



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

TEL: (412) 395-3699

FAX: (412) 395-2156

Alex Bosiljevac
Environmental Coordinator

August 24, 2015

FEDEX TRK# 7744 0983 4878

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

**RE: G70A Permit Modification
EQT Production Company
PEN-15 Natural Gas Production Site**

Dear Mr. Durham,

Enclosed are two electronic copies and one original hard copy of a proposed modification to the G70-A General Air Permit for the PEN-15 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,

A handwritten signature in blue ink, appearing to read 'RAB' followed by a large, stylized loop.

Alex Bosiljevac
EQT Corporation

Enclosures



PROJECT REPORT

**EQT Production
PEN-15 Pad**

G70-A Permit Application



Where energy meets innovation.

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

August 2015



Environmental solutions delivered uncommonly well

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1. INTRODUCTION

EQT Production Company (EQT) is submitting this modification application to the West Virginia Department of Environmental Protection (WVDEP) for an existing natural gas production well pad, PEN-15, located in Ritchie County, West Virginia. The facility is currently permitted under General Permit G70-A044.

1.1. FACILITY AND PROJECT DESCRIPTION

The PEN-15 pad is a natural gas production facility that consists of ten (10) natural gas wells. Natural gas and produced water are extracted from deposits underneath the surface. Natural gas is transported from the well to a gas line for additional processing and compression, as necessary. The liquids produced are stored in storage vessels.

The PEN-15 wellpad consists of the following equipment:

- > Twelve (12) 400 barrel (bbl) storage tanks for produced fluids, controlled by two (2) enclosed combustors, each rated at 11.66 MMBtu/hr,
- > Ten (10) line heaters, each rated at 1.54 MMBtu/hr (heat input),
- > Two (2) thermoelectric generators (TEG), each rated at 0.013 MMBtu/hr,
- > Produced fluid truck loading (emissions of which are controlled by the aforementioned combustors), and
- > Associated piping and components.

This application seeks to permit the following equipment:

- > Two (2) 140 bbl storage tank for sand and produced fluids from the sand separator,
- > One (1) TEG rated at 0.013 MMBtu/hr, and
- > Two (2) enclosed combustors, each rated at 18.75 MMBtu/hr, for control of emissions from the produced fluid tanks and liquid loading.

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 PEN-15 Pad for air permitting purposes if, and only if, all three elements of the “stationary source” definition above are fulfilled.

WVDEP previously determined that the PEN-15 wellpad should not be aggregated with any other sources with the issuance of the facility's existing G70 permit. There are no Marcellus facilities contiguous or adjacent to the PEN-15 Pad. The nearest wellpad, PEN-13, is located approximately 0.8 miles southwest of PEN-15. Therefore, the PEN-15 pad should continue to be considered a separate stationary source with respect to permitting programs, including Title V and Prevention of Significant Deterioration (PSD). As discussed in this application, the facility is a minor source of air emissions with respect to New Source Review (NSR) and Title V permitting.

1.3. G70-A APPLICATION ORGANIZATION

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

- > Section 2: Sample Emission Source Calculations;
- > Section 3: Regulatory Discussion;
- > Section 4: G70-A Application Forms;
- > Attachment A: Current Business Certificate;
- > Attachment B: Process Description;
- > Attachment C: Description of Fugitive Emissions;
- > Attachment D: Process Flow Diagram;
- > Attachment E: Plot Plan;
- > Attachment F: Area Map;
- > Attachment G: Emission Unit Data Sheets and G70-A Section Applicability Form;
- > Attachment H: Air Pollution Control Device Sheets;
- > Attachment I: Emission Calculations;
- > Attachment J: Class I Legal Advertisement;
- > Attachment K: Electronic Submittal;
- > Attachment L: General Permit Registration Application Fee;
- > Attachment M: Siting Criteria Waiver (*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, TEGs, and enclosed combustors. In addition, emissions will also result from the storage of organic liquids in storage tanks and loading of organic liquids into tank trucks. 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, TEGs, and Combustors:** Potential emissions of criteria pollutants and hazardous air pollutants (HAPs) are calculated using U.S. EPA's AP-42 factors for natural gas external combustion.¹ These calculations assume a heat content of natural gas of 1,050 Btu/scf (conservatively lower than the estimated Btu content). Greenhouse gas emissions are calculated according to 40 CFR 98 Subpart C.² Potential emissions of NO_x, CO, PM, SO₂ and GHGs from the combustor are also calculated according to the aforementioned methodologies.
- > **Fugitive Equipment Leaks:** Emissions of VOC and HAPs from leaking equipment components have been estimated using facility estimated component counts and types along with *Table 2-4: Oil & Gas Production Operations Average Emission Factors, Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995*. Emission factors used are based on average measured TOC from component types indicated in gas service at O&G Production Operations. Greenhouse gas emissions from component leaks are calculated according to the procedures in 40 CFR 98 Subpart W.³
- > **Storage Tanks:** Working, breathing and flashing emissions of VOC and HAPs from the produced fluid stored in the tanks at the facility are calculated using API E&P TANK v2.0. Controlled calculations assume 95% capture efficiency and 98% destruction efficiency.
- > **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.

3. REGULATORY DISCUSSION

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 m³ (~19,813 gallons). All of the tanks at the wellpad will 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 has been subsequently amended. The list of potentially affected facilities includes:

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

There are twelve (12) produced fluid storage vessels and there will be two (2) sand separator storage vessels at the wellpad. The storage vessels at the facility will each have potential VOC emissions less than 6 tpy based on the permit application materials and enforceable limits to be included in the G70-A permit. As such, per 60.5365(e), the tanks are not storage vessel affected facilities under the rule.

The pneumatic controllers were ordered and installed after August 23, 2011 and are therefore potentially subject to NSPS OOOO. Per 60.5365(d)(2), a pneumatic controller affected facility is a single continuous bleed natural gas driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh. No pneumatic controllers installed will meet the definition of a pneumatic controller affected facility. Therefore, these units are not subject to the requirements of Subpart OOOO.

3.3.4. Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas processing plants (Subparts 0000) 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

Glycol dehydration units are potentially subject to Subpart HH, NESHAP from Natural Gas Production Facilities. This standard applies to such units at natural gas production facilities that are major or area sources of HAP emissions. The PEN-15 wellpad does not operate any dehydration units. 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. All proposed units are natural gas fired; 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.

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 combustors are incinerators and therefore must comply with this regulation. Per 45 CSR 6-4.3, opacity of emissions from these units shall not exceed 20 percent, except as provided by 4.4. PM emissions from these units will not exceed the levels calculated in accordance with 6-4.1.

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

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

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

According to 45 CSR 17-3.1:

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

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

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

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

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

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

3.5.8. Non-Applicability of Other SIP Rules

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

4. G70-A APPLICATION FORMS

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



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

**APPLICATION FOR GENERAL
PERMIT REGISTRATION**
*CONSTRUCT, MODIFY, RELOCATE OR
ADMINISTRATIVELY UPDATE
A STATIONARY SOURCE OF AIR POLLUTANTS*

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

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

- | | |
|--|---|
| <input type="checkbox"/> G10-D – Coal Preparation and Handling <input type="checkbox"/> G20-B – Hot Mix Asphalt <input type="checkbox"/> G30-D – Natural Gas Compressor Stations <input type="checkbox"/> G33-A – Spark Ignition Internal Combustion Engines <input type="checkbox"/> G35-A – Natural Gas Compressor Stations (Flare/Glycol Dehydration Unit) | <input type="checkbox"/> G40-C – Nonmetallic Minerals Processing <input type="checkbox"/> G50-B – Concrete Batch <input type="checkbox"/> G60-C – Class II Emergency Generator <input type="checkbox"/> G65-C – Class I Emergency Generator <input checked="" type="checkbox"/> 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: Pennsboro, Ritchie County, WV | |
| 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? <input checked="" type="checkbox"/> YES <input type="checkbox"/> 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 Classification (SIC) code: 1311 AND 8b. North American Industry System (NAICS) code: 211111 |
| 9. DAQ Plant ID No. (for existing facilities only): 085-00022 | 10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only): <u>G70-A044</u> _____ _____ |

A: PRIMARY OPERATING SITE INFORMATION

| | | |
|---|--|---|
| 11A. Facility name of primary operating site: PEN-15 Pad _____ | 12A. Address of primary operating site: Mailing: 625 Liberty Avenue, Suite 1700, Pittsburgh, PA 15222 Physical: Pennsboro, Ritchie County, WV _____ | |
| 13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO — IF YES , please explain: Property is leased and held under production rights _____ — IF NO , YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE. | | |
| 14A. — For Modifications or Administrative Updates at an existing facility, please provide directions to the present location of the facility from the nearest state road; — For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a MAP as Attachment F . From Pennsboro, WV, go east on Old US 50 for approximately 1 mile and then turn right onto Pullman Drive (Route 74) and go approximately 1.5 miles. Turn left onto access road to the site. | | |
| 15A. Nearest city or town: Pennsboro | 16A. County: Ritchie | 17A. UTM Coordinates: Northing (KM): 4,345.858 Easting (KM): 504.160 Zone: 17 |
| 18A. Briefly describe the proposed new operation or change (s) to the facility: Construction and operation of two (2) sand separator storage tanks, one (1) thermoelectric generator, and two (2) enclosed combustors for controlling emissions from produced fluid tanks. | | 19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: <u>39.26205°</u> Longitude: <u>-80.95179°</u> |

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

| | | |
|---|--|--|
| 11B. Name of 1 st alternate operating site: _N/A_____ _____ | 12B. Address of 1 st alternate operating site: Mailing: _____ Physical: _____ _____ | |
| 13B. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? <input type="checkbox"/> YES <input type="checkbox"/> 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 2 nd alternate operating site: _N/A_ | 12C. Address of 2 nd alternate operating site: Mailing: _____ Physical: _____ | |
| 13C. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? <input type="checkbox"/> YES <input type="checkbox"/> 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: ____/____/____2015____ <input type="checkbox"/> 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: ____/____/____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 <u>24</u> Days per week <u>7</u> Weeks per year <u>52</u> Percentage of operation <u>100</u> | | |

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.)

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

SECTION IV. CERTIFICATION OF INFORMATION

This General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of a Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, Emission Inventory, Certified Emission Statement, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. Any administratively incomplete or improperly signed or unsigned Registration Application will be returned to the applicant.

FOR A CORPORATION (domestic or foreign)

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

FOR A PARTNERSHIP

☐ I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

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

FOR AN ASSOCIATION

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

FOR A JOINT VENTURE

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

FOR A SOLE PROPRIETORSHIP

☐ I certify that I am the Owner and Proprietor

☒ I hereby certify that (please print or type) Kenneth Kirk is an Authorized Representative and in that capacity shall represent the interest of the business (e.g., Corporation, Partnership, Limited Liability Company, Association Joint Venture or Sole Proprietorship) and may obligate and legally bind the business. If the business changes its Authorized Representative, a Responsible Official shall notify the Director of the Office of Air Quality immediately, and/or,

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

Signature

(please use blue ink)

Responsible Official

Date

Name & Title

(please print or type)

Kenneth Kirk, Executive Vice President

Signature

(please use blue ink)

Authorized Representative (if applicable)

Date

Applicant's Name

Alex Bosiljevac – Environmental Coordinator

Phone & Fax

412-395-3699

Phone

412-395-7027

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.

ATTACHMENT B

Process Description

ATTACHMENT B: PROCESS DESCRIPTION

This project involves the construction and operation of two (2) enclosed combustors for the control of emissions from produced fluid storage tanks and liquid loading, two (2) sand separator storage tanks, and one (1) thermoelectric generator.

The PEN-15 wellpad is an existing natural gas production facility that consists of ten (10) wells, each with the same basic operation. The incoming gas stream from the underground wells passes through a sand separator, where sand, water, and residual solids are displaced and transferred to the sand separator tank. The gas then flows into a separator which separates produced fluids from the gas stream. The produced fluid is transferred to storage tanks, where emissions are controlled by enclosed combustors. Once the tanks are filled, the contents are loaded into trucks for transport using vapor balanced loading. Vapors from truck loading are controlled by the aforementioned combustors. 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} | 2.30 0.59 0.06 | 10.06 2.56 0.26 | 2.30 0.59 0.06 | 10.06 2.56 0.26 | O ^A |
| Loading/Unloading Operations | VOC HAP | --- | 6.16 0.14 | --- | 1.93 0.04 | O ^B |
| Equipment Leaks | VOC CO ₂ e HAP | --- | 17.98 1,213 0.76 | --- | 17.98 1,213 0.76 | 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 and 40 CFR 98 Subpart W.

¹ List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂O, N₂, O₂, 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).

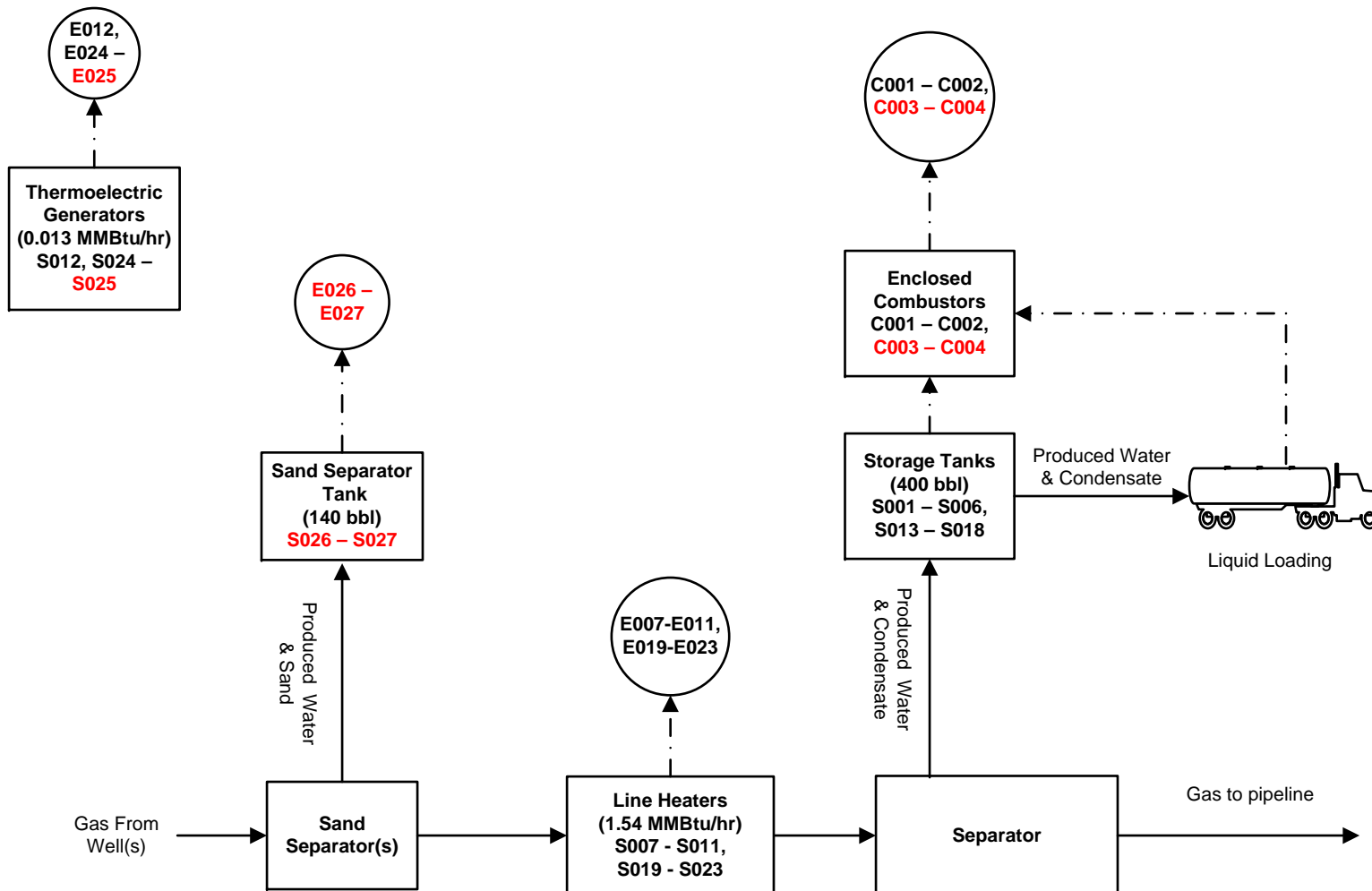
LEAK SOURCE DATA SHEET

| 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 | 522 | TBD | TBD | 8,395 |
| | Light Liquid VOC | --- | TBD | TBD | --- |
| | Heavy Liquid VOC | --- | TBD | TBD | --- |
| | Non-VOC | --- | TBD | TBD | --- |
| Safety Relief Valves | Gas VOC | 58 | TBD | TBD | 16,250 |
| | Non VOC | --- | TBD | TBD | --- |
| Open-ended Lines | VOC | 25 | TBD | TBD | 114 |
| | Non-VOC | --- | TBD | TBD | --- |
| Sampling Connections | VOC | --- | TBD | TBD | --- |
| | Non-VOC | --- | TBD | TBD | --- |
| Compressors | VOC | --- | TBD | TBD | --- |
| | Non-VOC | --- | TBD | TBD | --- |
| Flanges | VOC | 2,194 | TBD | TBD | 10,817 |
| | Non-VOC | --- | TBD | TBD | --- |
| Other | VOC | --- | TBD | TBD | --- |
| | Non-VOC | --- | TBD | TBD | --- |

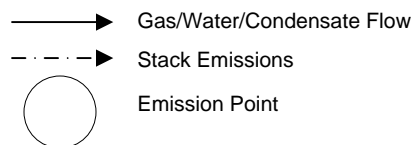
¹ U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). SOCMI factors were used as it was representative of natural gas liquids extraction

ATTACHMENT D

Process Flow Diagram



Flow Legend



EQT Where energy meets innovation.

