 _____ May 6, 2015
(please use blue ink) Responsible Official Date

Name & Title David Elkin, Senior 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 a natural gas production wellpad (PET-35).

The PET-35 wellpad will consist of six wells. The incoming gas stream from the underground wells will pass through a sand separator, where sand, water, and residual solids are displaced and transferred to the sand separator tank. 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. 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} $PM_{2.5}$	1.37 0.35 0.04	6.02 1.53 0.15	1.37 0.35 0.04	6.02 1.53 0.15	O[A]
Loading/Unloading Operations	VOC HAP	0.27 0.01	1.20 0.03	0.09 <0.01	0.40 0.01	O[B]
Equipment Leaks	VOC CO_2e HAP	Does not apply	11.66 719 0.31	Does not apply	11.66 719 0.31	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).

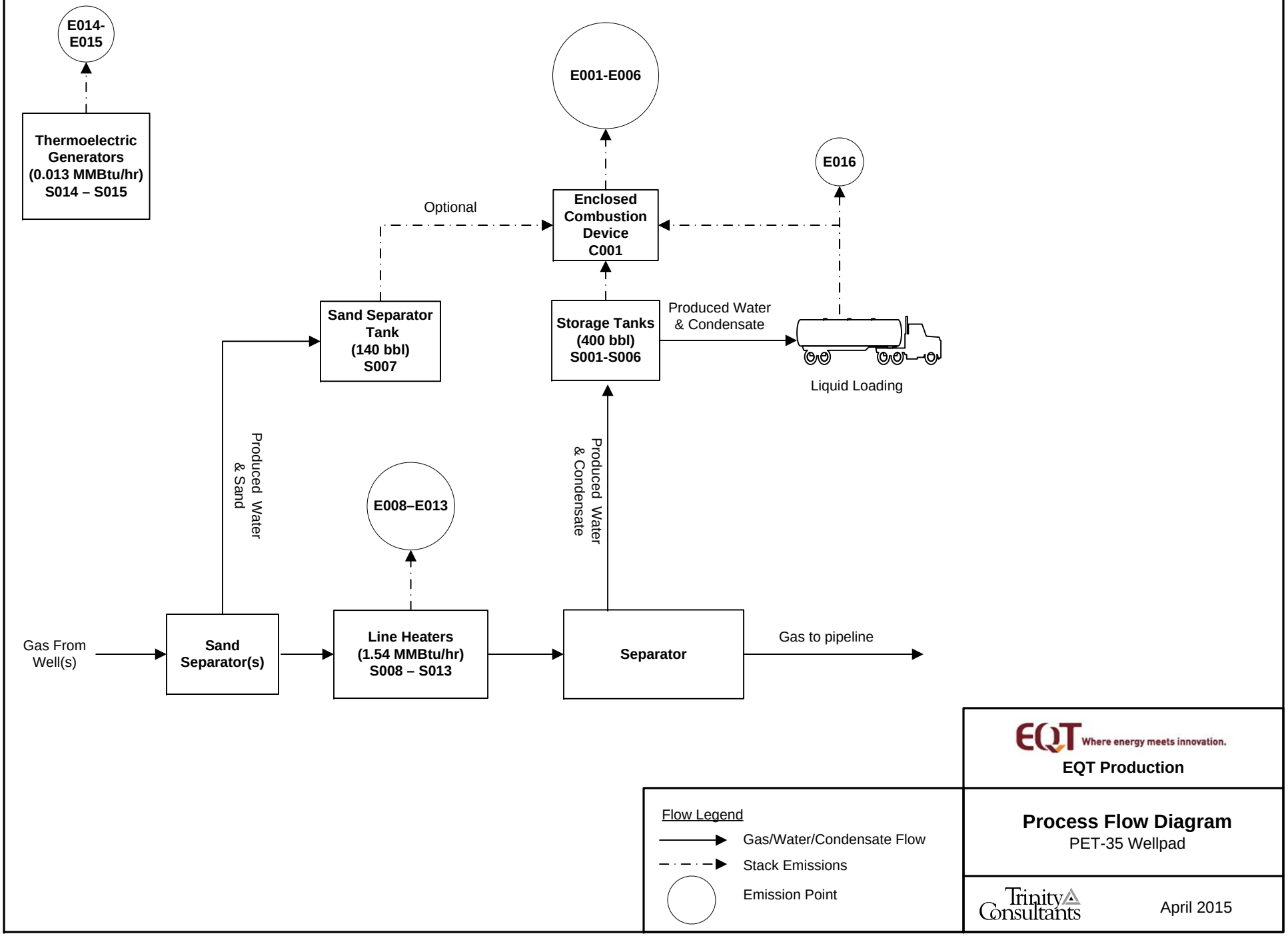
LEAK SOURCE DATA SHEET

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	295	TBD	TBD	6,802
	Light Liquid VOC	---	TBD	TBD	---
	Heavy Liquid VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Safety Relief Valves	Gas VOC	18	TBD	TBD	7,231
	Non VOC	---	TBD	TBD	---
Open-ended Lines	VOC	15	TBD	TBD	98
	Non-VOC	---	TBD	TBD	---
Sampling Connections	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Compressors	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Flanges	VOC	1,245	TBD	TBD	8,800
	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

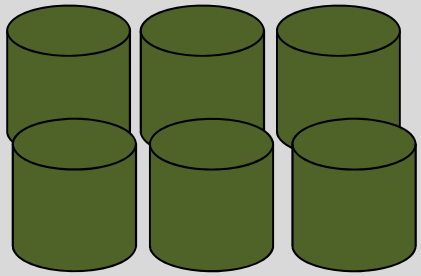
ATTACHMENT D

Process Flow Diagram

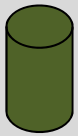

E014-
E015
Thermoelectric
Generators
(0.013 MMBtu/hr)
S014 – S015
E001-E006
E016
Optional
Enclosed
Combustion
Device
C001
Sand Separator
Tank
(140 bbl)
S007
Storage Tanks
(400 bbl)
S001-S006
Produced Water
& Condensate
Liquid Loading
Produced Water
& Sand
E008–E013
Produced Water
& Condensate
Gas From
Well(s)
Sand
Separator(s)
Line Heaters
(1.54 MMBtu/hr)
S008 – S013
Separator
Gas to pipeline
Flow Legend
Gas/Water/Condensate Flow
Stack Emissions
Emission Point
EQT Where energy meets innovation.
EQT Production
Process Flow Diagram
PET-35 Wellpad
Trinity Consultants
April 2015

ATTACHMENT E

Plot Plan



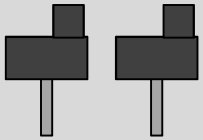
Tanks
400 bbl
(6)



Sand Separator
Tank
140 bbl

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

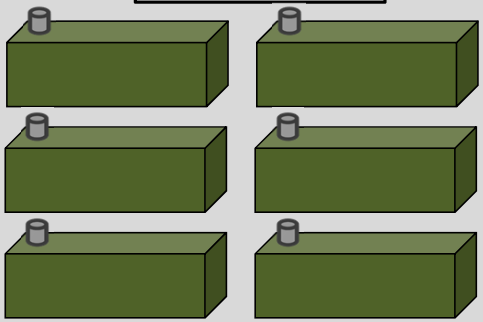
Entrance to PET-35 pad

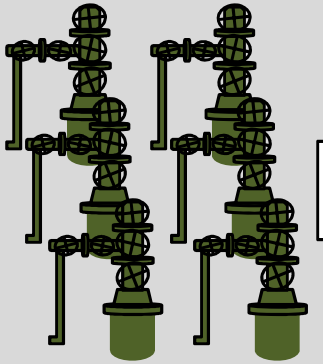


Thermoelectric
Generators
(2)

Combustor
11.66
MMBTU/hr

Line Heaters
(6)





Wellheads
(6)

Attachment E

PET-35 Well Pad Plot Plan

ATTACHMENT F

Area Map

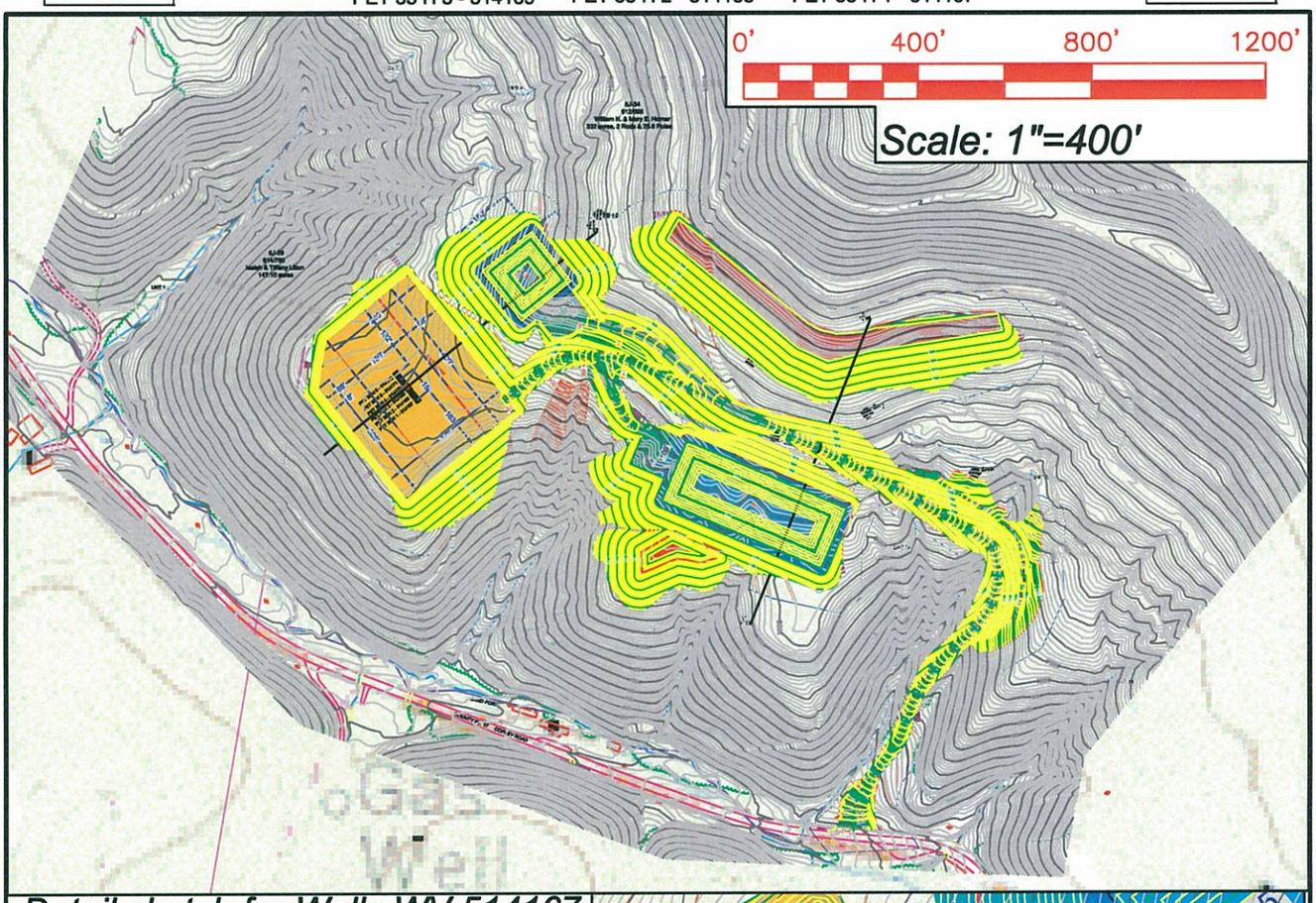
ATTACHMENT F: AREA MAP

Figure 1 - Map of PET-35 Location

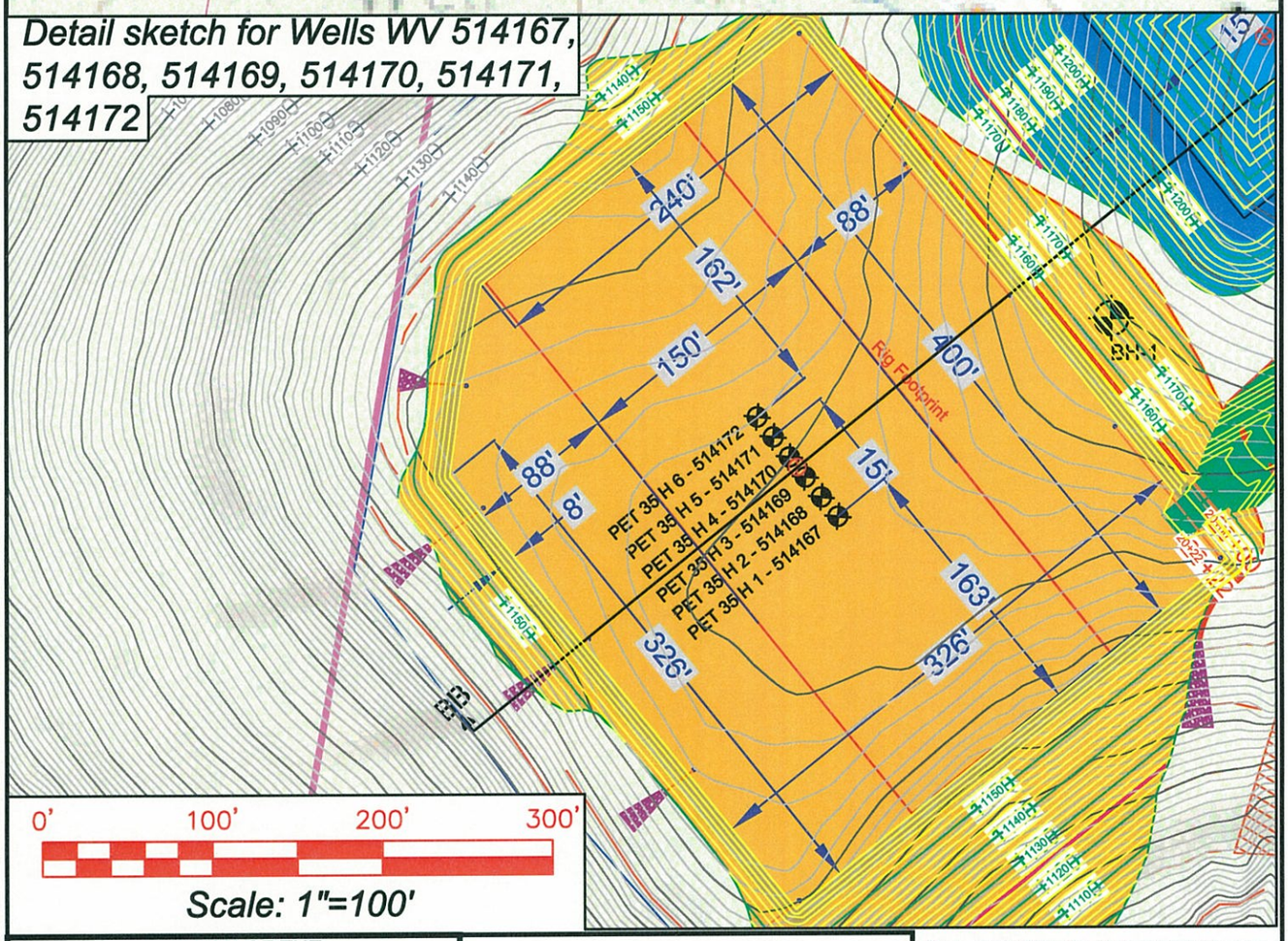
UTM Northing (KM):	4,314.806
UTM Easting (KM):	540.419
Elevation:	~1,160 ft