EQT Production

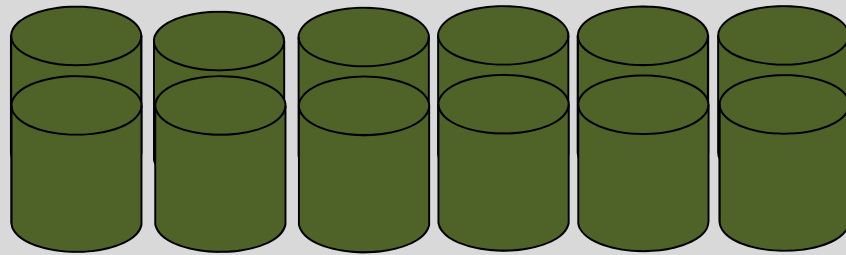
Process Flow Diagram
PEN-15 Wellpad

Trinity
Consultants

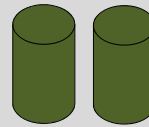
August 2015

ATTACHMENT E

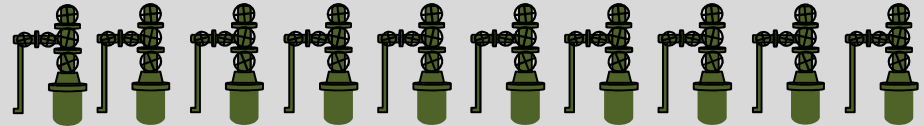
Plot Plan



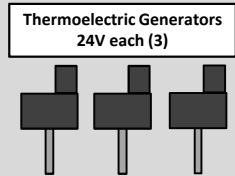
Tanks
400 bbl each
(12)



Sand
Separator
Tanks
140 bbl each
(2)



Wellheads
(10)



Thermoelectric Generators
24V each (3)



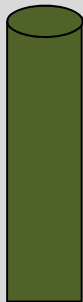
Combustor
11.66
MMBTU/hr



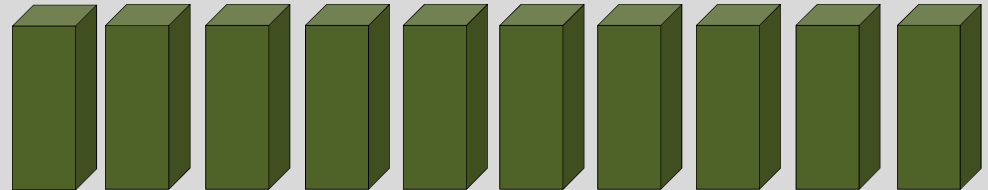
Combustor
11.66
MMBTU/hr



Combustor
18.75
MMBTU/hr



Combustor
18.75
MMBTU/hr



Line Heaters
(10)

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

Entrance to PEN-15 pad

ATTACHMENT F

Area Map

ATTACHMENT F: AREA MAP



Figure 1 - Map of PEN-15 Location

UTM Northing (KM): 4,345.858
UTM Easting (KM): 504.160
Elevation: ~1,120 ft

ATTACHMENT G

Emission Unit Data Sheets and G70-A Section Applicability Form

General Permit G70-A Registration Section Applicability Form

General Permit G70-A was developed to allow qualified applicants to seek registration for a variety of sources. These sources include natural gas well affected facilities, storage tanks, natural gas-fired compressor engines (RICE), natural gas producing units, natural gas-fired in-line heaters, pneumatic controllers, heater treaters, tank truck loading, glycol dehydration units, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

General Permit G70-A allows the registrant to choose which sections of the permit they are seeking registration under. Therefore, please mark which additional sections that you are applying for registration under. If the applicant is seeking registration under multiple sections, please select all that apply. Please keep in mind, that if this registration is approved, the issued registration will state which sections will apply to your affected facility.

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

* 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 | C001 – C004 | Produced Fluid Storage Tank | 2013 | 400 bbl | Existing; No change | C001 – C004 |
| S002 | C001 – C004 | Produced Fluid Storage Tank | 2013 | 400 bbl | Existing; No change | C001 – C004 |
| S003 | C001 – C004 | Produced Fluid Storage Tank | 2013 | 400 bbl | Existing; No change | C001 – C004 |
| S004 | C001 – C004 | Produced Fluid Storage Tank | 2013 | 400 bbl | Existing; No change | C001 – C004 |
| S005 | C001 – C004 | Produced Fluid Storage Tank | 2013 | 400 bbl | Existing; No change | C001 – C004 |
| S006 | C001 – C004 | Produced Fluid Storage Tank | 2013 | 400 bbl | Existing; No change | C001 – C004 |
| S007 | E007 | Line Heater | 2013 | 1.54 MMBtu/hr | Existing; No change | None |
| S008 | E008 | Line Heater | 2013 | 1.54 MMBtu/hr | Existing; No change | None |
| S009 | E009 | Line Heater | 2013 | 1.54 MMBtu/hr | Existing; No change | None |
| S010 | E010 | Line Heater | 2013 | 1.54 MMBtu/hr | Existing; No change | None |
| S011 | E011 | Line Heater | 2013 | 1.54 MMBtu/hr | Existing; No change | None |
| S012 | E012 | Thermoelectric Generator | 2013 | 0.013 MMBtu/hr | Existing; No change | None |
| S013 | C001 – C004 | Produced Fluid Storage Tank | 2014 | 400 bbl | Existing; No change | C001 – C004 |
| S014 | C001 – C004 | Produced Fluid Storage Tank | 2014 | 400 bbl | Existing; No change | C001 – C004 |
| S015 | C001 – C004 | Produced Fluid Storage Tank | 2014 | 400 bbl | Existing; No change | C001 – C004 |
| S016 | C001 – C004 | Produced Fluid Storage Tank | 2014 | 400 bbl | Existing; No change | C001 – C004 |
| S017 | C001 – C004 | Produced Fluid Storage Tank | 2014 | 400 bbl | Existing; No change | C001 – C004 |
| S018 | C001 – C004 | Produced Fluid Storage Tank | 2014 | 400 bbl | Existing; No change | C001 – C004 |
| S019 | E019 | Line Heater | 2014 | 1.54 MMBtu/hr | Existing; No change | None |
| S020 | E020 | Line Heater | 2014 | 1.54 MMBtu/hr | Existing; No change | None |
| S021 | E021 | Line Heater | 2014 | 1.54 MMBtu/hr | Existing; No change | None |
| S022 | E022 | Line Heater | 2014 | 1.54 MMBtu/hr | Existing; No change | None |

G70-A Oil and Natural Gas Production Facilities
Instructions and Forms

| | | | | | | |
|---|-------------|--------------------------|------|-------------------|---------------------|------|
| S023 | E023 | Line Heater | 2014 | 1.54 MMBtu/hr | Existing; No change | None |
| S024 | E024 | Thermoelectric Generator | 2014 | 0.013 MMBtu/hr | Existing; No change | None |
| S025 | E025 | Thermoelectric Generator | TBD | 0.013 MMBtu/hr | New | None |
| S026 | E026 | Sand Separator Tank | TBD | 140 bbl | New | None |
| S027 | E027 | Sand Separator Tank | TBD | 140 bbl | New | None |
| S028 | C001 – C004 | Liquid Loading | 2013 | 18,576,000 gal/yr | Existing; No change | None |
| C001 | C001 | Combustor | 2013 | 11.66 MMBTU/hr | Existing; No change | NA |
| C002 | C002 | Combustor | 2014 | 11.66 MMBTU/hr | Existing; No change | NA |
| C003 | C003 | Combustor | TBD | 18.75 MMBTU/hr | New | NA |
| C004 | C004 | Combustor | TBD | 18.75 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: | |
|---|--------------|
| 47-085-09929 | 47-085-10095 |
| 47-085-09930 | 47-085-10096 |
| 47-085-09931 | 47-085-10097 |
| 47-085-09932 | |
| 47-085-09933 | |
| 47-085-10093 | |
| 47-085-10094 | |

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 PEN-15 Wellpad | 2. Tank Name Produced Fluid Storage Tanks |
| 3. Emission Unit ID number S001 – S006, S013 – S018 | 4. Emission Point ID number C001 – C004 |
| 5. Date Installed or Modified (<i>for existing tanks</i>) Installed 2013-2014 | 6. Type of change: NA – No change <input type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other |
| 7A. Description of Tank Modification (<i>if applicable</i>) NA | |
| 7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | |
| 7C. Provide any limitations on source operation affecting emissions. (production variation, etc.) None | |

II. TANK INFORMATION (required)

| | |
|---|--|
| 8. Design Capacity (<i>specify barrels or gallons</i>). Use the internal cross-sectional area multiplied by internal height. 400 bbl each | |
| 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 (<i>specify barrels or gallons</i>). This is also known as “working volume. 400 bbl each | |
| 13A. Maximum annual throughput (gal/yr) ~18,576,000 (All tanks) | 13B. Maximum daily throughput (gal/day) ~50,893 (All tanks) |
| 14. Number of tank turnovers per year ~1,106 All tanks) | 15. Maximum tank fill rate (gal/min) TBD |
| 16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading | |
| 17. Is the tank system a variable vapor space system? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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): <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input checked="" type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe) | |

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

| |
|--|
| <input type="checkbox"/> Refer to enclosed TANKS Summary Sheets |
| <input checked="" type="checkbox"/> Refer to the responses to items 19 – 26 in section VII |

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

| |
|--|
| <input type="checkbox"/> Refer to enclosed TANKS Summary Sheets |
| <input checked="" type="checkbox"/> Refer to the responses to items 27 – 33 in section VII |

V. LIQUID INFORMATION (check which one applies)

| |
|--|
| <input type="checkbox"/> Refer to enclosed TANKS Summary Sheets |
| <input checked="" type="checkbox"/> 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): | | | | | | | | | |
|--|---------------|---|----------------|-----|--------------|------------------|-------------------------|-----|--------------------------------|
| <input checked="" type="checkbox"/> Does Not Apply | | <input type="checkbox"/> Rupture Disc (psig) | | | | | | | |
| <input type="checkbox"/> Carbon Adsorption ¹ | | <input type="checkbox"/> Inert Gas Blanket of _____ | | | | | | | |
| <input checked="" type="checkbox"/> Vent to Vapor Combustion Device ¹ (vapor combustors, flares, thermal oxidizers) | | | | | | | | | |
| <input type="checkbox"/> Condenser ¹ | | <input checked="" type="checkbox"/> Conservation Vent (psig) – Enardo Valve | | | | | | | |
| <input type="checkbox"/> Other ¹ (describe) | | Vacuum Setting | | | | Pressure Setting | | | |
| | | <input checked="" type="checkbox"/> 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 | | | | | | | | | |
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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: | | |
| <input type="checkbox"/> Riveted <input type="checkbox"/> Gunitite lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) Welded | | |
| 20A. Shell Color: Gray | 20B. Roof Color: Gray | 20C. Year Last Painted: |
| 21. Shell Condition (if metal and unlined): | | |
| <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable | | |
| 22A. Is the tank heated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 ? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | 24A. If yes, for dome roof provide radius (ft): | 24B. If yes, for cone roof, provide slop (ft/ft): 0.06 |
| 25. Complete item 25 for Floating Roof Tanks <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/> | | |
| 25A. Year Internal Floaters Installed: | | |
| 25B. Primary Seal Type (check one): <input type="checkbox"/> Metallic (mechanical) shoe seal <input type="checkbox"/> Liquid mounted resilient seal <input type="checkbox"/> Vapor mounted resilient seal <input type="checkbox"/> Other (describe): | | |
| 25C. Is the Floating Roof equipped with a secondary seal? <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 25D. If yes, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe): | | |

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| | | | |
|--|---------------------------------------|---|--|
| 25E. Is the floating roof equipped with a weather shield? <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |
| 25F. Describe deck fittings: | | | |
| 26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does not apply | | | |
| 26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded | | 26B. For bolted decks, provide deck construction: | |
| 26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> other (describe) | | | |
| 26D. Deck seam length (ft.): | 26E. Area of deck (ft ²): | 26F. For column supported tanks, # of columns: | 26G. For column supported tanks, diameter of column: |
| SITE INFORMATION: | | | |
| 27. Provide the city and state on which the data in this section are based: Elkins, WV | | | |
| 28. Daily Avg. Ambient Temperature (°F): 49.06 | | 29. Annual Avg. Maximum Temperature (°F): 61.15 | |
| 30. Annual Avg. Minimum Temperature (°F): 39.97 | | 31. Avg. Wind Speed (mph): 6.17 | |
| 32. Annual Avg. Solar Insulation Factor (BTU/ft ² -day): 1,193.87 | | 33. Atmospheric Pressure (psia): 13.73 | |
| LIQUID INFORMATION: | | | |
| 34. Avg. daily temperature range of bulk liquid (°F): 51.30 | 34A. Minimum (°F): | 34B. Maximum (°F): | |
| 35. Avg. operating pressure range of tank (psig): -0.03 to 0.70 | 35A. Minimum (psig): -0.03 | 35B. Maximum (psig): 0.70 | |
| 36A. Minimum liquid surface temperature (°F): 46.54 | | 36B. Corresponding vapor pressure (psia): 0.3828 | |
| 37A. Avg. liquid surface temperature (°F): 55.41 | | 37B. Corresponding vapor pressure (psia): 0.4707 | |
| 38A. Maximum liquid surface temperature (°F): 64.27 | | 38B. Corresponding vapor pressure (psia): 0.5780 | |
| 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): | 32.4499 | | |
| 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 PEN-15 Wellpad | 2. Tank Name Sand Separator Tanks |
| 3. Emission Unit ID number S026 – S027 | 4. Emission Point ID number E026 – E027 |
| 5. Date Installed or Modified (<i>for existing tanks</i>) TBD | 6. Type of change: <input checked="" type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other |
| 7A. Description of Tank Modification (<i>if applicable</i>) | |
| 7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | |
| 7C. Provide any limitations on source operation affecting emissions. (production variation, etc.) None | |