WW-9

PET 35 H 4 - 514170 PET 35 H 3 - 514169 PET 35 H 6 - 514172 PET 35 H 2 - 514168 PET 35 H 5 - 514171 PET 35 H 1 - 514167



Detail sketch for Wells WV 514167, 514168, 514169, 514170, 514171, 514172



SECTION OF THE Peterson 7.5' USGS QUADRANGLE		Proposed Disturbance Area	
Projected culvert inventory. (for bid purposes only)		Well Site Location	See Site Plan
15" minimum diameter culverts	See Site Plan	Proposed Access Road	See Site Plan
24" minimum diameter culverts	See Site Plan	Approximate Total Disturbance	See Site Plan

DRAWN BY:	DATE:	FILE NO.	DRAWING FILE NO.
Dale Tomlin	July 11, 2014	371-13	Rec Plan 371-13

Note: SEE SITE PLAN OF PET 35 FOR COMPLETE GRADING & DRAINAGE CONSTRUCTION INCLUDING EROSION & SEDIMENT CONTROL DETAILS, ETC.

SURVEYING AND MAPPING SERVICES PERFORMED BY:

ALLEGHENY SURVEYS, INC.

1-800-482-8606

Birch River Office
Phone: (304) 649-8606
Fax: (304) 649-8608

237 Birch River Road
P.O. Box 438
Birch River, WV 26610

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 Fluids Storage Tank	TBD	400 bbl	New	C001
S002	E002	Produced Fluids Storage Tank	TBD	400 bbl	New	C001
S003	E003	Produced Fluids Storage Tank	TBD	400 bbl	New	C001
S004	E004	Produced Fluids Storage Tank	TBD	400 bbl	New	C001
S005	E005	Produced Fluids Storage Tank	TBD	400 bbl	New	C001
S006	E006	Produced Fluids Storage Tank	TBD	400 bbl	New	C001
S007	E007	Sand Separator Tank	TBD	140 bbl	New	C001 (optional)
S008	E008	Line Heater	TBD	1.54 MMBtu/hr	New	None
S009	E009	Line Heater	TBD	1.54 MMBtu/hr	New	None
S010	E010	Line Heater	TBD	1.54 MMBtu/hr	New	None
S011	E011	Line Heater	TBD	1.54 MMBtu/hr	New	None
S012	E012	Line Heater	TBD	1.54 MMBtu/hr	New	None
S013	E013	Line Heater	TBD	1.54 MMBtu/hr	New	None
S014	E014	Thermoelectric Generator	TBD	0.013 MMBtu/hr	New	None
S015	E015	Thermoelectric Generator	TBD	0.013 MMBtu/hr	New	None
S016	E016	Liquid Loading	TBD	NA	New	None
C001	C001	Combustor	TBD	11.66 MMBtu/hr	New	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:	
47-041-05689	
47-041-05690	
47-041-05691	
47-041-05692	
47-041-05693	
47-041-05694	

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 PET-35 Wellpad	2. Tank Name Produced Fluids Tanks
3. Emission Unit ID number S001 through S006	4. Emission Point ID number E001 through E006
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. 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) ~2,401,862 per tank	13B. Maximum daily throughput (gal/day) ~6,580 per tank
14. Number of tank turnovers per year ~143 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 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): 0.2373	35A. Minimum (psig): 0.1791	35B. Maximum (psig): 0.3117	
36A. Minimum liquid surface temperature (°F): 46.54		36B. Corresponding vapor pressure (psia): 0.3117	
37A. Avg. liquid surface temperature (°F): 55.41		37B. Corresponding vapor pressure (psia): 0.2373	
38A. Maximum liquid surface temperature (°F): 64.27		38B. Corresponding vapor pressure (psia): 0.1791	
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):	19.13		
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 PET-35 Wellpad	2. Tank Name Sand Separator Tank
3. Emission Unit ID number S007	4. Emission Point ID number E007
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) ~141,120	13B. Maximum daily throughput (gal/day) ~387
14. Number of tank turnovers per year ~24 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 _____
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): 0.2373	35A. Minimum (psig): 0.1791	35B. Maximum (psig): 0.3117	
36A. Minimum liquid surface temperature (°F): 46.54		36B. Corresponding vapor pressure (psia): 0.1791	
37A. Avg. liquid surface temperature (°F): 55.41		37B. Corresponding vapor pressure (psia): 0.2373	
38A. Maximum liquid surface temperature (°F): 64.27		38B. Corresponding vapor pressure (psia): 0.3117	
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):	19.13		
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]
S008	E008	Line Heater	TBD	New	None	1.54	~1,225
S009	E009	Line Heater	TBD	New	None	1.54	~1,225
S010	E010	Line Heater	TBD	New	None	1.54	~1,225
S011	E011	Line Heater	TBD	New	None	1.54	~1,225
S012	E012	Line Heater	TBD	New	None	1.54	~1,225
S013	E013	Line Heater	TBD	New	None	1.54	~1,225
S014	E014	Thermoelectric Generator	TBD	New	None	0.013	~1,225
S015	E015	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: S016	2. Emission Point ID: E016	3. Year Installed/ Modified: TBD
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)	14,552,294		
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]	0.3117		
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: 0.09 HAP: <0.01		
	Annual (ton/yr)	VOC: 0.40 HAP: 0.01		
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: TBD ☒ 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: ~1,225 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#: E001-E006, E007, E016)

10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
S001 – S006	Produced Fluid Storage Tanks		
S007	Sand Separator Storage Tank (optional)		
S016	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.

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

GENERAL

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

PROCESS DATA

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

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

DESIGN DATA

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

EQUIPMENT SPECIFICATION

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

Environmental Control Equipment
Data Sheet

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Site:		**Supplier:**	LEED FABRICATION		
Unit/Lease:		**Remarks:**	-	**Model No.:**	L30-0011-00

EQUIPMENT SPECIFICATION

Flame Detection: ☐ Thermocouple ☑ Ionization Rod ☐ UV Scanner

General Configuration:

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

FABRICATION AND INSPECTION

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

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

Additional Notes:

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				By:	JS		
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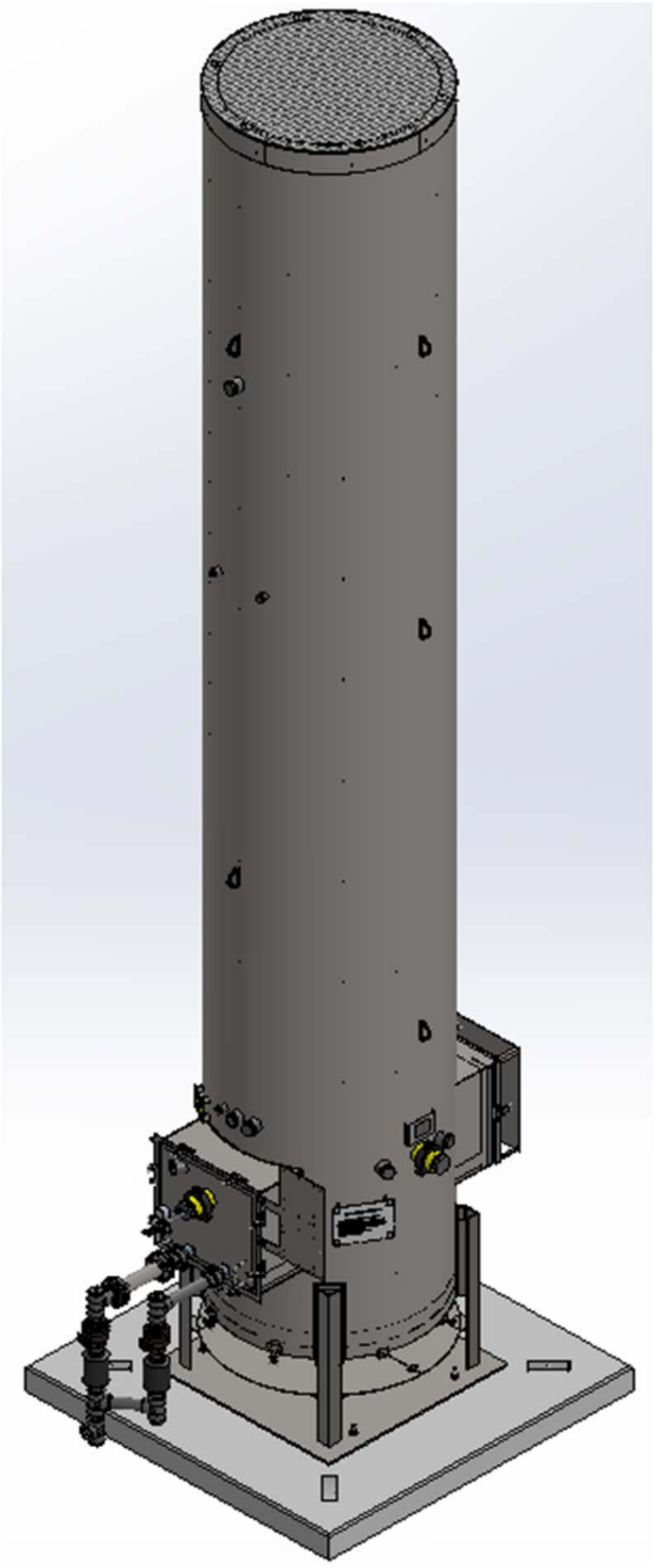
		RFQ No.:	-	Approved:	MS		
Client:		Ref. P&ID:	-				
Site:				Supplier:	LEED FABRICATION		
Unit/Lease:		Remarks:	-	Model No.:	L30-0011-00		

GENERAL ARRANGEMENT



ATTACHMENT I

Emission Calculations

Company Name: EQT Production, LLC
Facility Name: PET-35 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)	6	per pad	---	---	---
Storage Tank(s)	6	per pad	S001 - S006	E001- E006	Combustor
Sand Separator Tank	1	per pad	S007	E007	None
Line Heater(s)	6	per pad	S008 - S013	E008 - E013	None
Thermoelectric Generator(s) (TEGs)	2	per pad	S014 - S015	E014 - E015	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	2,000	feet	---	---	---

Constituent	Produced Fluid Storage Tanks (includes Combustor) (tpy)	Sand Separator Tank (tpy)	Line Heaters (tpy)	TEGs (tpy)	Fugitive Components (tpy)	Liquid Loading (tpy)	Haul Roads (tpy)	Total Emissions (tpy)
Criteria Pollutants								
NO_X	4.18	---	3.299	9.26E-03	---	---	---	**7.49**
CO	3.51	---	2.771	7.78E-03	---	---	---	**6.29**
PM Total	0.32	---	0.251	7.04E-04	---	---	6.02	**6.59**
PM_{10} Total	0.32	---	0.251	7.04E-04	---	---	1.53	**2.10**
$PM_{2.5}$ Total	0.32	---	0.251	7.04E-04	---	---	0.15	**0.72**
SO_2	0.03	---	0.020	5.56E-05	---	---	---	**0.04**
VOC	14.54	0.64	0.181	5.09E-04	11.66	0.36	---	**27.38**
Greenhouse Gases								
CO_2	5,988.64	---	4,730.29	13.28	0.19	---	---	**10,732**
CH_4	5.83	2.5E-01	0.09	2.5E-04	28.77	---	---	**34.94**
N_2O	0.01	---	0.01	2.5E-05		---	---	**0.02**
CO_2e	6,137.78	6.30	4,735.18	13.29	719.36	---	---	**11,612**
Hazardous Air Pollutants								
Methylnaphthalene (2-)	---	---	7.9E-07	2.2E-09	---	---	---	7.9E-07
Methylchloranthrene (3-)	---	---	5.9E-08	1.7E-10	---	---	---	6.0E-08
Dimethybenz(a)anthracene (7,12-)	---	---	5.3E-07	1.5E-09	---	---	---	5.3E-07
Acenaphthene	---	---	5.9E-08	1.7E-10	---	---	---	6.0E-08
Acenaphthylene	---	---	5.9E-08	1.7E-10	---	---	---	6.0E-08
Anthracene	---	---	7.9E-08	2.2E-10	---	---	---	7.9E-08
Benz(a)anthracene	---	---	5.9E-08	1.7E-10	---	---	---	6.0E-08
Benzene	6.0E-03	<0.001	6.9E-05	1.9E-07	5.6E-03	2.1E-05	---	1.2E-02
Benzo(a)pyrene	---	---	4.0E-08	1.1E-10	---	---	---	4.0E-08
Benzo(b)fluoranthene	---	---	5.9E-08	1.7E-10	---	---	---	6.0E-08
Benzo(g,h,i)perylene	---	---	4.0E-08	1.1E-10	---	---	---	4.0E-08
Benzo(k)fluoranthene	---	---	5.9E-08	1.7E-10	---	---	---	6.0E-08
Chrysene	---	---	5.9E-08	1.7E-10	---	---	---	6.0E-08
Dibenzo(a,h)anthracene	---	---	4.0E-08	1.1E-10	---	---	---	4.0E-08
Dichlorobenzene	---	---	4.0E-05	1.1E-07	---	---	---	4.0E-05
Fluoranthene	---	---	9.9E-08	2.8E-10	---	---	---	9.9E-08
Fluorene	---	---	9.2E-08	2.6E-10	---	---	---	9.3E-08
Formaldehyde	---	---	2.5E-03	6.9E-06	---	---	---	2.5E-03
Hexane, n-	1.6E-01	7.0E-03	5.9E-02	1.7E-04	1.7E-01	8.7E-04	---	3.9E-01
Indeno(1,2,3-cd)pyrene	---	---	5.9E-08	1.7E-10	---	---	---	6.0E-08
Naphthalene	---	---	2.0E-05	5.7E-08	---	---	---	2.0E-05
Phenanthrene	---	---	5.6E-07	1.6E-09	---	---	---	5.6E-07
Pyrene	---	---	1.6E-07	4.6E-10	---	---	---	1.7E-07
Toluene	1.2E-02	<0.001	1.1E-04	3.1E-07	1.2E-02	4.0E-05	---	2.4E-02
Arsenic	---	---	6.6E-06	1.9E-08	---	---	---	6.6E-06
Beryllium	---	---	4.0E-07	1.1E-09	---	---	---	4.0E-07
Cadmium	---	---	3.6E-05	1.0E-07	---	---	---	3.6E-05
Chromium	---	---	4.6E-05	1.3E-07	---	---	---	4.6E-05
Cobalt	---	---	2.8E-06	7.8E-09	---	---	---	2.8E-06
Manganese	---	---	1.3E-05	3.5E-08	---	---	---	1.3E-05
Mercury	---	---	8.6E-06	2.4E-08	---	---	---	8.6E-06
Nickel	---	---	6.9E-05	1.9E-07	---	---	---	6.9E-05
Selenium	---	---	7.9E-07	2.2E-09	---	---	---	7.9E-07
Ethylbenzene	<0.001	<0.001	---	---	<0.001	2.2E-06	---	2.2E-06
Trimethylpentane (2,2,4-)	<0.001	<0.001	---	---	1.2E-01	1.9E-06	---	1.2E-01
Xylene	6.0E-03	<0.001	---	---	6.0E-03	3.0E-05	---	1.2E-02
Total HAP	0.18	0.01	0.06	1.7E-04	0.31	0.00	---	**0.57**