II. TANK INFORMATION (required)

| | |
|--|--|
| 8. Design Capacity (<i>specify barrels or gallons</i>). Use the internal cross-sectional area multiplied by internal height. 140 bbl (each) | |
| 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 (<i>specify barrels or gallons</i>). This is also known as “working volume. 140 bbl (each) | |
| 13A. Maximum annual throughput (gal/yr) ~141,120 (each) | 13B. Maximum daily throughput (gal/day) ~387 (each) |
| 14. Number of tank turnovers per year ~24 per tank | 15. Maximum tank fill rate (gal/min) TBD |
| 16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading | |
| 17. Is the tank system a variable vapor space system? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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): <input checked="" type="checkbox"/> Fixed Roof <input type="checkbox"/> vertical <input checked="" type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe) | |

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

| |
|--|
| <input type="checkbox"/> Refer to enclosed TANKS Summary Sheets |
| <input checked="" type="checkbox"/> Refer to the responses to items 19 – 26 in section VII |

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

| |
|--|
| <input type="checkbox"/> Refer to enclosed TANKS Summary Sheets |
| <input checked="" type="checkbox"/> Refer to the responses to items 27 – 33 in section VII |

V. LIQUID INFORMATION (check which one applies)

| |
|--|
| <input type="checkbox"/> Refer to enclosed TANKS Summary Sheets |
| <input checked="" type="checkbox"/> 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): | | | | | | | | | |
|---|---------------|---|----------------|-----|--------------|------------------|-------------------------|-----|--------------------------------|
| <input checked="" type="checkbox"/> Does Not Apply | | <input type="checkbox"/> Rupture Disc (psig) | | | | | | | |
| <input type="checkbox"/> Carbon Adsorption ¹ | | <input type="checkbox"/> Inert Gas Blanket of _____ | | | | | | | |
| <input type="checkbox"/> Vent to Vapor Combustion Device ¹ (vapor combustors, flares, thermal oxidizers) | | | | | | | | | |
| <input type="checkbox"/> Condenser ¹ | | <input type="checkbox"/> Conservation Vent (psig) | | | | | | | |
| <input type="checkbox"/> Other ¹ (describe) | | Vacuum Setting | | | | Pressure Setting | | | |
| <input type="checkbox"/> 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 | | | | | | | | | |
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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: | | |
| <input type="checkbox"/> Riveted <input type="checkbox"/> Gunitite lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) Welded | | |
| 20A. Shell Color: Gray | 20B. Roof Color: Gray | 20C. Year Last Painted: New |
| 21. Shell Condition (if metal and unlined): | | |
| <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable | | |
| 22A. Is the tank heated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 ? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/> | | |
| 25A. Year Internal Floaters Installed: | | |
| 25B. Primary Seal Type (check one): <input type="checkbox"/> Metallic (mechanical) shoe seal <input type="checkbox"/> Liquid mounted resilient seal <input type="checkbox"/> Vapor mounted resilient seal <input type="checkbox"/> Other (describe): | | |
| 25C. Is the Floating Roof equipped with a secondary seal? <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 25D. If yes, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe): | | |

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| | | | |
|--|---------------------------------------|---|--|
| 25E. Is the floating roof equipped with a weather shield? <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |
| 25F. Describe deck fittings: | | | |
| 26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does not apply | | | |
| 26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded | | 26B. For bolted decks, provide deck construction: | |
| 26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> other (describe) | | | |
| 26D. Deck seam length (ft.): | 26E. Area of deck (ft ²): | 26F. For column supported tanks, # of columns: | 26G. For column supported tanks, diameter of column: |
| SITE INFORMATION: | | | |
| 27. Provide the city and state on which the data in this section are based: Elkins, WV | | | |
| 28. Daily Avg. Ambient Temperature (°F): 49.06 | | 29. Annual Avg. Maximum Temperature (°F): 61.15 | |
| 30. Annual Avg. Minimum Temperature (°F): 39.97 | | 31. Avg. Wind Speed (mph): 6.17 | |
| 32. Annual Avg. Solar Insulation Factor (BTU/ft ² -day): 1,193.87 | | 33. Atmospheric Pressure (psia): 13.73 | |
| LIQUID INFORMATION: | | | |
| 34. Avg. daily temperature range of bulk liquid (°F): 51.30 | | 34A. Minimum (°F): | 34B. Maximum (°F): |
| 35. Avg. operating pressure range of tank (psig): -0.03 to 0.70 | | 35A. Minimum (psig): -0.03 | 35B. Maximum (psig): 0.70 |
| 36A. Minimum liquid surface temperature (°F): 46.54 | | 36B. Corresponding vapor pressure (psia): 0.3828 | |
| 37A. Avg. liquid surface temperature (°F): 55.41 | | 37B. Corresponding vapor pressure (psia): 0.4707 | |
| 38A. Maximum liquid surface temperature (°F): 64.27 | | 38B. Corresponding vapor pressure (psia): 0.5780 | |
| 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): | 32.4499 | | |
| 39F. Maximum true vapor pressure (psia): | TBD | | |
| 39G. Maxim Reid vapor pressure (psia): | TBD | | |
| 39H. Months Storage per year. From: | 12 (All year) | | |
| To: | | | |

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 |
|---------------------------------|---------------------------------|--|-------------------------|--------------------------------------|-----------------------------|---|---|
| S007 | E007 | Line Heater | 2013 | Existing; No change | None | 1.54 | ~1,050 |
| S008 | E008 | Line Heater | 2013 | Existing; No change | None | 1.54 | ~1,050 |
| S009 | E009 | Line Heater | 2013 | Existing; No change | None | 1.54 | ~1,050 |
| S010 | E010 | Line Heater | 2013 | Existing; No change | None | 1.54 | ~1,050 |
| S011 | E011 | Line Heater | 2013 | Existing; No change | None | 1.54 | ~1,050 |
| S012 | E012 | Thermoelectric Generator | 2013 | Existing; No change | None | 0.013 | ~1,050 |
| S019 | E019 | Line Heater | 2014 | Existing; No change | None | 1.54 | ~1,050 |
| S020 | E020 | Line Heater | 2014 | Existing; No change | None | 1.54 | ~1,050 |
| S021 | E021 | Line Heater | 2014 | Existing; No change | None | 1.54 | ~1,050 |
| S022 | E022 | Line Heater | 2014 | Existing; No change | None | 1.54 | ~1,050 |
| S023 | E023 | Line Heater | 2014 | Existing; No change | None | 1.54 | ~1,050 |
| S024 | E024 | Thermoelectric Generator | 2014 | Existing; No change | None | 0.013 | ~1,050 |
| S025 | E025 | Thermoelectric Generator | TBD | New | None | 0.013 | ~1,050 |

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: S028 | 2. Emission Point ID: C001 – C004 | 3. Year Installed/ Modified: Installed 2013 | |
| 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? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If YES, describe: | | | |
| 8. Projected Maximum Operating Schedule (for rack or transfer point as a whole): | | | |
| Maximum | Jan. - Mar. | Apr. - June | July - Sept. |
| hours/day | As needed | As needed | As needed |
| days/week | As needed | As needed | As needed |
| 9. Bulk Liquid Data <i>(add pages as necessary)</i> : | | | |
| Liquid Name | Produced Fluids | | |
| Max. daily throughput (1000 gal/day) | Variable | | |
| Max. annual throughput (gal/yr) | 18,576,000 | | |
| Loading Method ¹ | SP | | |
| Max. Fill Rate (gal/min) | TBD | | |
| Average Fill Time (min/loading) | | | |
| Max. Bulk Liquid Temperature (°F) | 51.30 | | |
| True Vapor Pressure ² | 0.5780 | | |
| Cargo Vessel Condition ³ | Unknown | | |
| Control Equipment or Method ⁴ | VB, ECD | | |
| Minimum collection efficiency (%) | 70 | | |
| Minimum control efficiency (%) | 98 | | |
| * Continued on next page | | | |

| | | | | |
|--|-----------------|------------------------|--|--|
| Maximum Emission Rate | Loading (lb/hr) | VOC: 0.44 HAP: 0.01 | | |
| | Annual (ton/yr) | VOC: 1.93 HAP: 0.04 | | |
| 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 <i>Air Pollution Control Device Sheets as Attachment "H"</i>): 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 <i>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.</i> Liquid throughput | RECORDKEEPING <i>Please describe the proposed recordkeeping that will accompany the monitoring.</i> Liquid throughput |
| REPORTING <i>Please describe the proposed frequency of reporting of the recordkeeping.</i> None | TESTING <i>Please describe any proposed emissions testing for this process equipment/air pollution control device.</i> 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 & C002 | | 2. Installation Date: C001 – 2013; C002 - 2014 <input type="checkbox"/> New | |
| 3. Maximum Rated Total Flow Capacity: ~131 scf/min ~188,380 scfd | 4. Maximum Design Heat Input: 11.66 MMBtu/hr | 5. Design Heat Content: 1,500 btu/scf | |

Control Device Information

| | | | |
|---|--|--------------------------------------|------------------------------|
| 6. Select the type of vapor combustion control device being used: <input checked="" type="checkbox"/> Enclosed Combustion Device <input type="checkbox"/> Elevated Flare <input type="checkbox"/> Ground Flare <input type="checkbox"/> Thermal Oxidizer <input type="checkbox"/> 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#: C001 – C002) | | | |
| 10. Emission Unit ID# | Emission Source Description: | Emission Unit ID# | Emission Source Description: |
| S001 – S006, S013 – S018 | Twelve (12) 400 bbl Produced Fluids Tank | | |
| S026 | Tank Truck 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? |
| <input type="checkbox"/> Steam - <input type="checkbox"/> Air - <input type="checkbox"/> Pressure - <input checked="" type="checkbox"/> Non - | ~25 ft | ~4 ft | <input type="checkbox"/> Yes <input type="checkbox"/> 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) |
| ~131 | 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 | 50 | 75,000 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | 28. If yes, what type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infra-Red <input type="checkbox"/> Ultra Violet <input type="checkbox"/> Camera with monitoring control room <input type="checkbox"/> Other, describe: | | |

| 29. Pollutant(s) Controlled | 30. % Capture Efficiency | 31. Manufacturer's Guaranteed Control Efficiency (%) |
|--|--------------------------|--|
| HC | 95 | ≥ 98 |
| VOC | 95 | ≥ 98 |
| HAP | 95 | ≥ 98 |
| 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? <input checked="" type="checkbox"/> YES <input type="checkbox"/> 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.

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#: C003 & C004 | | 2. Installation Date: TBD <input checked="" type="checkbox"/> New | |
| 3. Maximum Rated Total Flow Capacity: ~208 scf/min ~300,000 scfd | 4. Maximum Design Heat Input: 18.75 MMBtu/hr | 5. Design Heat Content: 1,500 btu/scf | |
| Control Device Information | | | |
| 6. Select the type of vapor combustion control device being used: <input checked="" type="checkbox"/> Enclosed Combustion Device <input type="checkbox"/> Elevated Flare <input type="checkbox"/> Ground Flare <input type="checkbox"/> Thermal Oxidizer <input type="checkbox"/> Completion Combustion Device | | | |
| 7. Manufacturer: LEED Fabrication Model No.: Enclosed Combustor 60" | | 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#: C003 – C004) | | | |
| 10. Emission Unit ID# | Emission Source Description: | Emission Unit ID# | Emission Source Description: |
| S001 – S006, S013 – S018 | Twelve (12) 400 bbl Produced Fluids Tank | | |
| S026 | Tank Truck Loading | | |
| | | | |
| <i>If this vapor combustor controls emissions from more than six emission units, please attach additional pages.</i> | | | |
| 11. Assist Type | | 12. Flare Height | 13. Tip Diameter |
| <input type="checkbox"/> Steam - <input type="checkbox"/> Air - <input type="checkbox"/> Pressure - <input checked="" type="checkbox"/> Non - | | ~30 ft | ~5 ft |
| | | 14. Was the design per §60.18? <input type="checkbox"/> Yes <input type="checkbox"/> 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) |
| ~208 | Variable | ~70 | |
| 19. Provide an attachment with the characteristics of the waste gas stream to be burned. <i>See attached emission calculations.</i> | | | |

| 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 | 50 | 75,000 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | 28. If yes, what type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infra-Red <input type="checkbox"/> Ultra Violet <input type="checkbox"/> Camera with monitoring control room <input type="checkbox"/> Other, describe: | | |

| 29. Pollutant(s) Controlled | 30. % Capture Efficiency | 31. Manufacturer's Guaranteed Control Efficiency (%) |
|--|--------------------------|--|
| HC | 95 | ≥ 98 |
| VOC | 95 | ≥ 98 |
| HAP | 95 | ≥ 98 |
| 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? <input checked="" type="checkbox"/> YES <input type="checkbox"/> 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.



Enviromental Control Equipment
Data Sheet

| | | | | | |
|---------------|---|------------|------------------|----|---|
| Item/Tag No.: | | Page | 1 | of | 2 |
| Project No.: | | Revision: | B | | |
| | | Date: | 27 February 2014 | | |
| Project: | | By: | JS | | |
| P.O. No.: | - | Checked: | SG | | |
| RFQ No.: | - | Approved: | MS | | |
| Ref. P&ID: | - | Supplier: | LEED FABRICATION | | |
| Remarks: | - | Model No.: | L30-0011-00 | | |

GENERAL

| | | |
|----------------|-----------------|--|
| 1 Design Code: | NDE: | LEED Fabrication Standards |
| 2 Service: | Customer Specs: | <input type="checkbox"/> Yes |
| 3 Description: | | <input checked="" type="checkbox"/> 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 | <input checked="" type="checkbox"/> Gas | <input type="checkbox"/> 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 H2O | | | | | |
| 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

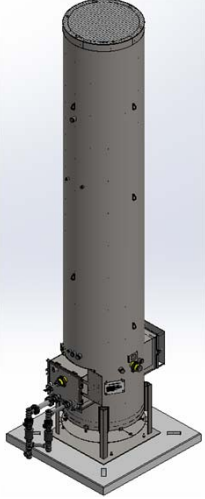
| | | | |
|---------------------------|--|--------------------------------|----------------------------------|
| 35 Type: | <input type="checkbox"/> Elevated <input checked="" type="checkbox"/> Enclosed | Equipment Design: | |
| 36 | <input type="checkbox"/> Above Ground | Component | Material / Size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



Environmental Control Equipment
Data Sheet

| | | | | | |
|---------------|------------------|-----------|------------------|----|---|
| Item/Tag No.: | | Page | 2 | of | 3 |
| Project No.: | | Revision: | B | | |
| Project: | | Date: | 27 February 2014 | | |
| P.O. No.: | - | By: | JS | | |
| RFQ No.: | - | Checked: | SG | | |
| Ref. P&ID: | - | Approved: | MS | | |
| Supplier: | LEED FABRICATION | | | | |
| Model No.: | L30-0011-00 | | | | |

EQUIPMENT SPECIFICATION

| | | | | |
|-----------------------------------|---|--|--|----|
| Flame Detection: | <input type="checkbox"/> Thermocouple | <input checked="" type="checkbox"/> Ionization Rod | Auxiliary Equipment | |
| | <input type="checkbox"/> UV Scanner | | Valves | NA |
| General Configuration: |  | | 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 | <input type="checkbox"/> Skid Mounted | <input checked="" type="checkbox"/> Concrete Pad | Equipment Info | |
| | <input type="checkbox"/> Other | | Component | Weight / Dimensions |
| Inspection | <input checked="" type="checkbox"/> Vendor Standard | | Burner | |
| | <input type="checkbox"/> Other. Specify: | | Burner Assembly | |
| Material Certification | <input checked="" type="checkbox"/> Vendor Standard | | Stack | |
| | <input type="checkbox"/> MTR | | Stack Assembly | 48" OD x 25' H |
| | <input type="checkbox"/> Certificate of Compliance | | Pilot Tip | |
| | <input type="checkbox"/> Other (Specify): | | Pilot Line(s) | |
| NDE | <input checked="" type="checkbox"/> Vendor Standard | | Stack Assembly | |
| | <input type="checkbox"/> Radiography. Specify: | | Auxiliary Equipment | |
| | <input type="checkbox"/> Ultrasonic. Specify: | | Blowers | |
| | <input type="checkbox"/> Liquid Penetrant. | | Inlet KO / Liquid Seal | |
| | <input type="checkbox"/> Magnetic Particles. | | Flame / Detonation Arrestor | |
| | <input type="checkbox"/> PMI. Specify: | | Skid | |
| | <input type="checkbox"/> Other. Specify: | | Instrumentation & Controls | |
| Surface Preparation | <input checked="" type="checkbox"/> Vendor Standard | | BMS | |
| | <input type="checkbox"/> Other. Specify: | | Control Panel | |
| Paint System | <input checked="" type="checkbox"/> Vendor Standard | | | |
| | <input type="checkbox"/> Other. Specify: | | | |
| Finished Color | <input checked="" type="checkbox"/> Vendor Standard | | | |
| | <input type="checkbox"/> Other. Specify: | | | |

Additional Notes:

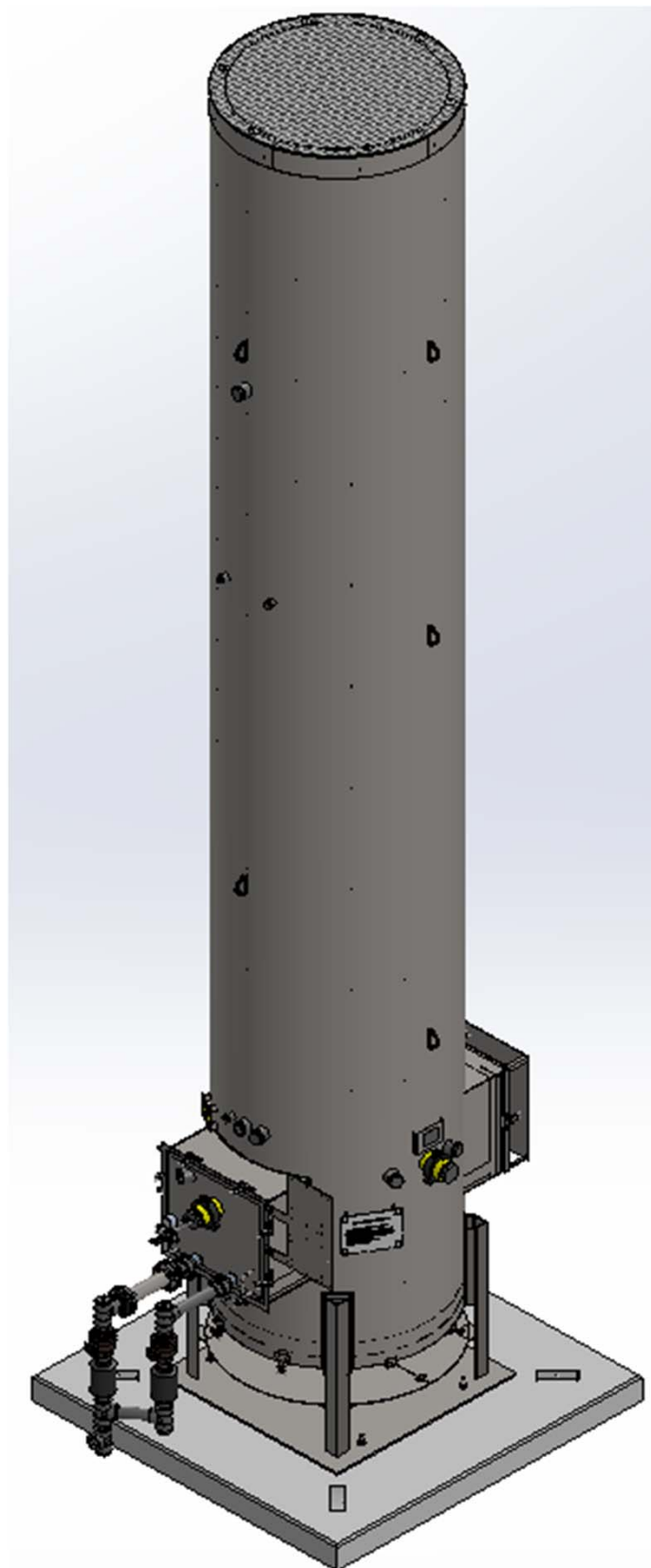


Environmental Control Equipment
Data Sheet

| | | | | | |
|---------------|---|------------|------------------|----|---|
| Item/Tag No.: | | Page | 3 | of | 3 |
| Project No.: | | Revision: | B | | |
| | | Date: | 27 February 2014 | | |
| Project: | | By: | JS | | |
| P.O. No.: | - | Checked: | SG | | |
| RFQ No.: | - | Approved: | MS | | |
| Ref. P&ID: | - | | | | |
| | | Supplier: | LEED FABRICATION | | |
| Remarks: | - | Model No.: | L30-0011-00 | | |

Client:
Site:
Unit/Lease:

GENERAL ARRANGEMENT





Enviromental Control Equipment
Data Sheet

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|---------------|---|------------|------------------|----|---|
| Item/Tag No.: | | Page | 1 | of | 3 |
| Project No.: | | Revision: | A | | |
| | | Date: | 10 November 2014 | | |
| Project: | | By: | JS | | |
| P.O. No.: | - | Checked: | SG | | |
| RFQ No.: | - | Approved: | MS | | |
| Ref. P&ID: | - | Supplier: | LEED FABRICATION | | |
| Remarks: | - | Model No.: | L30-0028-00 | | |

GENERAL

| | | |
|--------------|--|--|
| Design Code: | NDE: | LEED Fabrication Standards |
| Service: | Customer Specs: | <input type="checkbox"/> Yes |
| Description: | Standard Dual Stage 60 High Efficiency Combustor | <input checked="" type="checkbox"/> No |

PROCESS DATA

| Gas Composition: | | mol % | | Process Conditions: | |
|-------------------|--|-------|--|--|---|
| | | | | Variable | Value |
| Methane | | | | Flow Rate | Up to 300 |
| Ethane | | | | Pressure | Up to 12 |
| Propane | | | | Temperature | |
| I-Butane | | | | Molecular Weight | |
| n-Butane | | | | Process/Waste Stream | <input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid |
| I-Pentane | | | | Detailed Process Description / Process Notes: | |
| n-Pentane | | | | 1. Turndown 10:1. Based on an expected normal operating rate indicated above. | |
| n-Hexane | | | | 2. DRE: 98 % operating at design conditions | |
| CO2 | | | | 3. Burner Pressure Drop: Min. 0.12 oz/in2 | |
| N2 | | | | 4. Gas mixture heating value estimated to be 1500 BTU/SCF unless specified by customer | |
| Helium | | | | | |
| H2O | | | | | |
| C7 | | | | | |
| C8 | | | | | |
| C9 | | | | | |
| C10 | | | | | |
| C11+ | | | | | |
| TOTAL | | | | | |
| Other Components: | | PPMV | | Available Utilities: | |
| H2S | | | | Fuel / Pilot Gas | Min. 30psig Natural Gas /Propane 40-50 SCFH |
| Benzene | | | | Instrument Air | NA |
| Toluene | | | | Power | 120 V / 60 Hz or Solar Power |
| E-Benzene | | | | Steam | NA |
| Xylene | | | | Purge Gas | |

DESIGN DATA

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

EQUIPMENT SPECIFICATION


| | | | |
|------------------------|--|--------------------------------|----------------------------------|
| Type: | <input type="checkbox"/> Elevated <input checked="" type="checkbox"/> Enclosed | Equipment Design: | |
| | <input type="checkbox"/> Above Ground | Component | Material / Size / Rating / Other |
| | <input checked="" type="checkbox"/> Stack <input type="checkbox"/> Multiple Stack | Burner | |
| | <input type="checkbox"/> Portable / Trailer | Burner Tip / Assist Gas Burner | Stainless Steel |
| | | Burner Body | Carbon Steel |
| Smokeless By: | <input type="checkbox"/> Steam <input type="checkbox"/> Assist Air | Pilot | |
| | <input type="checkbox"/> Gas Assist <input checked="" type="checkbox"/> Staging | Pilot Tip | Stainless Steel |
| | | Pilot Line(s) | Carbon Steel |
| Stack: | <input checked="" type="checkbox"/> Self Supporting | Firebox / Stack | |
| Flare Burner: | <input type="checkbox"/> Non-Smokeless <input checked="" type="checkbox"/> Smokeless <input type="checkbox"/> Gas Assist | Shell | Carbon Steel |
| Pilot: | <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Continuous | Piping | Carbon Steel |
| Pilot Air Inspirator: | <input checked="" type="checkbox"/> Local <input type="checkbox"/> Remote | Nozzles | Carbon Steel |
| Pilot Flame Control: | <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (Thermocouple) | Flanges | Carbon Steel |
| | | Insulation | Blanket |
| Pilot Ignition: | <input type="checkbox"/> Flamefront Generator <input checked="" type="checkbox"/> Inspiring Ignitor | Insulation Pins | Stainless Steel |
| | <input type="checkbox"/> Electronic <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Manual | Refractory | NA |
| | <input type="checkbox"/> With Pilot Flame Control | Refractory Anchors | NA |
| | <input type="checkbox"/> With Auto Pilot Re-Ignition | Ladders and Platforms | NA |
| | | Stack Sample Connections | Per EPA requirements |
| Pilot Ignition Backup: | <input type="checkbox"/> Manual Specify: i.e Piezo-Electric | Sight Glass | 2 |
| | <input type="checkbox"/> Battery Pack | Other | |



Environmental Control Equipment
Data Sheet

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| Project No.: | | Revision: | A | | |
| Project: | | Date: | 10 November 2014 | | |
| P.O. No.: | - | By: | JS | | |
| RFQ No.: | - | Checked: | SG | | |
| Ref. P&ID: | - | Approved: | MS | | |
| Remarks: | - | Supplier: | LEED FABRICATION | | |
| | | Model No.: | L30-0028-00 | | |

EQUIPMENT SPECIFICATION

| | | | | |
|------------------------|---|--|-----------------------------------|--|
| Flame Detection: | <input type="checkbox"/> Thermocouple | <input checked="" type="checkbox"/> Ionization Rod | Auxiliary Equipment | |
| | <input type="checkbox"/> UV Scanner | | Valves | NA |
| General Configuration: |  | | 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 | Check with Sales for available config. |
| | | | Calorimeter | NA |
| | | | Pressure Switches/Transmitters | Check with Sales for available config. |
| | | | Thermocouples | Check with Sales for available config. |
| | | | Temperature Switches/Transmitters | Check with Sales for available config. |
| | | | BMS | Check with Sales for available config. |
| | | | CEMS | NA |
| | | | Other | NA |

FABRICATION AND INSPECTION

| | | | | |
|------------------------|---|--|-----------------------------|-----------------------------|
| Special requirements | <input type="checkbox"/> Skid Mounted | <input checked="" type="checkbox"/> Concrete Pad | Equipment Info | |
| | <input type="checkbox"/> Other | | Component | Weight / Dimensions |
| Inspection | <input checked="" type="checkbox"/> Vendor Standard | | Burner | |
| | <input type="checkbox"/> Other. Specify: | | Burner Assembly | |
| Material Certification | <input checked="" type="checkbox"/> Vendor Standard | | Stack | |
| | <input type="checkbox"/> MTR | | Stack Assembly | 60 " OD x 30 ' H. 7,000 Lbs |
| | <input type="checkbox"/> Certificate of Compliance | | Pilot Tip | |
| | <input type="checkbox"/> Other (Specify): | | Pilot Line(s) | |
| | | | Concrete Pad | 12'x12' 12". 21,600 Lbs |
| NDE | <input checked="" type="checkbox"/> Vendor Standard | | Auxiliary Equipment | |
| | <input type="checkbox"/> Radiography. Specify: | | Blowers | |
| | <input type="checkbox"/> Ultrasonic. Specify: | | Inlet KO / Liquid Seal | |
| | <input type="checkbox"/> Liquid Penetrant. | | Flame / Detonation Arrestor | |
| | <input type="checkbox"/> Magnetic Particles. | | Skid | |
| | <input type="checkbox"/> PMI. Specify: | | Instrumentation & Controls | |
| | <input type="checkbox"/> Other. Specify: | | BMS | |
| Surface Preparation | <input checked="" type="checkbox"/> Vendor Standard | | Control Panel | |
| | <input type="checkbox"/> Other. Specify: | | | |
| Paint System | <input checked="" type="checkbox"/> Vendor Standard | | | |
| | <input type="checkbox"/> Other. Specify: | | | |
| Finished Color | <input checked="" type="checkbox"/> Vendor Standard | | | |
| | <input type="checkbox"/> Other. Specify: | | | |

Additional Notes:

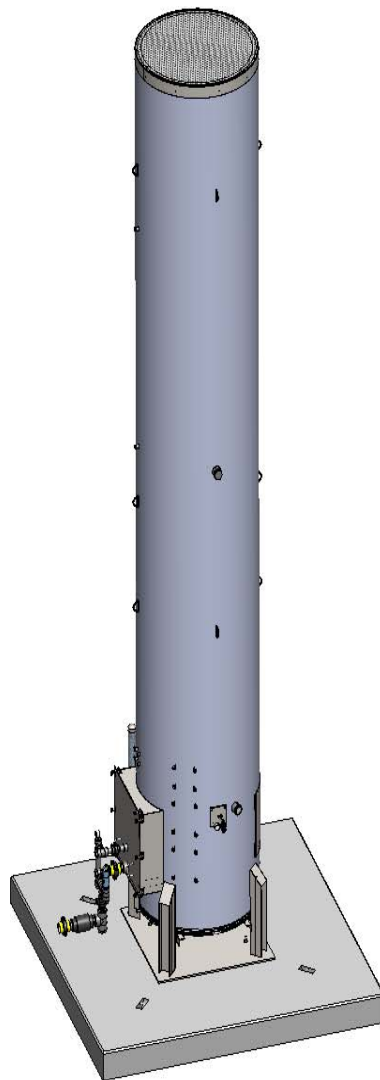


Environmental Control Equipment
Data Sheet

| | | | | | |
|---------------|---|------------|------------------|----|---|
| Item/Tag No.: | | Page | 3 | of | 3 |
| Project No.: | | Revision: | A | | |
| | | Date: | 10 November 2014 | | |
| Project: | | By: | JS | | |
| P.O. No.: | - | Checked: | SG | | |
| RFQ No.: | - | Approved: | MS | | |
| Ref. P&ID: | - | | | | |
| | | Supplier: | LEED FABRICATION | | |
| Remarks: | - | Model No.: | L30-0028-00 | | |

| | |
|-------------|--|
| Client: | |
| Site: | |
| Unit/Lease: | |

GENERAL ARRANGEMENT



ATTACHMENT I

Emission Calculations

Company Name: EOT Production, LLC
 Facility Name: PEN 15 Wellpad
 Project Description: G70A Modification Application