Company Name: **EQT Production, LLC**
Facility Name: **PET-35 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]	22.7	bbl/day
Total Condensate Throughput	2,832	bbl/month
Total Produced Water Throughput	25,762	bbl/month

Description	Potential Throughput [2] (gal/yr)
Produced Water and Condensate	14,411,174

[1] For the purposes of establishing PTE, produced water is conservatively assumed to contain 5% condensate.
[2] Based on maximum historical produced water and condensate throughput for OXF-131 wellpad.

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

Constituent	Total Emissions [1] lb/hr	tpy
Methane	4.353	19.064
Ethane	6.504	28.487
Propane	5.625	24.636
Isobutane	1.185	5.191
n-Butane	2.337	10.236
Isopentane	0.734	3.217
n-Pentane	0.606	2.653
n-Hexane	0.117	0.513
Cyclohexane	<0.001	<0.001
Other Hexanes	0.140	0.615
Heptanes	0.205	0.900
Benzene	0.003	0.015
Toluene	0.008	0.036
Ethylbenzene	<0.001	0.002
Xylenes	0.004	0.018
2,2,4-Trimethylpentane	<0.001	0.002
C8+ Heavies	0.097	0.427
Total Emissions:	22.021	96.453
Total VOC Emissions:	11.064	48.461
Total HAP Emissions:	0.135	0.590

[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 5/14/2014 condensate sample from OXF-131 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: PET-35 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	0.218	0.953
Ethane	0.325	1.424
Propane	0.281	1.232
Isobutane	0.059	0.260
n-Butane	0.117	0.512
Isopentane	0.037	0.161
n-Pentane	0.030	0.133
n-Hexane	0.006	0.026
Cyclohexane	<0.001	<0.001
Other Hexanes	0.007	0.031
Heptanes	0.010	0.045
Benzene	<0.001	0.001
Toluene	<0.001	0.002
Ethylbenzene	<0.001	<0.001
Xylenes	<0.001	0.001
2,2,4-Trimethylpentane	<0.001	<0.001
C8+ Heavies	0.005	0.022
Total Emissions:	1.101	4.823
Total VOC Emissions:	0.553	2.423
Total HAP Emissions:	0.007	0.030

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: **PET-35 Wellpad**
Project Description: **G-70A Permit Application**

Sand Separator Tank

Throughput Parameter	Value	Units
Tank Capacity	5,880	gallons
Operational Hours	8,760	hrs/yr
Total Produced Water and Sand Throughput	280	bbl/month
Percent Produced Water	50%	
Total Produced Water Throughput	140	bbl/month

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

Description	Potential Throughput (gal/yr)
Produced Water and Sand	141,120

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

Constituent	Total Emissions [1] lb/hr	tpy
Methane	0.058	0.252
Ethane	0.086	0.376
Propane	0.074	0.326
Isobutane	0.016	0.069
n-Butane	0.031	0.135
Isopentane	0.010	0.043
n-Pentane	0.008	0.035
n-Hexane	0.002	0.007
Cyclohexane	<0.001	<0.001
Other Hexanes	0.002	0.008
Heptanes	0.003	0.012
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	0.005
Total Emissions:	0.291	1.274
Total VOC Emissions:	0.146	0.640
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 5/14/2014 condensate sample from OXF-131 wellpad.

Company Name: **EQT Production, LLC**
Facility Name: **PET-35 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	5.00E-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: **PET-35 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: **PET-35 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 f^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: PET-35 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 $(tons/yr)_{Potential} = (lb/hr)_{Emissions} \times$ (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: PET-35 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 Productior

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	295	3.88	17.01
Pump Seals	Light Liquid	1.99E-02	1	0.04	0.19
Pressure Relief Valves	Gas	1.04E-01	18	4.13	18.08
Connectors	All	1.83E-03	1,245	5.02	22.00
Open-Ended Lines	All	1.70E-03	15	0.06	0.25
			Emission Totals:	**13.13**	**57.52**

[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 from the same representative gas analyses used for other emission calculation

Company Name: **EQT Production, LLC**
Facility Name: **PET-35 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	2.662	11.66
Hexane	3.9E-02	1.7E-01
Benzene	1.3E-03	5.6E-03
Toluene	2.7E-03	1.2E-02
Ethylbenzene	<0.001	<0.001
2,2,4-trimethylpentane	2.7E-02	1.2E-01
Xylene	1.4E-03	6.0E-03
Total HAP	7.2E-02	3.1E-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	1,245	3.0E-03	5.6E-01	3.6E-03	1.4E+01
Open-Ended Lines	15	6.1E-02	1.4E-01	8.8E-04	3.4E+00
Pressure Relief Devices	18	4.0E-02	1.1E-01	6.9E-04	2.7E+00
Pneumatic Devices	30	6.0E+00	2.7E+01	1.7E-01	6.7E+02
Valves	295	2.7E-02	1.2E+00	7.7E-03	3.0E+01
Total			**28.8**	**0.186**	**719**

[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: **PET-35 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	0.31	max true vapor pressure of liquid loaded (psia) - EPA TANKS Data
M	21.62	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)	Controlled Uncaptured (tpy)	Controlled[2] Captured (tpy)
Liquids Hauling	0.2	14,552,294	1.20	0.36	0.04