Site Wide Summary

| Emission Source | Value | Units | Emission Unit ID(s) | Emission Point ID(s) | Control Device |
|------------------------------------|-------|---------|-----------------------------------|-----------------------------------|----------------|
| Well(s) | 10 | per pad | --- | --- | --- |
| Storage Tank(s) (400 bbl) | 12 | per pad | S001 - S006, S013 - S018 | E001 - E006, E013 - E018 | C001 - C004 |
| Sand Separator Tank | 2 | per pad | S026 - S027 | E026 - E027 | None |
| Line Heater(s) (1.54 MMBtu/hr) | 10 | per pad | S007 - S011, S019 - S023 | E007 - E011, E019 - E023 | None |
| Thermoelectric Generator(s) (TEGs) | 3 | per pad | S012, S024 - S025 | E012, E024 - E025 | None |
| Dehydrator(s) | 0 | per pad | --- | --- | --- |
| Reboiler(s) | 0 | per pad | --- | --- | --- |
| Dehy Drip Tank | 0 | per pad | --- | --- | --- |
| Tank Combustor(s) (11.66 MMBtu/hr) | 2 | per pad | C001 - C002 | C001 - C002 | --- |
| Tank Combustor(s) (18.75 MMBtu/hr) | 2 | per pad | C003 - C004 | C003 - C004 | --- |
| Dehy Combustor(s) | 0 | per pad | --- | --- | N/A |
| Length of lease road | 2,630 | feet | --- | --- | --- |

| Constituent | Produced Fluid Storage Tanks (Includes Four Combustors) (tpy) | Sand Separator Tanks (tpy) | Line Heaters (1.54 MMBtu/hr) (tpy) | TEGs (tpy) | Fugitive Components (tpy) | Liquid Loading (tpy) | Haul Roads (tpy) | Total Emissions (tpy) |
|-----------------------------------|---|----------------------------|------------------------------------|------------|---------------------------|----------------------|------------------|-----------------------|
| Criteria Pollutants | | | | | | | | |
| NO _x | 25.50 | --- | 6.42 | 0.02 | --- | --- | --- | 31.94 |
| CO | 21.42 | --- | 5.40 | 0.01 | --- | --- | --- | 26.83 |
| PM Total | 1.94 | --- | 0.49 | 1.2E-03 | --- | --- | 10.06 | 12.49 |
| PM ₁₀ Total | 1.94 | --- | 0.49 | 1.2E-03 | --- | --- | 2.56 | 4.99 |
| PM _{2.5} Total | 1.94 | --- | 0.49 | 1.2E-03 | --- | --- | 0.26 | 2.68 |
| SO ₂ | 0.15 | --- | 0.04 | 9.7E-05 | --- | --- | --- | 0.19 |
| VOC | 51.29 | 0.39 | 0.35 | 8.9E-04 | 17.98 | 1.93 | --- | 71.95 |
| Greenhouse Gases | | | | | | | | |
| CO ₂ | 31321 | --- | 7,891.70 | 19.92 | 0.40 | --- | --- | 39,233 |
| CH ₄ | 7.98 | 0.06 | 0.15 | 3.8E-04 | 48.50 | --- | --- | 56.69 |
| N ₂ O | 0.06 | --- | 0.01 | 3.8E-05 | --- | --- | --- | 0.07 |
| CO _{2e} | 31538 | 1.40 | 7,899.85 | 19.94 | 1,212.96 | --- | --- | 40,672 |
| Hazardous Air Pollutants | | | | | | | | |
| Methylnaphthalene (2-) | --- | --- | 1.5E-06 | 3.9E-09 | --- | --- | --- | 1.5E-06 |
| Methylchloranthrene (3-) | --- | --- | 1.2E-07 | 2.9E-10 | --- | --- | --- | 1.2E-07 |
| Dimethylbenz(a)anthracene (7,12-) | --- | --- | 1.0E-06 | 2.6E-09 | --- | --- | --- | 1.0E-06 |
| Acenaphthene | --- | --- | 1.2E-07 | 2.9E-10 | --- | --- | --- | 1.2E-07 |
| Acenaphthylene | --- | --- | 1.2E-07 | 2.9E-10 | --- | --- | --- | 1.2E-07 |
| Anthracene | --- | --- | 1.5E-07 | 3.9E-10 | --- | --- | --- | 1.5E-07 |
| Benz(a)anthracene | --- | --- | 1.2E-07 | 2.9E-10 | --- | --- | --- | 1.2E-07 |
| Benzene | 3.6E-02 | <0.001 | 1.3E-04 | 3.4E-07 | 9.99E-03 | 9.7E-04 | --- | 4.7E-02 |
| Benzo(a)pyrene | --- | --- | 7.7E-08 | 1.9E-10 | --- | --- | --- | 7.7E-08 |
| Benzo(b)fluoranthene | --- | --- | 1.2E-07 | 2.9E-10 | --- | --- | --- | 1.2E-07 |
| Benzo(g,h,i)perylene | --- | --- | 7.7E-08 | 1.9E-10 | --- | --- | --- | 7.7E-08 |
| Benzo(k)fluoranthene | --- | --- | 1.2E-07 | 2.9E-10 | --- | --- | --- | 1.2E-07 |
| Chrysene | --- | --- | 1.2E-07 | 2.9E-10 | --- | --- | --- | 1.2E-07 |
| Dibenzo(a,h)anthracene | --- | --- | 7.7E-08 | 1.9E-10 | --- | --- | --- | 7.7E-08 |
| Dichlorobenzene | --- | --- | 7.7E-05 | 1.9E-07 | --- | --- | --- | 7.7E-05 |
| Fluoranthene | --- | --- | 1.9E-07 | 4.9E-10 | --- | --- | --- | 1.9E-07 |
| Fluorene | --- | --- | 1.8E-07 | 4.5E-10 | --- | --- | --- | 1.8E-07 |
| Formaldehyde | --- | --- | 4.8E-03 | 1.2E-05 | --- | --- | --- | 4.8E-03 |
| Hexane, n- | <0.001 | 1.2E-02 | 1.2E-01 | 2.9E-04 | 3.03E-01 | 4.0E-02 | --- | 4.7E-01 |
| Indeno(1,2,3-cd)pyrene | --- | --- | 1.2E-07 | 2.9E-10 | --- | --- | --- | 1.2E-07 |
| Naphthalene | --- | --- | 3.9E-05 | 9.9E-08 | --- | --- | --- | 3.9E-05 |
| Phenanthrene | --- | --- | 1.1E-06 | 2.8E-09 | --- | --- | --- | 1.1E-06 |
| Pyrene | --- | --- | 3.2E-07 | 8.1E-10 | --- | --- | --- | 3.2E-07 |
| Toluene | <0.001 | <0.001 | 2.2E-04 | 5.5E-07 | 2.95E-02 | 1.8E-03 | --- | 3.2E-02 |
| Arsenic | --- | --- | 1.3E-05 | 3.2E-08 | --- | --- | --- | 1.3E-05 |
| Beryllium | --- | --- | 7.7E-07 | 1.9E-09 | --- | --- | --- | 7.7E-07 |
| Cadmium | --- | --- | 7.1E-05 | 1.8E-07 | --- | --- | --- | 7.1E-05 |
| Chromium | --- | --- | 9.0E-05 | 2.3E-07 | --- | --- | --- | 9.0E-05 |
| Cobalt | --- | --- | 5.4E-06 | 1.4E-08 | --- | --- | --- | 5.4E-06 |
| Manganese | --- | --- | 2.4E-05 | 6.2E-08 | --- | --- | --- | 2.4E-05 |
| Mercury | --- | --- | 1.7E-05 | 4.2E-08 | --- | --- | --- | 1.7E-05 |
| Nickel | --- | --- | 1.3E-04 | 3.4E-07 | --- | --- | --- | 1.4E-04 |
| Selenium | --- | --- | 1.5E-06 | 3.9E-09 | --- | --- | --- | 1.5E-06 |
| Ethylbenzene | <0.001 | <0.001 | --- | --- | <0.001 | 1.0E-04 | --- | 1.0E-04 |
| Trimethylpentane (2,2,4-) | <0.001 | 8.0E-03 | --- | --- | 3.80E-01 | 8.7E-05 | --- | 3.9E-01 |
| Xylene | <0.001 | <0.001 | --- | --- | 3.40E-02 | 1.4E-03 | --- | 3.5E-02 |
| Total HAP | 2.95 | 0.02 | 0.12 | 3.1E-04 | 0.76 | 0.04 | --- | 3.89 |

Company Name: EQT Production, LLC
Facility Name: PEN 15 Wellpad
Project Description: G70A Modification Application

Produced Fluid Storage Tanks

| Throughput Parameter | Value | Units |
|--|--------|--------------------|
| Operational Hours | 8,760 | hrs/yr |
| Total Produced Fluid Throughput for E&P ¹ | 31.08 | bbl/day (per tank) |
| Total Condensate Throughput | 11,057 | bbl/month |
| Total Produced Water Throughput | 25,800 | bbl/month |

| Description | Potential Throughput ^{1,2} (gal/yr) |
|-------------------------------|--|
| Produced Water and Condensate | 18,576,000 |

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

² Total liquids throughput is conservatively assumed to contain 30% condensate based on historical production at the wellpad.

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

| Constituent | Total Emissions ¹ | |
|-----------------------------|------------------------------|--------|
| | lb/hr | tpy |
| Methane | 2.009 | 8.801 |
| Ethane | 1.093 | 4.789 |
| Propane | 3.864 | 16.924 |
| Isobutane | 1.444 | 6.323 |
| n-Butane | 3.890 | 17.039 |
| Isopentane | 1.382 | 6.053 |
| n-Pentane | 1.439 | 6.304 |
| n-Hexane | 0.459 | 2.011 |
| Cyclohexane | --- | --- |
| Other Hexanes | 0.575 | 2.520 |
| Heptanes | 0.477 | 2.089 |
| Benzene | 0.008 | 0.036 |
| Toluene | 0.015 | 0.066 |
| Ethylbenzene | 0.001 | 0.003 |
| Xylenes | 0.008 | 0.033 |
| 2,2,4-Trimethylpentane | 0.314 | 1.374 |
| C8+ Heavies | 0.064 | 0.280 |
| Total HC Emissions: | 17.042 | 74.646 |
| Total VOC Emissions: | 13.940 | 61.056 |
| Total HAP Emissions: | 0.804 | 3.520 |

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 a 3/25/2013 condensate sample from the PEN 15 wellpad.

| | C001-C002 | C003-C004 | |
|---------------------------------------|-----------|-----------|--|
| Total Control Efficiency of Combustor | 93% | 93% | 95% Capture, 98% guaranteed destruction efficiency for Leed Enclosed Combustor Max. pilot fuel usage for Leed Enclosed Combustor (50 scf/hr at design heat input of 1500 BTU/scf) Max. input from Leed Enclosed Combustor Specifications |
| Pilot Rating | 0.08 | 0.08 | |
| Combustor Rating | 11.66 | 18.75 | |

| | |
|----------------------|--------------------------------------|
| Company Name: | <u>EQT Production, LLC</u> |
| Facility Name: | <u>PEN 15 Wellpad</u> |
| Project Description: | <u>G70A Modification Application</u> |

Produced Fluid Storage Tanks

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

| Constituent | Total Emissions | |
|------------------------|-----------------|--------|
| | lb/hr | tpy |
| Methane | 0.141 | 0.616 |
| Ethane | 0.077 | 0.335 |
| Propane | 0.270 | 1.185 |
| Isobutane | 0.101 | 0.443 |
| n-Butane | 0.272 | 1.193 |
| Isopentane | 0.097 | 0.424 |
| n-Pentane | 0.101 | 0.441 |
| n-Hexane | 0.032 | 0.141 |
| Cyclohexane | --- | --- |
| Other Hexanes | 0.040 | 0.176 |
| Heptanes | 0.033 | 0.146 |
| Benzene | 0.001 | 0.003 |
| Toluene | 0.001 | 0.005 |
| Ethylbenzene | <0.001 | <0.001 |
| Xylenes | 0.001 | 0.002 |
| 2,2,4-Trimethylpentane | 0.022 | 0.096 |
| C8+ Heavies | 0.005 | 0.019 |
| Total HC Emissions: | 1.193 | 5.225 |
| Total VOC Emissions: | 0.976 | 4.274 |
| Total HAP Emissions: | 0.056 | 0.246 |

Enclosed Combustor Emissions C001 & C002 - (Per combustor) ¹

Company Name: EQT Production, LLC
Facility Name: PEN 15 Wellpad
Project Description: G70A Modification Application

Produced Fluid Storage Tanks

| Pollutant ² | Emission Factor (lb/MMBtu) | Combustor Potential Emissions | | Pilot Potential Emissions | |
|---------------------------------------|-------------------------------|----------------------------------|---------|------------------------------|---------|
| | | (lb/hr) | (tpy) | (lb/hr) | (tpy) |
| NO _x | 0.095 | 1.11 | 4.86 | 7.1E-03 | 3.1E-02 |
| CO | 0.080 | 0.93 | 4.09 | 6.0E-03 | 2.6E-02 |
| PM/PM ₁₀ | 0.007 | 0.08 | 0.37 | 5.4E-04 | 2.4E-03 |
| SO ₂ | 5.7E-04 | 0.01 | 0.03 | 4.3E-05 | 1.9E-04 |
| VOC | 5.2E-03 | --- | --- | 3.9E-04 | 1.7E-03 |
| CO ₂ (Natural Gas Firing) | 116.997 | 1364.19 | 5975.15 | 8.77 | 38.43 |
| CH ₄ (Natural Gas Firing) | 0.002 | 0.03 | 0.11 | 1.7E-04 | 7.2E-04 |
| N ₂ O (Natural Gas Firing) | 2.2E-04 | 2.6E-03 | 0.01 | 1.7E-05 | 7.2E-05 |

Enclosed Combustor Emissions C003 & C004 - (Per combustor) ¹

| Pollutant ² | Emission Factor (lb/MMBtu) | Combustor Potential Emissions | | Pilot Potential Emissions | |
|---------------------------------------|-------------------------------|----------------------------------|---------|------------------------------|---------|
| | | (lb/hr) | (tpy) | (lb/hr) | (tpy) |
| NO _x | 0.095 | 1.79 | 7.82 | 7.1E-03 | 3.1E-02 |
| CO | 0.080 | 1.50 | 6.57 | 6.0E-03 | 2.6E-02 |
| PM/PM ₁₀ | 0.007 | 0.14 | 0.59 | 5.4E-04 | 2.4E-03 |
| SO ₂ | 5.7E-04 | 0.01 | 0.05 | 4.3E-05 | 1.9E-04 |
| VOC | 5.2E-03 | --- | --- | 3.9E-04 | 1.7E-03 |
| CO ₂ (Natural Gas Firing) | 116.997 | 2193.70 | 9608.40 | 8.77 | 38.43 |
| CH ₄ (Natural Gas Firing) | 0.002 | 0.04 | 0.18 | 1.7E-04 | 7.2E-04 |
| N ₂ O (Natural Gas Firing) | 2.2E-04 | 4.1E-03 | 0.02 | 1.7E-05 | 7.2E-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.

Company Name: EQT Production, LLC
Facility Name: PEN 15 Wellpad
Project Description: G70A Modification 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 | 0.006 | 0.028 |
| Ethane | 0.003 | 0.015 |
| Propane | 0.012 | 0.054 |
| Isobutane | 0.005 | 0.020 |
| n-Butane | 0.013 | 0.055 |
| Isopentane | 0.004 | 0.019 |
| n-Pentane | 0.005 | 0.020 |
| n-Hexane | 0.001 | 0.006 |
| Cyclohexane | --- | --- |
| Other Hexanes | 0.002 | 0.008 |
| Heptanes | 0.002 | 0.007 |
| 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 | 0.004 |
| C8+ Heavies | <0.001 | <0.001 |
| Total HC Emissions: | 0.055 | 0.240 |
| Total VOC Emissions: | 0.045 | 0.196 |
| 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 a 3/25/2013 condensate sample from the PEN 15 wellpad.

Company Name: EQT Production, LLC
Facility Name: PEN 15 Wellpad
Project Description: G70A Modification Application

Line Heaters

| Parameter | Value | Units |
|-------------------------------------|-------------|-----------------|
| Fuel Used | Natural Gas | |
| Higher Heating Value (HHV) | 1,050 | BTU/scf |
| Heat Input | 1.54 | MMBtu/hr (each) |
| Fuel Consumption | 1.47E-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 | (tons/yr) ³ |
|--|--|---|------------------------|
| NO _x | 100 | 1.5E-01 | 6.4E-01 |
| CO | 84 | 1.2E-01 | 5.4E-01 |
| SO ₂ | 0.6 | 8.8E-04 | 3.9E-03 |
| PM Total | 7.6 | 1.1E-02 | 4.9E-02 |
| PM Condensable | 5.7 | 8.4E-03 | 3.7E-02 |
| PM ₁₀ (Filterable) | 1.9 | 2.8E-03 | 1.2E-02 |
| PM _{2.5} (Filterable) | 1.9 | 2.8E-03 | 1.2E-02 |
| VOC | 5.5 | 8.1E-03 | 3.5E-02 |
| Lead | 5.0E-04 | 7.3E-07 | 3.2E-06 |
| CO ₂ (Natural Gas Firing) ⁴ | 122,847 | 180 | 789 |
| CH ₄ (Natural Gas Firing) ⁴ | 2.3 | 3.4E-03 | 1.5E-02 |
| N ₂ O (Natural Gas Firing) ⁴ | 0.23 | 3.4E-04 | 1.5E-03 |

Company Name: EQT Production, LLC
Facility Name: PEN 15 Wellpad
Project Description: G70A Modification Application

Line Heaters

Hazardous Air Pollutant (HAP) Potential Emissions:

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

¹ Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, 1.4-3, & 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: PEN 15 Wellpad
Project Description: G70A Modification Application

Thermoelectric Generators (TEGs)

| Parameter | Value | Units |
|-------------------------------------|-----------------------|-----------------|
| Manufacturer | Global Thermoelectric | |
| Fuel Used | Natural Gas | |
| Higher Heating Value (HHV) | 1,050 | BTU/scf |
| Heat Input | 0.013 | MMBtu/hr (each) |
| Fuel Consumption ¹ | 1.23E-05 | MMscf/hr (each) |
| Potential Annual Hours of Operation | 8,760 | hr/yr |

¹ Global Thermoelectric specification sheet states 311 f³/day at 1000 BTU/ft³.