[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	8.2E-03
Isobutane	0.867	46.110	4.0E-01	6.1E-02	5.8E+01	3.6E+00	4.9E-02	2.1E-03
n-Butane	2.986	32.045	9.6E-01	1.5E-01	5.8E+01	8.5E+00	1.2E-01	4.9E-03
Isopentane	3.103	12.530	3.9E-01	5.9E-02	7.2E+01	4.3E+00	5.9E-02	2.5E-03
n-Pentane	3.943	8.433	3.3E-01	5.1E-02	7.2E+01	3.7E+00	5.1E-02	2.1E-03
n-Hexane	4.692	2.436	1.1E-01	1.7E-02	8.6E+01	1.5E+00	2.1E-02	8.7E-04
Other Hexanes	4.939	2.436	1.2E-01	1.8E-02	8.6E+01	1.6E+00	2.2E-02	9.2E-04
Heptanes	14.686	0.735	1.1E-01	1.7E-02	9.8E+01	1.6E+00	2.2E-02	9.4E-04
Benzene	0.200	1.508	3.0E-03	4.6E-04	7.8E+01	3.6E-02	5.0E-04	2.1E-05
Toluene	1.138	0.425	4.8E-03	7.4E-04	9.2E+01	6.8E-02	9.4E-04	4.0E-05
Ethylbenzene	0.155	0.151	2.3E-04	3.6E-05	1.1E+02	3.8E-03	5.3E-05	2.2E-06
Xylenes	1.763	0.180	3.2E-03	4.8E-04	1.1E+02	5.1E-02	7.1E-04	3.0E-05
2,2,4-Trimethylpentane	0.031	0.596	1.8E-04	2.8E-05	1.1E+02	3.2E-03	4.5E-05	1.9E-06
C8+ Heavies	59.154	3.400	2.0E+00	3.1E-01	1.1E+02	3.3E+01	4.6E-01	1.9E-02
	100.0		6.54			72.15	1.00	
Total Emissions:								0.04
Total HAP Emissions:								9.6E-04

[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: **PET-35 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	0.76	3,638	2,756	0	5.90	1.50	0.150
Employee Vehicles	3	3	3	0.76	200	152	0	0.12	0.03	0.003
Total Potential Emissions								**6.02**	**1.53**	**0.15**

Company Name: **EQT Production, LLC**
Facility Name: **PET-35 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	0.111	0.003	0.001	44.01	0.03
Nitrogen	<0.001	<0.001	<0.001	28.00	<0.001
Methane	26.176	1.632	0.387	16.04	6.21
Ethane	39.110	1.301	0.309	30.07	9.28
Propane	33.824	0.767	0.182	44.10	8.02
Isobutane	7.126	0.123	0.029	58.12	1.69
n-Butane	14.053	0.242	0.057	58.12	3.33
Isopentane	4.414	0.061	0.015	72.15	1.05
n-Pentane	3.644	0.051	0.012	72.15	0.86
n-Hexane	0.704	0.008	0.002	85.67	0.17
Cyclohexane	<0.001	<0.001	<0.001	84.16	<0.001
Other Hexanes	0.842	0.010	0.002	86.18	0.20
Heptanes	1.233	0.013	0.003	97.88	0.29
2,2,4-Trimethylpentane	<0.001	<0.001	<0.001	114.23	<0.001
Benzene	0.018	2.3E-04	5.5E-05	78.11	0.00
Toluene	0.048	0.001	1.2E-04	92.14	0.01
Ethylbenzene	<0.001	<0.001	<0.001	106.17	<0.001
Xylenes	0.024	2.3E-04	5.4E-05	106.17	0.01
C8 + Heavies	0.583	0.005	0.001	107.73	0.138
Total	131.91	4.22		31.29	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)

$$\frac{7{,}849\ \text{scf}}{\text{hr}} * \frac{1\ \text{lbmole}}{379\ \text{scf}} * \frac{31.29\ \text{lb}}{\text{lbmole}} = \frac{648\ \text{lb}}{\text{hr}}$$

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: **PET-35 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

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*     Project Setup Information
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******
Project File              : \\tsclient\Z\Client\EQT Corporation\West Virginia\WV
Production Wells\153901.0056 WV Wellpads 2015\PET 35\02 Draft\Attach I - Emission
Calcs\E&P Tank\2015-0311_EQT_PET-35_G70 Ap_Produced Fluid Tanks.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                : PET-35 Wellpad
Well Name                 : Produced Fluid Tanks
Date                      : 2015.03.11


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

Separator Pressure        : 414.00[psig]
Separator Temperature     : 60.00[F]
Ambient Pressure          : 14.70[psia]
Ambient Temperature       : 55.00[F]
C10+ SG                   : 0.8024
C10+ MW                   : 163.342

-- Low Pressure Oil
--------------------------------------------------------------------------
   No.    Component             mol %
   1      H2S                    0.0000
   2      O2                     0.0000
   3      CO2                    0.0840
   4      N2                     0.0000
   5      C1                     9.9570
   6      C2                     8.1140
   7      C3                     6.8240
   8      i-C4                   1.8640
   9      n-C4                   4.8700
   10     i-C5                   2.9440
   11     n-C5                   3.3610
   12     C6                     2.2410
   13     C7                     9.7080
   14     C8                    11.4500
   15     C9                     8.4380
   16     C10+                  25.3730
   17     Benzene                0.0910
   18     Toluene                0.7580
   19     E-Benzene              0.1130
   20     Xylenes                1.3570
   21     n-C6                   2.4330
   22     224Trimethylp          0.0200

-- Sales Oil
--------------------------------------------------------------------------
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Production Rate : 22.7[bbl/day]
Days of Annual Operation : 365 [days/year]
API Gravity : 59.11
Reid Vapor Pressure : 10.60[psia]

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

-- Emission Summary

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
Total HAPs	0.590	0.135	0.030	0.007

Total HC	96.012	21.921	4.801	1.096
VOCs, C2+	76.948	17.568	3.847	0.878
VOCs, C3+	48.461	11.064	2.423	0.553

Uncontrolled Recovery Info.

Vapor	6.3900	[MSCFD]
HC Vapor	6.3700	[MSCFD]
GOR	281.50	[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	0.441	0.101	0.441	0.101
4	N2	0.000	0.000	0.000	0.000
5	C1	19.064	4.353	0.953	0.218
6	C2	28.487	6.504	1.424	0.325
7	C3	24.636	5.625	1.232	0.281
8	i-C4	5.191	1.185	0.260	0.059
9	n-C4	10.236	2.337	0.512	0.117
10	i-C5	3.217	0.734	0.161	0.037
11	n-C5	2.653	0.606	0.133	0.030
12	C6	0.615	0.140	0.031	0.007
13	C7	0.900	0.205	0.045	0.010
14	C8	0.331	0.076	0.017	0.004
15	C9	0.081	0.018	0.004	0.001
16	C10+	0.015	0.003	0.001	0.000
17	Benzene	0.015	0.003	0.001	0.000
18	Toluene	0.036	0.008	0.002	0.000
19	E-Benzene	0.002	0.000	0.000	0.000
20	Xylenes	0.018	0.004	0.001	0.000
21	n-C6	0.513	0.117	0.026	0.006
22	224Trimethylp	0.002	0.000	0.000	0.000
	Total	96.453	22.021	4.823	1.101