Criteria and Manufacturer Specific Pollutant Emission Rates:

| Pollutant | Emission Factor (lb/MMscf) ¹ | Potential Emissions | |
|--|--|----------------------|------------------------|
| | | (lb/hr) ² | (tons/yr) ³ |
| NO _x | 100 | 1.2E-03 | 5.4E-03 |
| CO | 84 | 1.0E-03 | 4.5E-03 |
| SO ₂ | 0.6 | 7.4E-06 | 3.2E-05 |
| PM Total | 7.6 | 9.4E-05 | 4.1E-04 |
| PM Condensable | 5.7 | 7.0E-05 | 3.1E-04 |
| PM ₁₀ (Filterable) | 1.9 | 2.3E-05 | 1.0E-04 |
| PM _{2.5} (Filterable) | 1.9 | 2.3E-05 | 1.0E-04 |
| VOC | 5.5 | 6.8E-05 | 3.0E-04 |
| Lead | 5.00E-04 | 6.2E-09 | 2.7E-08 |
| CO ₂ (Natural Gas Firing) ⁴ | 122,847 | 2 | 7 |
| CH ₄ (Natural Gas Firing) ⁴ | 2.3 | 2.9E-05 | 1.3E-04 |
| N ₂ O (Natural Gas Firing) ⁴ | 0.23 | 2.9E-06 | 1.3E-05 |

Company Name: EQT Production, LLC
Facility Name: PEN 15 Wellpad
Project Description: G70A Modification Application

Thermoelectric Generators (TEGs)

Hazardous Air Pollutant (HAP) Potential Emissions:

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

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:

PEN 15 Wellpad

Project Description:

G70A Modification Application

Fugitive Components

Component Counts

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

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

Fugitive Emissions from Component Leaks

| Equipment Type | Service | Emission Factors ¹ (kg/hr/source) | Facility Equipment Count ² (units) | TOC Total Fugitive Emissions (lb/hr) | TOC Annual Fugitive Emissions (tpy) |
|------------------------|--------------|---|--|---|--|
| Valves | Gas | 5.97E-03 | 522 | 6.87 | 30.09 |
| Pump Seals | Light Liquid | 1.99E-02 | 1 | 0.04 | 0.19 |
| Pressure Relief Valves | Gas | 1.04E-01 | 58 | 13.30 | 58.25 |
| Connectors | All | 1.83E-03 | 2,194 | 8.85 | 38.77 |
| Open-Ended Lines | All | 1.70E-03 | 25 | 0.09 | 0.41 |
| Emission Totals: | | | | 29.16 | 127.71 |

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, 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 | 0.139 | 2.4E-03 | 7.8E-05 | 2.3E-04 | <0.001 | 3.0E-03 | 2.7E-04 |
| Light Liquid | 1.000 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| All | 0.139 | 2.4E-03 | 7.8E-05 | 2.3E-04 | <0.001 | 3.0E-03 | 2.7E-04 |

Company Name:

EQT Production, LLC

Facility Name:

PEN 15 Wellpad

Project Description:

G70A Modification Application

Fugitive Components

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

VOC and HAP Fugitive Emissions

| Pollutant | Hourly Fugitive Emissions (lb/hr) | Annual Fugitive Emissions (tpy) |
|------------------------|-----------------------------------|---------------------------------|
| VOC | 4.105 | 17.98 |
| Hexane | 6.9E-02 | 3.0E-01 |
| Benzene | 2.3E-03 | 1.0E-02 |
| Toluene | 6.7E-03 | 2.9E-02 |
| Ethylbenzene | <0.001 | <0.001 |
| 2,2,4-trimethylpentane | 8.7E-02 | 3.8E-01 |
| Xylene | 7.8E-03 | 3.4E-02 |
| Total HAP | 1.7E-01 | 7.6E-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 ₂ e Emissions ⁵ (tpy) |
|-------------------------|------------------------------|---|--|--|--|
| Connectors | 2,194 | 3.0E-03 | 9.8E-01 | 8.0E-03 | 2.5E+01 |
| Open-Ended Lines | 25 | 6.1E-02 | 2.3E-01 | 1.9E-03 | 5.7E+00 |
| Pressure Relief Devices | 58 | 4.0E-02 | 3.5E-01 | 2.8E-03 | 8.7E+00 |
| Pneumatic Devices | 50 | 6.0E+00 | 4.5E+01 | 3.7E-01 | 1.1E+03 |
| Valves | 522 | 2.7E-02 | 2.1E+00 | 1.7E-02 | 5.3E+01 |
| Total | | | 48.5 | 0.396 | 1213 |

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-32a, W-35 and W-36 in Subpart W of 40 CFR 98.

⁴ Mole fractions of CH₄ and CO₂ based on gas analysis:

CH₄:80.62%

CO₂:0.24%

⁵ Carbon equivalent emissions (CO₂e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:

Carbon Dioxide (CO₂):1

Methane (CH₄):25

Company Name: EQT Production, LLC
Facility Name: PEN 15 Wellpad
Project Description: G70A Modification Application

Liquid Loading

Liquid Loading Losses:

Uncontrolled Loading Losses: L_L (lb/10³ gal) = 12.46 (SPM)/T

Controlled Loading Losses: L_L (lb/10³ gal) = 12.46 (SPM)/T * (1 - collection efficiency * control efficiency)

| Parameter | Value | Description |
|-----------------------|-------|---|
| S | 1.45 | saturation factor for splash loading (AP-42 Table 5.2-1) |
| Collection Efficiency | 70% | collection efficiency for non-NSPS/MACT annual leak tested trucks |
| Control Efficiency | 98% | destruction efficiency of combustor |
| P | 0.58 | max true vapor pressure of liquid loaded (psia) - EPA TANKS Data |
| M | 32.45 | 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) | Uncontrolled Uncaptured (tpy) | Controlled ² Captured (tpy) |
| Liquids Hauling | 0.7 | 18,576,000 | 6.16 | 1.85 | 0.09 |

¹ Sum of the annual throughput from each well at the pad.

Speciated HAP Emission Potential:

| Constituent | mol% ¹ | True Vapor Pressure of Organic Compounds in liquid (psia) ² | Partial Vapor Pressure (psia) | Mole Fraction | Molecular Weight | VOC Vapor Weight | Speciated Weight Fraction | Controlled Speciated Liquid Loading Emissions (tpy) ³ |
|-----------------------------|-------------------|--|----------------------------------|---------------|---------------------|---------------------|------------------------------|--|
| Methane | 0.095 | --- | --- | --- | --- | --- | --- | --- |
| Ethane | 0.602 | --- | --- | --- | --- | --- | --- | --- |
| Propane | 1.646 | 127.310 | 2.1E+00 | 3.2E-01 | 4.4E+01 | 1.4E+01 | 2.0E-01 | 1.7E-02 |
| Isobutane | 0.867 | 46.110 | 4.0E-01 | 6.1E-02 | 5.8E+01 | 3.6E+00 | 4.9E-02 | 4.2E-03 |
| n-Butane | 2.986 | 32.045 | 9.6E-01 | 1.5E-01 | 5.8E+01 | 8.5E+00 | 1.2E-01 | 1.0E-02 |
| Isopentane | 3.103 | 12.530 | 3.9E-01 | 5.9E-02 | 7.2E+01 | 4.3E+00 | 5.9E-02 | 5.1E-03 |
| n-Pentane | 3.943 | 8.433 | 3.3E-01 | 5.1E-02 | 7.2E+01 | 3.7E+00 | 5.1E-02 | 4.4E-03 |
| n-Hexane | 4.692 | 2.436 | 1.1E-01 | 1.7E-02 | 8.6E+01 | 1.5E+00 | 2.1E-02 | 1.8E-03 |
| Other Hexanes | 4.939 | 2.436 | 1.2E-01 | 1.8E-02 | 8.6E+01 | 1.6E+00 | 2.2E-02 | 1.9E-03 |
| Heptanes | 14.686 | 0.735 | 1.1E-01 | 1.7E-02 | 9.8E+01 | 1.6E+00 | 2.2E-02 | 1.9E-03 |
| Benzene | 0.200 | 1.508 | 3.0E-03 | 4.6E-04 | 7.8E+01 | 3.6E-02 | 5.0E-04 | 4.3E-05 |
| Toluene | 1.138 | 0.425 | 4.8E-03 | 7.4E-04 | 9.2E+01 | 6.8E-02 | 9.4E-04 | 8.1E-05 |
| Ethylbenzene | 0.155 | 0.151 | 2.3E-04 | 3.6E-05 | 1.1E+02 | 3.8E-03 | 5.3E-05 | 4.6E-06 |
| Xylenes | 1.763 | 0.180 | 3.2E-03 | 4.8E-04 | 1.1E+02 | 5.1E-02 | 7.1E-04 | 6.2E-05 |
| 2,2,4-Trimethylpentane | 0.031 | 0.596 | 1.8E-04 | 2.8E-05 | 1.1E+02 | 3.2E-03 | 4.5E-05 | 3.9E-06 |
| C8+ Heavies | 59.154 | 3.400 | 2.0E+00 | 3.1E-01 | 1.1E+02 | 3.3E+01 | 4.6E-01 | 4.0E-02 |
| | 100.0 | | 6.54 | | | 72.15 | 1.00 | |
| Total Emissions: | | | | | | | | 0.09 |
| Total HAP Emissions: | | | | | | | | 0.002 |

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

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

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

Company Name:

EOT Production, LLC

Facility Name:

PEN 15 Wellpad

Project Description:

G70A Modification Application

Haul Roads

Estimated Potential Road Fugitive Emissions

Unpaved Road Emissions

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

| | | | | |
|------------------------|------|------------------|-------------------|--|
| | 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 | 1.00 | 4,644 | 4,626 | 0 | 9.91 | 2.53 | 0.253 |
| Employee Vehicles | 3 | 3 | 3 | 1.00 | 200 | 199 | 0 | 0.15 | 0.04 | 0.004 |
| Total Potential Emissions | | | | | | | | 10.06 | 2.56 | 0.26 |

Company Name: EQT Production, LLC
Facility Name: PEN 15 Wellpad
Project Description: G70A Modification Application

Combustor Flow Rate Calculations

| TANK GAS STREAM (FROM E&P TANK v2.0) ¹ | | | | | |
|---|--------|-----------|--------|-----------------|------------------|
| Component | lb/hr | lb-mol/hr | mol% | MW lb/lb-mol | MW in Mixture |
| Carbon Dioxide | 0.360 | 0.008 | 0.002 | 44.01 | 0.07 |
| Nitrogen | <0.001 | <0.001 | <0.001 | 28.00 | <0.001 |
| Methane | 24.108 | 1.503 | 0.312 | 16.04 | 5.01 |
| Ethane | 13.116 | 0.436 | 0.091 | 30.07 | 2.72 |
| Propane | 46.368 | 1.051 | 0.218 | 44.10 | 9.63 |
| Isobutane | 17.328 | 0.298 | 0.062 | 58.12 | 3.60 |
| n-Butane | 46.680 | 0.803 | 0.167 | 58.12 | 9.69 |
| Isopentane | 16.584 | 0.230 | 0.048 | 72.15 | 3.44 |
| n-Pentane | 17.268 | 0.239 | 0.050 | 72.15 | 3.59 |
| n-Hexane | 5.508 | 0.064 | 0.013 | 85.67 | 1.14 |
| Cyclohexane | <0.001 | <0.001 | <0.001 | 84.16 | <0.001 |
| Other Hexanes | 6.900 | 0.080 | 0.017 | 86.18 | 1.43 |
| Heptanes | 5.724 | 0.058 | 0.012 | 97.88 | 1.19 |
| 2,2,4-Trimethylpentane | 3.768 | 0.033 | 0.007 | 114.23 | 0.78 |
| Benzene | 0.096 | 0.001 | <0.001 | 78.11 | 0.02 |
| Toluene | 0.180 | 0.002 | <0.001 | 92.14 | 0.04 |
| Ethylbenzene | 0.012 | <0.001 | <0.001 | 106.17 | 0.00 |
| Xylenes | 0.096 | 0.001 | <0.001 | 106.17 | 0.02 |
| C8 + Heavies | 0.768 | 0.007 | 0.001 | 107.73 | 0.159 |
| Total | 204.86 | 4.82 | | 42.53 | lb/lbmole |

1. Representative gas stream from the produced water storage tanks flowing to the combustor

C001 & C002

| | | |
|-------------------------|----------------|---|
| Combustor Rating | 11.66 MMBtu/hr | Max. input from Leed Enclosed Combustor Operations Manual |
| Pilot Rating | 0.08 MMBtu/hr | Max. pilot fuel usage for Leed Enclosed Combustor |
| Pilot Rating | 75,000 btu/hr | |
| Pilot Fuel Usage | 50 scf/hr | |
| Combustor Flow Capacity | 188.38 MSCFD | Max. flowrate from LEED Combustor specifications |
| | 7,849 scf/hr | |
| | 131 scf/min | |

Enclosed Combustor Mass Flow Rate (C001 & C002)

$$\frac{7,849 \text{ scf}}{\text{hr}} \times \frac{1 \text{ lbmole}}{379 \text{ scf}} \times 42.53 \frac{\text{lb}}{\text{lbmole}} = 881 \frac{\text{lb}}{\text{hr}}$$

C003 & C004

| | | |
|-------------------------|----------------|---|
| Combustor Rating | 18.75 MMBtu/hr | Max. input calculated using design heat input of 1500 BTU/scf |
| Pilot Rating | 0.08 MMBtu/hr | Max. pilot fuel usage for Leed Enclosed Combustor |
| Pilot Rating | 75,000 btu/hr | |
| Pilot Fuel Usage | 50 scf/hr | |
| Combustor Flow Capacity | 300.00 MSCFD | Max. flowrate from LEED Combustor specifications |
| | 12,500 scf/hr | |
| | 208 scf/min | |

Enclosed Combustor Mass Flow Rate (C003 & C004)

$$\frac{12,500 \text{ scf}}{\text{hr}} \times \frac{1 \text{ lbmole}}{379 \text{ scf}} \times 42.53 \frac{\text{lb}}{\text{lbmole}} = 1403 \frac{\text{lb}}{\text{hr}}$$

$$\text{Mass flow rate (lb/hr)} = \frac{\text{Maximum Rated total flow capacity (scf/hr)} \times \text{Vapor Molecular Weight (lb/lbmole)}}{\text{Molar Gas Volume (scf/lbmole)}}$$

Company Name:
Facility Name:
Project Description:

EQT Production, LLC
PEN 15 Wellpad
G70A Modification Application

Gas Analysis

Sample Location: WEU-1 Gas Analysis
Sample Date: 5/20/2013
HHV (Btu/scf): 1,217

Note: A conservatively low BTU content of 1050 was used for calculations.

| Constituent | Natural Gas Stream Speciation (Mole %) | Molecular Weight | Molar Weight | Average Weight Fraction | Natural Gas Stream Speciation (Wt. %) |
|------------------------|--|------------------|--------------|----------------------------|---|
| Carbon Dioxide | 0.240 | 44.01 | 1.1E-01 | 5.3E-03 | 5.3E-01 |
| Nitrogen | 0.428 | 28.01 | 1.2E-01 | 6.0E-03 | 6.0E-01 |
| Methane | 80.616 | 16.04 | 1.3E+01 | 6.5E-01 | 6.5E+01 |
| Ethane | 13.296 | 30.07 | 4.0E+00 | 2.0E-01 | 2.0E+01 |
| Propane | 3.541 | 44.10 | 1.6E+00 | 7.8E-02 | 7.8E+00 |
| Isobutane | 0.426 | 58.12 | 2.5E-01 | 1.2E-02 | 1.2E+00 |
| n-Butane | 0.746 | 58.12 | 4.3E-01 | 2.2E-02 | 2.2E+00 |
| Isopentane | 0.191 | 72.15 | 1.4E-01 | 6.9E-03 | 6.9E-01 |
| n-Pentane | 0.164 | 72.15 | 1.2E-01 | 5.9E-03 | 5.9E-01 |
| n-Hexane | 0.055 | 86.18 | 4.7E-02 | 2.4E-03 | 2.4E-01 |
| Cyclohexane | 0.009 | 84.16 | 7.6E-03 | 3.8E-04 | 3.8E-02 |
| Other Hexanes | 0.091 | 86.18 | 7.8E-02 | 3.9E-03 | 3.9E-01 |
| Heptanes | 0.029 | 100.21 | 2.9E-02 | 1.4E-03 | 1.4E-01 |
| 2,2,4-Trimethylpentane | 0.052 | 114.23 | 5.9E-02 | 3.0E-03 | 3.0E-01 |
| Benzene* | 0.002 | 78.11 | 1.6E-03 | 7.8E-05 | 7.8E-03 |
| Toluene* | 0.005 | 92.14 | 4.6E-03 | 2.3E-04 | 2.3E-02 |
| Ethylbenzene* | <0.001 | 106.17 | <0.001 | <0.001 | <0.001 |
| Xylenes* | 0.005 | 106.16 | 5.3E-03 | 2.7E-04 | 2.7E-02 |
| C8 + Heavies | 0.043 | 114.23 | 4.9E-02 | 2.5E-03 | 2.5E-01 |
| Totals | 100 | | 19.94 | 1.00 | 100 |

| | | |
|-------------|-------|-------|
| TOC (Total) | 99.27 | 98.87 |
| VOC (Total) | 5.36 | 13.95 |
| HAP (Total) | 0.12 | 0.59 |

2015-0818_PEN-15_Produced Fluid Tanks.txt

* Project Setup Information

*

Project File : \\tsclient\Z\Client\EQT Corporation\West Virginia\WV
Production Wells\153901.0056 WV Wellpads 2015\PEN 15\2015-0818_EQT_PEN15_G70
Mod\Attach I - Emission Calcs\E&P Tank\2015-0818_PEN-15_Produced Fluid Tanks.ept
Flowsheet Selection : Oil Tank with Separator
Calculation Method : RVP Distillation
Control Efficiency : 93.0%
Known Separator Stream : Low Pressure Oil
Entering Air Composition : No

Filed Name : PEN-15 Wellpad
Well Name : Produced Fluid Tanks
Date : 2015.08.14

* Data Input

*

Separator Pressure : 595.00[psi g]
Separator Temperature : 60.00[F]
Ambient Pressure : 14.70[psi a]
Ambient Temperature : 70.00[F]
C10+ SG : 0.7550
C10+ MW : 156.475

-- Low Pressure Oil

| No. | Component | mol % |
|-----|-------------------|---------|
| 1 | H2S | 0.0000 |
| 2 | O2 | 0.0000 |
| 3 | CO2 | 0.0180 |
| 4 | N2 | 0.0000 |
| 5 | C1 | 3.3360 |
| 6 | C2 | 0.9730 |
| 7 | C3 | 3.3090 |
| 8 | i-C4 | 2.1840 |
| 9 | n-C4 | 8.2860 |
| 10 | i-C5 | 5.9510 |
| 11 | n-C5 | 8.3650 |
| 12 | C6 | 7.9030 |
| 13 | C7 | 17.1930 |
| 14 | C8 | 3.4250 |
| 15 | C9 | 5.9770 |
| 16 | C10+ | 9.0440 |
| 17 | Benzene | 0.1670 |
| 18 | Toluene | 0.9290 |
| 19 | E-Benzene | 0.1160 |
| 20 | Xylenes | 1.4150 |
| 21 | n-C6 | 7.8940 |
| 22 | 2,2,4-Trimethyl p | 12.1580 |

-- Sales Oil

| | |
|--------------------------|-------------------|
| Production Rate | : 31.1 [bbl/day] |
| Days of Annual Operation | : 365 [days/year] |
| API Gravity | : 59.11 |
| Reid Vapor Pressure | : 10.60 [psi a] |

```

*****
*****
*          Calculati on  Resul ts
*
*****
*****

```

| Item | Uncontrolled [ton/yr] | Uncontrolled [lb/hr] | Controlled [ton/yr] | Controlled [lb/hr] |
|-------------|--------------------------|-------------------------|------------------------|-----------------------|
| Total HAPs | 3.520 | 0.804 | 0.246 | 0.056 |
| Page 1----- | | | | E&P TANK |
| Total HC | 74.646 | 17.042 | 5.225 | 1.193 |
| VOCs, C2+ | 65.845 | 15.033 | 4.609 | 1.052 |
| VOCs, C3+ | 61.056 | 13.940 | 4.274 | 0.976 |

| | | |
|----------|--------|-----------|
| Vapor | 3.6500 | [MSCFD] |
| HC Vapor | 3.6500 | [MSCFD] |
| GOR | 117.36 | [SCF/bbl] |

| 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 | 0.130 | 0.030 | 0.130 | 0.030 |
| 4 | N2 | 0.000 | 0.000 | 0.000 | 0.000 |
| 5 | C1 | 8.801 | 2.009 | 0.616 | 0.141 |
| 6 | C2 | 4.789 | 1.093 | 0.335 | 0.077 |
| 7 | C3 | 16.924 | 3.864 | 1.185 | 0.270 |
| 8 | i-C4 | 6.323 | 1.444 | 0.443 | 0.101 |
| 9 | n-C4 | 17.039 | 3.890 | 1.193 | 0.272 |
| 10 | i-C5 | 6.053 | 1.382 | 0.424 | 0.097 |
| 11 | n-C5 | 6.304 | 1.439 | 0.441 | 0.101 |
| 12 | C6 | 2.520 | 0.575 | 0.176 | 0.040 |
| 13 | C7 | 2.089 | 0.477 | 0.146 | 0.033 |
| 14 | C8 | 0.148 | 0.034 | 0.010 | 0.002 |
| 15 | C9 | 0.100 | 0.023 | 0.007 | 0.002 |
| 16 | C10+ | 0.032 | 0.007 | 0.002 | 0.001 |
| 17 | Benzene | 0.036 | 0.008 | 0.003 | 0.001 |
| 18 | Toluene | 0.066 | 0.015 | 0.005 | 0.001 |
| 19 | E-Benzene | 0.003 | 0.001 | 0.000 | 0.000 |
| 20 | Xylenes | 0.033 | 0.008 | 0.002 | 0.001 |
| 21 | n-C6 | 2.011 | 0.459 | 0.141 | 0.032 |
| 22 | 2,2,4-Trimethyl p | 1.374 | 0.314 | 0.096 | 0.022 |
| | Total | 74.775 | 17.072 | 5.234 | 1.195 |

| No. | Component | MW | LP Oil | Flash Oil | Sale Oil | Flash Gas | W&S Gas |
|-------|-----------|----|--------|-----------|----------|-----------|---------|
| Total | Emissions | | mol % | mol % | mol % | mol % | mol % |

2015-0818_PEN-15_Produced Fluid Tanks. txt

| | | | | | | |
|----------------------|-----------|---------|---------|---------|---------|---------|
| 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 | 0.0180 | 0.0036 | 0.0000 | 0.1957 | 0.1037 |
| 0.1683 | | | | | | |
| 4 N2 | 28.01 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 0.0000 | | | | | | |
| 5 C1 | 16.04 | 3.3360 | 0.2539 | 0.0000 | 41.3358 | 7.2693 |
| 31.1964 | | | | | | |
| 6 C2 | 30.07 | 0.9730 | 0.3338 | 0.0053 | 8.9045 | 9.4110 |
| 9.0553 | | | | | | |
| 7 C3 | 44.10 | 3.3090 | 2.2911 | 1.1089 | 16.2573 | 34.9590 |
| 21.8236 | | | | | | |
| 8 i-C4 | 58.12 | 2.1840 | 1.9617 | 1.7311 | 5.2757 | 8.3348 |
| 6.1862 | | | | | | |
| 9 n-C4 | 58.12 | 8.2860 | 7.8859 | 7.3945 | 14.6371 | 21.4660 |
| 16.6696 | | | | | | |
| 10 i-C5 | 72.15 | 5.9510 | 6.1746 | 6.1864 | 4.3130 | 5.8490 |
| 4.7702 | | | | | | |
| 11 n-C5 | 72.15 | 8.3650 | 8.8091 | 8.9071 | 4.4880 | 6.1016 |
| 4.9683 | | | | | | |
| 12 C6 | 86.16 | 7.9030 | 8.5458 | 8.7784 | 1.5314 | 2.1176 |
| 1.7059 | | | | | | |
| 13 C7 | 100.20 | 17.1930 | 18.7768 | 19.3999 | 1.0818 | 1.5612 |
| 1.2245 | | | | | | |
| 14 C8 | 114.23 | 3.4250 | 3.7529 | 3.8850 | 0.0658 | 0.1001 |
| 0.0760 | | | | | | |
| 15 C9 | 128.28 | 5.9770 | 6.5554 | 6.7903 | 0.0384 | 0.0651 |
| 0.0464 | | | | | | |
| 16 C10+ | 156.48 | 9.0440 | 9.9233 | 10.2818 | 0.0096 | 0.0171 |
| 0.0118 | | | | | | |
| 17 Benzene | 78.11 | 0.1670 | 0.1813 | 0.1867 | 0.0236 | 0.0331 |
| 0.0265 | | | | | | |
| 18 Toluene | 92.13 | 0.9290 | 1.0165 | 1.0513 | 0.0358 | 0.0528 |
| 0.0408 | | | | | | |
| 19 E-Benzene | 106.17 | 0.1160 | 0.1272 | 0.1317 | 0.0014 | 0.0022 |
| 0.0017 | | | | | | |
| 20 Xylenes | 106.17 | 1.4150 | 1.5515 | 1.6067 | 0.0150 | 0.0235 |
| 0.0175 | | | | | | |
| 21 n-C6 | 86.18 | 7.8940 | 8.5644 | 8.8143 | 1.1857 | 1.6603 |
| 1.3269 | | | | | | |
| 22 2,2,4-Trimethyl p | 114.24 | 12.1580 | 13.2913 | 13.7407 | 0.6043 | 0.8725 |
| 0.6842 | | | | | | |
| MW | | 91.84 | 96.21 | 97.83 | 38.74 | 51.44 |
| 42.52 | | | | | | |
| Stream Mole Ratio | | 1.0000 | 0.9239 | 0.8916 | 0.0761 | 0.0323 |
| 0.1084 | | | | | | |
| Heating Value | [BTU/SCF] | | | | 2217.35 | 2898.76 |
| 2420.16 | | | | | | |
| Gas Gravity | [Gas/Air] | | | | 1.34 | 1.78 |
| 1.47 | | | | | | |
| Bubble Pt. @ 100F | [psi a] | 116.98 | 22.57 | 11.29 | | |
| RVP @ 100F | [psi a] | 36.70 | 15.08 | 10.57 | | |

Page 2-----E&P TANK

Spec. Gravity @ 100F 0.661 0.668 0.671

2015-0818_PEN-15_Sand Separator Tank.txt

* Project Setup Information

*

Project File : \\tsclient\Z\Client\EQT Corporation\West Virginia\WV
Production Wells\153901.0056 WV Wellpads 2015\PEN 15\2015-0818_EQT_PEN15_G70
Mod\Attach I - Emission Calcs\E&P Tank\2015-0818_PEN-15_Sand Separator Tank.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 : PEN-15 Wellpad
Well Name : Sand Separator Tank
Date : 2015.08.14

* Data Input

*

Separator Pressure : 595.00[psi g]
Separator Temperature : 60.00[F]
Ambient Pressure : 14.70[psi a]
Ambient Temperature : 70.00[F]
C10+ SG : 0.7550
C10+ MW : 156.475

-- Low Pressure Oil

| No. | Component | mol % |
|-----|-------------------|---------|
| 1 | H2S | 0.0000 |
| 2 | O2 | 0.0000 |
| 3 | CO2 | 0.0180 |
| 4 | N2 | 0.0000 |
| 5 | C1 | 3.3360 |
| 6 | C2 | 0.9730 |
| 7 | C3 | 3.3090 |
| 8 | i-C4 | 2.1840 |
| 9 | n-C4 | 8.2860 |
| 10 | i-C5 | 5.9510 |
| 11 | n-C5 | 8.3650 |
| 12 | C6 | 7.9030 |
| 13 | C7 | 17.1930 |
| 14 | C8 | 3.4250 |
| 15 | C9 | 5.9770 |
| 16 | C10+ | 9.0440 |
| 17 | Benzene | 0.1670 |
| 18 | Toluene | 0.9290 |
| 19 | E-Benzene | 0.1160 |
| 20 | Xylenes | 1.4150 |
| 21 | n-C6 | 7.8940 |
| 22 | 2,2,4-Trimethyl p | 12.1580 |

-- Sales Oil

2015-0818_PEN-15_Sand Separator Tank.txt

Production Rate : 0.1 [bbl /day]
 Days of Annual Operation : 365 [days/year]
 API Gravity : 59.11
 Reid Vapor Pressure : 10.60 [psi a]

* 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 |
| Page 1 | ----- E&P TANK | | | |
| Total HC | 0.240 | 0.055 | 0.240 | 0.055 |
| VOCs, C2+ | 0.212 | 0.048 | 0.212 | 0.048 |
| VOCs, C3+ | 0.196 | 0.045 | 0.196 | 0.045 |

Uncontrolled Recovery Info.

| | | |
|----------|---------------|-----------|
| Vapor | 11.7400 x1E-3 | [MSCFD] |
| HC Vapor | 11.7200 x1E-3 | [MSCFD] |
| GOR | 117.40 | [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 | 0.000 | 0.000 | 0.000 | 0.000 |
| 4 | N2 | 0.000 | 0.000 | 0.000 | 0.000 |
| 5 | C1 | 0.028 | 0.006 | 0.028 | 0.006 |
| 6 | C2 | 0.015 | 0.003 | 0.015 | 0.003 |
| 7 | C3 | 0.054 | 0.012 | 0.054 | 0.012 |
| 8 | i-C4 | 0.020 | 0.005 | 0.020 | 0.005 |
| 9 | n-C4 | 0.055 | 0.013 | 0.055 | 0.013 |
| 10 | i-C5 | 0.019 | 0.004 | 0.019 | 0.004 |
| 11 | n-C5 | 0.020 | 0.005 | 0.020 | 0.005 |
| 12 | C6 | 0.008 | 0.002 | 0.008 | 0.002 |
| 13 | C7 | 0.007 | 0.002 | 0.007 | 0.002 |
| 14 | C8 | 0.000 | 0.000 | 0.000 | 0.000 |
| 15 | C9 | 0.000 | 0.000 | 0.000 | 0.000 |
| 16 | C10+ | 0.000 | 0.000 | 0.000 | 0.000 |
| 17 | Benzene | 0.000 | 0.000 | 0.000 | 0.000 |
| 18 | Toluene | 0.000 | 0.000 | 0.000 | 0.000 |
| 19 | E-Benzene | 0.000 | 0.000 | 0.000 | 0.000 |
| 20 | Xylenes | 0.000 | 0.000 | 0.000 | 0.000 |
| 21 | n-C6 | 0.006 | 0.001 | 0.006 | 0.001 |
| 22 | 2,2,4-Tri methyl p | 0.004 | 0.001 | 0.004 | 0.001 |
| | Total | 0.236 | 0.054 | 0.236 | 0.054 |