-- 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	0.0840	0.0069	0.0001	0.3251	0.3289	0.3254
4	N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	C1	16.04	9.9570	0.2491	0.0001	40.3145	12.0792	38.6045
6	C2	30.07	8.1140	1.3061	0.2375	29.4027	52.0759	30.7759
7	C3	44.10	6.8240	3.2946	2.8877	17.8607	22.6275	18.1494
8	i-C4	58.12	1.8640	1.5368	1.5034	2.8873	3.1206	2.9014
9	n-C4	58.12	4.8700	4.6049	4.5743	5.6989	6.0623	5.7209
10	i-C5	72.15	2.9440	3.4237	3.4639	1.4439	1.5163	1.4483
11	n-C5	72.15	3.3610	4.0550	4.1140	1.1907	1.2521	1.1944
12	C6	86.16	2.2410	2.8819	2.9372	0.2370	0.2510	0.2378
13	C7	100.20	9.7080	12.7165	12.9774	0.3002	0.3211	0.3015
14	C8	114.23	11.4500	15.0807	15.3960	0.0965	0.1043	0.0969
15	C9	128.28	8.4380	11.1296	11.3633	0.0212	0.0250	0.0215
16	C10+	163.34	25.3730	33.4860	34.1908	0.0030	0.0034	0.0030
17	Benzene	78.11	0.0910	0.1181	0.1204	0.0064	0.0068	0.0064
18	Toluene	92.13	0.7580	0.9963	1.0170	0.0128	0.0138	0.0128
19	E-Benzene	106.17	0.1130	0.1490	0.1521	0.0005	0.0006	0.0005
20	Xylenes	106.17	1.3570	1.7892	1.8267	0.0056	0.0061	0.0056
21	n-C6	86.18	2.4330	3.1494	3.2114	0.1926	0.2046	0.1933
22	224Trimethylp	114.24	0.0200	0.0262	0.0268	0.0005	0.0005	0.0005
	MW		95.74	116.43	118.13	31.04	35.93	31.33
	Stream Mole Ratio		1.0000	0.7577	0.7421	0.2423	0.0156	0.2579
	Heating Value	[BTU/SCF]				1808.07	2072.28	1824.07
	Gas Gravity	[Gas/Air]				1.07	1.24	1.08
	Bubble Pt. @ 100F	[psia]	406.75	28.61	13.23			
	RVP @ 100F	[psia]	101.88	15.92	10.81			

	Spec. Gravity @ 100F	0.685	0.715	0.717

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*******************************************************************************
******
*     Project Setup Information
    *
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******
Project File              : \\tsclient\Z\Client\EQT Corporation\West Virginia\WV
Production Wells\153901.0056 WV Wellpads 2015\PET 35\02 Draft\Attach I - Emission
Calcs\E&P Tank\2015-0311_EQT_PET-35_G70 Ap_Sand Sep Tanks.ept
Flowsheet Selection       : Oil Tank with Separator
Calculation Method        : RVP Distillation
Control Efficiency        : 0.0%
Known Separator Stream    : Low Pressure Oil
Entering Air Composition  : No

Filed Name                : PET-35 Wellpad
Well Name                 : Sand Separator Tank
Date                      : 2015.03.11


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

Separator Pressure        : 414.00[psig]
Separator Temperature     : 60.00[F]
Ambient Pressure          : 14.70[psia]
Ambient Temperature       : 55.00[F]
C10+ SG                   : 0.8024
C10+ MW                   : 163.342

-- Low Pressure Oil
-------------------------------------------------------------------------
   No.    Component             mol %
   1      H2S                    0.0000
   2      O2                     0.0000
   3      CO2                    0.0840
   4      N2                     0.0000
   5      C1                     9.9570
   6      C2                     8.1140
   7      C3                     6.8240
   8      i-C4                   1.8640
   9      n-C4                   4.8700
   10     i-C5                   2.9440
   11     n-C5                   3.3610
   12     C6                     2.2410
   13     C7                     9.7080
   14     C8                    11.4500
   15     C9                     8.4380
   16     C10+                  25.3730
   17     Benzene                0.0910
   18     Toluene                0.7580
   19     E-Benzene              0.1130
   20     Xylenes                1.3570
   21     n-C6                   2.4330
   22     224Trimethylp          0.0200