-- Stream Data

| No. | Component | MW | LP Oil | Flash Oil | Sale Oil | Flash Gas | W&S Gas |
|-------|-----------|----|--------|-----------|----------|-----------|---------|
| Total | Emissions | | | | | | |
| | | | mol % | mol % | mol % | mol % | mol % |

2015-0818_PEN-15_Sand Separator Tank.txt

| | | | | | | |
|----------------------|--------|---------|---------|---------|---------|---------|
| 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 | 0.0180 | 0.0036 | 0.0000 | 0.1957 | 0.1037 |
| 0.1683 | | | | | | |
| 4 N2 | 28.01 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 0.0000 | | | | | | |
| 5 C1 | 16.04 | 3.3360 | 0.2539 | 0.0000 | 41.3358 | 7.2693 |
| 31.1964 | | | | | | |
| 6 C2 | 30.07 | 0.9730 | 0.3338 | 0.0053 | 8.9045 | 9.4110 |
| 9.0553 | | | | | | |
| 7 C3 | 44.10 | 3.3090 | 2.2911 | 1.1089 | 16.2573 | 34.9590 |
| 21.8236 | | | | | | |
| 8 i-C4 | 58.12 | 2.1840 | 1.9617 | 1.7311 | 5.2757 | 8.3348 |
| 6.1862 | | | | | | |
| 9 n-C4 | 58.12 | 8.2860 | 7.8859 | 7.3945 | 14.6371 | 21.4660 |
| 16.6696 | | | | | | |
| 10 i-C5 | 72.15 | 5.9510 | 6.1746 | 6.1864 | 4.3130 | 5.8490 |
| 4.7702 | | | | | | |
| 11 n-C5 | 72.15 | 8.3650 | 8.8091 | 8.9071 | 4.4880 | 6.1016 |
| 4.9683 | | | | | | |
| 12 C6 | 86.16 | 7.9030 | 8.5458 | 8.7784 | 1.5314 | 2.1176 |
| 1.7059 | | | | | | |
| 13 C7 | 100.20 | 17.1930 | 18.7768 | 19.3999 | 1.0818 | 1.5612 |
| 1.2245 | | | | | | |
| 14 C8 | 114.23 | 3.4250 | 3.7529 | 3.8850 | 0.0658 | 0.1001 |
| 0.0760 | | | | | | |
| 15 C9 | 128.28 | 5.9770 | 6.5554 | 6.7903 | 0.0384 | 0.0651 |
| 0.0464 | | | | | | |
| 16 C10+ | 156.48 | 9.0440 | 9.9233 | 10.2818 | 0.0096 | 0.0171 |
| 0.0118 | | | | | | |
| 17 Benzene | 78.11 | 0.1670 | 0.1813 | 0.1867 | 0.0236 | 0.0331 |
| 0.0265 | | | | | | |
| 18 Toluene | 92.13 | 0.9290 | 1.0165 | 1.0513 | 0.0358 | 0.0528 |
| 0.0408 | | | | | | |
| 19 E-Benzene | 106.17 | 0.1160 | 0.1272 | 0.1317 | 0.0014 | 0.0022 |
| 0.0017 | | | | | | |
| 20 Xylenes | 106.17 | 1.4150 | 1.5515 | 1.6067 | 0.0150 | 0.0235 |
| 0.0175 | | | | | | |
| 21 n-C6 | 86.18 | 7.8940 | 8.5644 | 8.8143 | 1.1857 | 1.6603 |
| 1.3269 | | | | | | |
| 22 2,2,4-Trimethyl p | 114.24 | 12.1580 | 13.2913 | 13.7407 | 0.6043 | 0.8725 |
| 0.6842 | | | | | | |

| | | | | | | |
|-------------------|-----------|--------|--------|--------|---------|---------|
| MW | | 91.84 | 96.21 | 97.83 | 38.74 | 51.44 |
| 42.52 | | | | | | |
| Stream Mole Ratio | | 1.0000 | 0.9239 | 0.8916 | 0.0761 | 0.0323 |
| 0.1084 | | | | | | |
| Heating Value | [BTU/SCF] | | | | 2217.35 | 2898.76 |
| 2420.16 | | | | | | |
| Gas Gravity | [Gas/Air] | | | | 1.34 | 1.78 |
| 1.47 | | | | | | |
| Bubble Pt. @ 100F | [psi a] | 116.98 | 22.57 | 11.29 | | |
| | | | | | | |
| RVP @ 100F | [psi a] | 36.70 | 15.08 | 10.57 | | |

Page 2-----E&P TANK

Spec. Gravity @ 100F 0.661 0.668 0.671

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

Identification

| | |
|----------------------|---|
| User Identification: | PEN 15 |
| City: | |
| State: | |
| Company: | |
| Type of Tank: | Vertical Fixed Roof Tank |
| Description: | Liquid Loading parameters for PEN 15 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: | 1,105.71 |
| Net Throughput(gal/yr): | 18,576,000.00 |
| 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 |

Meteorological 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**

PEN 15 - Vertical Fixed Roof Tank

| Mixture/Component | Month | Daily Liquid Surf. Temperature (deg F) | | | Liquid Bulk Temp (deg F) | Vapor Pressure (psia) | | | Vapor Mol. Weight | Liquid Mass Fract. | Vapor Mass Fract. | Mol. Weight | Basis for Vapor Pressure Calculations |
|-------------------|-------|---|-------|-------|-----------------------------------|-----------------------|---------|----------|-------------------------|--------------------------|-------------------------|----------------|--|
| | | Avg. | Min. | Max. | | Avg. | Min. | Max. | | | | | |
| Produced Fluid | All | 55.41 | 46.54 | 64.27 | 51.30 | 0.4707 | 0.3828 | 0.5780 | 32.4499 | | | 18.45 | |
| Benzene | | | | | | 1.0267 | 0.7943 | 1.3132 | 78.1100 | 0.0000 | 0.0000 | 78.11 | Option 2: A=6.905, B=1211.033, C=220.79 |
| Butane (-n) | | | | | | 0.4614 | 0.3889 | 0.5438 | 58.1200 | 0.0012 | 0.0007 | 58.12 | Option 2: A=5.09536, B=935.86, C=238.73 |
| Decane (-n) | | | | | | 0.0301 | 0.0245 | 0.0369 | 142.2900 | 0.0144 | 0.0005 | 142.29 | Option 1: VP50 = .026411 VP60 = .033211 |
| Heptane (-n) | | | | | | 0.5323 | 0.4043 | 0.6943 | 100.2000 | 0.0025 | 0.0016 | 100.20 | Option 3: A=37358, B=8.2585 |
| Hexane (-n) | | | | | | 1.6957 | 1.3330 | 2.1360 | 86.1700 | 0.0013 | 0.0027 | 86.17 | Option 2: A=6.876, B=1171.17, C=224.41 |
| Isopentane | | | | | | 9.0329 | 7.1932 | 11.0836 | 72.1500 | 0.0004 | 0.0048 | 72.15 | Option 1: VP50 = 7.889 VP60 = 10.005 |
| methane | | | | | | 100.7917 | 87.8791 | 115.0985 | 44.0956 | 0.0026 | 0.3215 | 44.10 | Option 2: A=7.3408624923, B=1104.2267744, C=291.70993941 |
| Nonane (-n) | | | | | | 0.0588 | 0.0475 | 0.0729 | 128.2600 | 0.0016 | 0.0001 | 128.26 | Option 1: VP50 = .051285 VP60 = .065278 |
| Octane (-n) | | | | | | 0.1303 | 0.1035 | 0.1637 | 114.2300 | 0.0014 | 0.0002 | 114.23 | Option 1: VP50 = .112388 VP60 = .145444 |
| Pentane (-n) | | | | | | 6.1673 | 5.0301 | 7.5097 | 72.1500 | 0.0005 | 0.0039 | 72.15 | Option 3: A=27691, B=7.558 |
| Propane (-n) | | | | | | 100.7917 | 87.8791 | 115.0985 | 44.0956 | 0.0034 | 0.4116 | 44.10 | Option 2: A=7.340862493, B=1104.2267744, C=291.70993941 |
| Toluene | | | | | | 0.2857 | 0.2141 | 0.3766 | 92.1300 | 0.0001 | 0.0000 | 92.13 | Option 2: A=6.954, B=1344.8, C=219.48 |
| Water | | | | | | 0.2153 | 0.1602 | 0.2863 | 18.0150 | 0.9700 | 0.2523 | 18.02 | Option 1: VP50 = .178 VP60 = .247 |
| Xylene (-o) | | | | | | 0.0601 | 0.0431 | 0.0827 | 106.1700 | 0.0005 | 0.0000 | 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)

PEN 15 - Vertical Fixed Roof Tank

| | |
|--|-----------------|
| Annual Emission Calculations | |
| Standing Losses (lb): | 26.0386 |
| Vapor Space Volume (cu ft): | 1,130.9734 |
| Vapor Density (lb/cu ft): | 0.0028 |
| Vapor Space Expansion Factor: | 0.0285 |
| Vented Vapor Saturation Factor: | 0.8003 |
| 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): | 0.0028 |
| Vapor Molecular Weight (lb/lb-mole): | 32.4499 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.4707 |
| 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: | 0.0285 |
| Daily Vapor Temperature Range (deg. R): | 35.4636 |
| Daily Vapor Pressure Range (psia): | 0.1952 |
| Breather Vent Press. Setting Range (psia): | 0.7300 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.4707 |
| Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia): | 0.3828 |
| Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia): | 0.5780 |
| 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: | 0.8003 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.4707 |
| Vapor Space Outage (ft): | 10.0000 |
| Working Losses (lb): | |
| Vapor Molecular Weight (lb/lb-mole): | 1,309.3202 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 32.4499 |
| Annual Net Throughput (gal/yr.): | 0.4707 |
| Annual Turnovers: | 18,576,000.0000 |
| Turnover Factor: | 1,105.7143 |
| Maximum Liquid Volume (gal): | 0.1938 |
| Maximum Liquid Height (ft): | 16,800.0000 |
| Tank Diameter (ft): | 20.0000 |
| Working Loss Product Factor: | 12.0000 |
| Working Loss Product Factor: | 1.0000 |
| Total Losses (lb): | |
| Total Losses (lb): | 1,335.3588 |

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

Emissions Report for: Annual

PEN 15 - Vertical Fixed Roof Tank

| Components | Losses(lbs) | | |
|----------------|--------------|----------------|-----------------|
| | Working Loss | Breathing Loss | Total Emissions |
| Produced Fluid | 1,309.32 | 26.04 | 1,335.36 |
| Propane (-n) | 538.88 | 10.72 | 549.60 |
| Butane (-n) | 0.86 | 0.02 | 0.88 |
| Isopentane | 6.29 | 0.13 | 6.41 |
| Pentane (-n) | 5.17 | 0.10 | 5.27 |
| Hexane (-n) | 3.49 | 0.07 | 3.56 |
| Benzene | 0.03 | 0.00 | 0.03 |
| Heptane (-n) | 2.14 | 0.04 | 2.18 |
| Toluene | 0.04 | 0.00 | 0.04 |
| Octane (-n) | 0.29 | 0.01 | 0.30 |
| Xylene (-o) | 0.04 | 0.00 | 0.04 |
| Nonane (-n) | 0.15 | 0.00 | 0.15 |
| Decane (-n) | 0.68 | 0.01 | 0.70 |
| Water | 330.36 | 6.57 | 336.93 |
| methane | 420.90 | 8.37 | 429.27 |

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 modification to Class II General Permit G70-A044 for an existing natural gas production wellpad (PEN-15). The facility is located along Pullman Drive (State Rt. 74) in Ritchie County, West Virginia approximately 1.8 miles southeast of Pennsboro, WV at 39.26205°, -80.95179°.

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

| Pollutant | Emissions (tons per year) |
|--|--------------------------------------|
| NO _x | 15.76 |
| CO | 13.24 |
| VOC | 36.73 |
| SO ₂ | 0.09 |
| PM | 7.84 |
| Total HAPs | 2.38 |
| Carbon Dioxide Equivalents (CO ₂ e) | 19,458 |

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

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this XX day of August, 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 (Speciate VOCs & HAPS) | Maximum Potential Uncontrolled Emissions ³ | | Maximum Potential Controlled Emissions ⁴ | | Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor) | Est. Method Used ⁵ |
|---|----------------------------------|---|--------------------------------|------------------------------|--------------------|---|---|--|---|--|--|-------------------------------|
| | | ID No. | Source | ID No. | Device Type | | lb/hr | ton/yr | lb/hr | ton/yr | | |
| C001 – C004 (Total-All Tanks) | Upward vertical stack | S001 – S006, S013 – S018 | Produced Fluid Storage Tanks | C001 – C004 | Enclosed Combustor | VOC HAPs | 167.28 9.65 | 732.67 42.24 | 11.71 0.67 | 51.29 2.95 | Gas/Vapor | E&P Tank v2.0 |
| E007 – E011, E019 – E023 (Total – All units) | Upward vertical stack | S007 – S011, S019 – S023 | Line Heaters | None | --- | NO _x CO PM/PM ₁₀ /PM _{2.5} SO ₂ VOC CO _{2e} HAPs | 1.47 1.23 0.11 <0.01 0.08 1.804 0.03 | 6.42 5.40 0.49 0.04 0.35 7,900 0.12 | 1.47 1.23 0.11 <0.01 0.08 1,804 0.03 | 6.42 5.40 0.49 0.04 0.35 7,900 0.12 | Gas/Vapor | AP-42 |
| E012, E024 – E025 (Total – All units) | Upward vertical stack | S012, S024 – S025 | Thermoelectric Generators | None | --- | NO _x CO PM/PM ₁₀ /PM _{2.5} SO ₂ VOC CO _{2e} HAPs | <0.01 <0.01 <0.01 <0.01 <0.01 5 <0.01 | 0.02 0.01 <0.01 <0.01 <0.01 20 <0.01 | <0.01 <0.01 <0.01 <0.01 <0.01 5 <0.01 | 0.02 0.01 <0.01 <0.01 <0.01 20 <0.01 | Gas/Vapor | AP-42 |
| E026 – E027 (Total – All Units) | Upward vertical stack | S026 – E027 | Sand Separator Tank | None | --- | VOC HAPs | 0.09 <0.01 | 0.39 0.02 | 0.09 <0.01 | 0.39 0.02 | Gas/Vapor | E&P Tank v2.0 |
| C001 – C004 (Controlled captured) | Upward vertical stack | S028 | Liquid Loading | C001 – C004 | Enclosed Combustor | VOC HAPs | 1.41 0.03 | 6.16 0.14 | 0.02 <0.01 | 0.09 <0.01 | Gas/Vapor | AP-42 |
| E026 (Uncaptured) | Fugitive | S028 | Liquid Loading | None | --- | VOC HAPs | 1.41 0.03 | 6.16 0.14 | 0.42 0.01 | 1.85 0.04 | Gas/Vapor | AP-42 |
| C001 – C002 (Total – All units) | Upward vertical stack | C001 – C002 | Combustors (11.66 MMBtu/hr) | NA | --- | NO _x COPM/PM ₁₀ /PM _{2.5} VOC SO ₂ CO _{2e} | 2.24 1.88 0.17 <0.01 0.01 2,749 | 9.79 8.22 0.74 <0.01 0.06 12,040 | 2.24 1.88 0.17 <0.01 0.01 2,749 | 9.79 8.22 0.74 <0.01 0.06 12,040 | Gas/Vapor | AP-42 |
| C003 – C004 (Total – All units) | Upward vertical stack | C003 – C004 | Combustors (18.75 MMBtu/hr) | NA | --- | NO _x CO PM/PM ₁₀ /PM _{2.5} SO ₂ CO _{2e} | 3.59 3.01 0.27 <0.01 0.02 4,409 | 15.71 13.19 1.19 <0.01 0.09 19,314 | 3.59 3.01 0.27 <0.01 0.02 4,409 | 15.71 13.19 1.19 <0.01 0.09 19,314 | 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, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. **DO NOT LIST** H₂, H₂O, N₂, O₂, 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).