-- Sales Oil
-------------------------------------------------------------------------
```

Production Rate : 0.3[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]
Total HAPs	0.010	0.002	0.010	0.002

Total HC	1.269	0.290	1.269	0.290
VOCs, C2+	1.017	0.232	1.017	0.232
VOCs, C3+	0.640	0.146	0.640	0.146

Uncontrolled Recovery Info.

Vapor	84.4800 x1E-3	[MSCFD]
HC Vapor	84.2100 x1E-3	[MSCFD]
GOR	281.60	[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	0.006	0.001	0.006	0.001
4	N2	0.000	0.000	0.000	0.000
5	C1	0.252	0.058	0.252	0.058
6	C2	0.376	0.086	0.376	0.086
7	C3	0.326	0.074	0.326	0.074
8	i-C4	0.069	0.016	0.069	0.016
9	n-C4	0.135	0.031	0.135	0.031
10	i-C5	0.043	0.010	0.043	0.010
11	n-C5	0.035	0.008	0.035	0.008
12	C6	0.008	0.002	0.008	0.002
13	C7	0.012	0.003	0.012	0.003
14	C8	0.004	0.001	0.004	0.001
15	C9	0.001	0.000	0.001	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	0.007	0.002
22	224Trimethylp	0.000	0.000	0.000	0.000
	Total	1.274	0.291	1.274	0.291

-- 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	0.0840	0.0069	0.0001	0.3251	0.3289
0.3254							
4	N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000							
5	C1	16.04	9.9570	0.2491	0.0001	40.3145	12.0792
38.6045							
6	C2	30.07	8.1140	1.3061	0.2375	29.4027	52.0759
30.7759							
7	C3	44.10	6.8240	3.2946	2.8877	17.8607	22.6275
18.1494							
8	i-C4	58.12	1.8640	1.5368	1.5034	2.8873	3.1206
2.9014							
9	n-C4	58.12	4.8700	4.6049	4.5743	5.6989	6.0623
5.7209							
10	i-C5	72.15	2.9440	3.4237	3.4639	1.4439	1.5163
1.4483							
11	n-C5	72.15	3.3610	4.0550	4.1140	1.1907	1.2521
1.1944							
12	C6	86.16	2.2410	2.8819	2.9372	0.2370	0.2510
0.2378							
13	C7	100.20	9.7080	12.7165	12.9774	0.3002	0.3211
0.3015							
14	C8	114.23	11.4500	15.0807	15.3960	0.0965	0.1043
0.0969							
15	C9	128.28	8.4380	11.1296	11.3633	0.0212	0.0250
0.0215							
16	C10+	163.34	25.3730	33.4860	34.1908	0.0030	0.0034
0.0030							
17	Benzene	78.11	0.0910	0.1181	0.1204	0.0064	0.0068
0.0064							
18	Toluene	92.13	0.7580	0.9963	1.0170	0.0128	0.0138
0.0128							
19	E-Benzene	106.17	0.1130	0.1490	0.1521	0.0005	0.0006
0.0005							
20	Xylenes	106.17	1.3570	1.7892	1.8267	0.0056	0.0061
0.0056							
21	n-C6	86.18	2.4330	3.1494	3.2114	0.1926	0.2046
0.1933							
22	224Trimethylp	114.24	0.0200	0.0262	0.0268	0.0005	0.0005
0.0005							
	MW		95.74	116.43	118.13	31.04	35.93
31.33							
	Stream Mole Ratio		1.0000	0.7577	0.7421	0.2423	0.0156
0.2579							
	Heating Value	[BTU/SCF]				1808.07	2072.28
1824.07							
	Gas Gravity	[Gas/Air]				1.07	1.24
1.08							
	Bubble Pt. @ 100F	[psia]	406.75	28.61	13.23		
	RVP @ 100F	[psia]	101.88	15.92	10.81		

	Spec. Gravity @ 100F		0.685	0.715	0.717		

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

Identification

User Identification:	PET-35 (OXF-131 Sample)
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	Liquid Loading parameters for PET-131 wellpad 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:	866.21
Net Throughput(gal/yr):	14,552,294.00
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

PET-35 (OXF-131 Sample) - 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	0.2373	0.1791	0.3117	21.6164			18.81	
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	0.0001	0.0003	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Butane (-n)						0.4614	0.3889	0.5438	58.1200	0.0010	0.0016	58.12	Option 2: A=5.09536, B=935.86, C=238.73
Decane (-n)						0.0301	0.0245	0.0369	142.2900	0.0219	0.0024	142.29	Option 1: VP50 = .026411 VP60 = .033211
Ethylbenzene						0.0923	0.0669	0.1257	106.1700	0.0000	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	0.0061	0.0120	100.20	Option 3: A=37358, B=8.2585
Hexane (-n)						1.6957	1.3330	2.1360	86.1700	0.0035	0.0218	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopentane						9.0329	7.1932	11.0836	72.1500	0.0010	0.0315	72.15	Option 1: VP50 = 7.889 VP60 = 10.005
methane						100.7917	87.8791	115.0985	44.0956	0.0000	0.0037	44.10	Option 2: A=7.3408624923, B=1104.2267744, C=291.70993941
Nonane (-n)						0.0588	0.0475	0.0729	128.2600	0.0069	0.0015	128.26	Option 1: VP50 = .051285 VP60 = .065278
Octane (-n)						0.1303	0.1035	0.1637	114.2300	0.0067	0.0032	114.23	Option 1: VP50 = .112388 VP60 = .145444
Pentane (-n)						6.1673	5.0301	7.5097	72.1500	0.0012	0.0274	72.15	Option 3: A=27691, B=7.558
Propane (-n)						100.7917	87.8791	115.0985	44.0956	0.0004	0.1441	44.10	Option 2: A=7.340862493, B=1104.2267744, C=291.70993941
Toluene						0.2857	0.2141	0.3766	92.1300	0.0005	0.0005	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2153	0.1602	0.2863	18.0150	0.9500	0.7499	18.02	Option 1: VP50 = .178 VP60 = .247
Xylene (-o)						0.0601	0.0431	0.0827	106.1700	0.0008	0.0002	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)

PET-35 (OXF-131 Sample) - Vertical Fixed Roof Tank

Annual Emission Calcaulations	
Standing Losses (lb):	8.3659
Vapor Space Volume (cu ft):	1,130.9734
Vapor Density (lb/cu ft):	0.0009
Vapor Space Expansion Factor:	0.0246
Vented Vapor Saturation Factor:	0.8883
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):	0.0009
Vapor Molecular Weight (lb/lb-mole):	21.6164
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2373
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:	0.0246
Daily Vapor Temperature Range (deg. R):	35.4636
Daily Vapor Pressure Range (psia):	0.1326
Breather Vent Press. Setting Range(psia):	0.7300
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2373
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1791
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3117
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:	0.8883
Vapor Pressure at Daily Average Liquid:	
Surface Temperature (psia):	0.2373
Vapor Space Outage (ft):	10.0000
Working Losses (lb):	357.7824
Vapor Molecular Weight (lb/lb-mole):	21.6164
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2373
Annual Net Throughput (gal/yr.):	14,552,294.0000
Annual Turnovers:	866.2080
Turnover Factor:	0.2013
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):	366.1483

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

Emissions Report for: Annual

PET-35 (OXF-131 Sample) - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Produced Fluid	357.78	8.37	366.15
methane	1.32	0.03	1.35
Propane (-n)	51.56	1.21	52.77
Butane (-n)	0.57	0.01	0.59
Isopentane	11.26	0.26	11.52
Pentane (-n)	9.79	0.23	10.02
Hexane (-n)	7.81	0.18	7.99
2,2,4-Trimethylpentane	0.01	0.00	0.01
Benzene	0.09	0.00	0.10
Heptane (-n)	4.28	0.10	4.38
Toluene	0.18	0.00	0.18
Octane (-n)	1.14	0.03	1.17
Ethylbenzene	0.00	0.00	0.00
Xylene (-o)	0.06	0.00	0.06
Nonane (-n)	0.53	0.01	0.54
Decane (-n)	0.86	0.02	0.88
Water	268.30	6.27	274.57

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 a new natural gas production wellpad (PET-35 wellpad). The facility will be located off of Copley Road in Lewis County, West Virginia approximately 5.25 miles Southwest of Weston, WV at 39.981317, -80.533338.

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

Pollutant	Emissions (tons per year)
NO_X	7.49
CO	6.29
VOC	27.38
SO_2	0.04
PM	6.59
Total HAPs	0.57
Carbon Dioxide Equivalents (CO_2e)	11,612

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 1227, during normal business hours.

Dated this the XX day of May, 2015.

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

ATTACHMENT K

Electronic Submittal

ATTACHMENT L

General Permit Registration Application Fee

ATTACHMENT M

Siting Criteria Waiver (*not applicable*)

ATTACHMENT N

Material Safety Data Sheet (*not applicable*)

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]	Maximum Potential Uncontrolled Emissions [3]		Maximum Potential Controlled Emissions [4]		Emission Form or Phase	Est. Method Used [5]
		ID No.	Source	ID No.	Device Type	*(Speciate VOCs & HAPS)*	lb/hr	ton/yr	lb/hr	ton/yr	*(At exit conditions, Solid, Liquid or Gas/Vapor)*	
E001 – E006 (Total-All Tanks)	Upward vertical stack	S001 – S006	Produced Fluids Tanks	C001	Combustor	VOC HAPs	66.38 0.81	290.77 3.54	3.32 0.04	14.54 0.18	Gas/Vapor	E&P Tank v2.0
E007	Upward vertical stack	S007	Sand Separator Tank	None	---	VOC HAPS	0.15 <0.01	0.64 <0.01	0.15 <0.01	0.64 <0.01	Gas/Vapor	E&P Tank v2.0
E008 – E013 (Total – All units)	Upward vertical stack	S008 – S013	Line Heaters	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 0.01	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 0.01	Gas/Vapor	AP-42
E014 – E015 (Total – All units)	Upward vertical stack	S014 – S015	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 3 <0.01	0.01 <0.01 <0.01 <0.01 <0.01 13 <0.01	<0.01 <0.01 <0.01 <0.01 <0.01 3 <0.01	0.01 <0.01 <0.01 <0.01 <0.01 13 <0.01	Gas/Vapor	AP-42
E016 (Uncaptured)	Upward vertical stack	Fugitive	Liquid Loading	None	---	VOC HAPs	0.27 0.01	1.20 0.03	0.09 <0.01	0.36 0.01	Gas/Vapor	AP-42
E016 (Controlled emissions)	Upward vertical stack	S001 – S006	Liquid Loading	C001	Combustor	VOC HAPs	0.27 0.01	1.20 0.03	0.01 <0.01	0.04 <0.01	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 1,401	4.18 3.51 0.32 0.03 6,138	0.95 0.80 0.07 0.01 1,401	4.18 3.51 0.32 0.03 6,138	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).