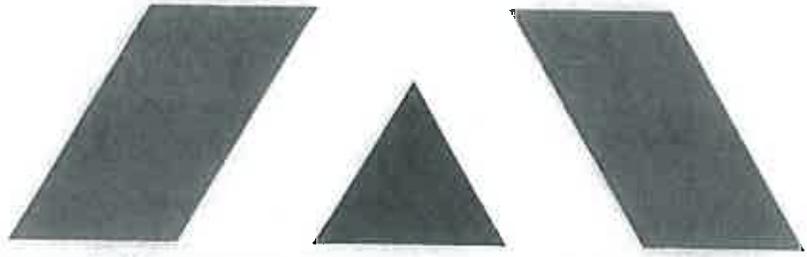
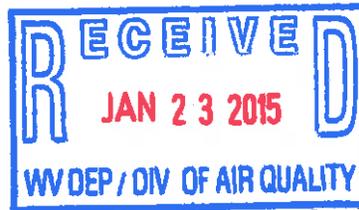


Roy
G70-A142
017-00055



PROJECT REPORT

**EQT Production
SMI-28 Pad**



G70-A Permit Application



Where energy meets innovation.

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

January 2015



Environmental solutions delivered uncommonly well

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1. INTRODUCTION

EQT Production Company (EQT) is submitting this Class II General Permit application (G-70A) to the West Virginia Department of Environmental Protection (WVDEP) for the SMI-28 facility, a natural gas production well pad, located in Doddridge County, West Virginia.

1.1. FACILITY AND PROJECT DESCRIPTION

The SMI-28 Pad is an existing natural gas production facility consisting of eleven natural gas wells. SMI-28 is currently permitted and operating under West Virginia permit R13-3064A. Natural gas and liquids (including water and condensate) are extracted from deposits underneath the surface. Natural gas is transported from the well to a gas line for additional processing and compression, as necessary. The liquids produced are stored in storage vessels.

This application seeks to authorize installation and operation of the following additional equipment at the SMI-28 Pad:

- > Two (2) natural gas wells;
- > Two (2) 400 barrel (bbl) storage tanks for produced fluids, controlled by one of two (2) existing combustors (rated at 11.66 MMBtu/hr, each);
- > One (1) 140 bbl sand separator tank for produced water and sand, which may be controlled by one of two (2) existing combustors (rated at 11.66 MMBtu/hr, each); control is optional and no credit is included in emissions calculations.
- > Two (2) line heaters, rated at 1.54 MMBtu/hr (heat input).
- > Three (3) thermoelectric generators (TEG), rated at 0.07 MMBtu/hr (heat input, each).

The following equipment is already permitted and installed at the SMI-28 Pad:

- > Eleven (11) natural gas wells;
- > Twelve (12) 400 barrel (bbl) storage tanks for produced fluids, controlled by two (2) existing combustors (rated at 11.66 MMBtu/hr, each);
- > Eleven (11) line heaters, rated at 1.54 MMBtu/hr (heat input, each), and
- > Two (2) thermoelectric generators (TEG), rated at 0.03 MMBtu/hr (heat input, each).

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 SMI-28 Pad for air permitting purposes if, and only if, all three elements of the "stationary source" definition above are fulfilled.

There are no Marcellus facilities within a one-mile radius of the SMI-28 Pad. The nearest EQT Marcellus wellpad is located approximately 1.4 miles southeast (WEU-51 pad). Therefore, the SMI-28 Pad should be considered a separate stationary source with respect to permitting programs, including Title V and Prevention of Significant Deterioration (PSD). As discussed in this application, the facility is a minor source of air emissions with respect to New Source Review (NSR) and Title V permitting.

1.3. G70-A APPLICATION ORGANIZATION

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

- > Section 2: Sample Emission Source Calculations;
- > Section 3: Regulatory Discussion;
- > Section 4: G70-A Application Forms;
- > Attachment A: Current Business Certificate;
- > Attachment B: Process Description;
- > Attachment C: Description of Fugitive Emissions;
- > Attachment D: Process Flow Diagram;
- > Attachment E: Plot Plan;
- > Attachment F: Area Map;
- > Attachment G: Emission Unit Data Sheets and G70-A Section Applicability Form;
- > Attachment H: Air Pollution Control Device Sheets;
- > Attachment I: Emission Calculations;
- > Attachment J: Class I Legal Advertisement;
- > Attachment K: Electronic Submittal (*not applicable*);
- > Attachment L: General Permit Registration Application Fee;
- > 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 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 the project will primarily result from natural gas combustion in the line heaters and thermoelectric generators, as well as emissions from the produced fluid storage tanks (which are controlled by combustors). The methods by which emissions from each of these source types, as well as the existing source types, are calculated are summarized below.

- > **Line Heaters and Thermoelectric Generators:** Potential emissions of all criteria pollutants and HAPs are calculated using U.S. EPA's AP-42 factors for natural gas combustion equipment.¹ These calculations assume a site-specific heat content of natural gas. Greenhouse gas (GHG) emissions are calculated according to 40 CFR 98 Subpart C.² Please note that potential emissions of NO_x, CO, PM, SO₂ and GHGs from the combustors are also calculated according to the aforementioned methodologies.
- > **Fugitive Equipment Leaks:** Emissions of VOC and HAPs from leaking equipment components have been estimated using facility estimated component counts and types along with *Table 2-4: Oil & Gas Production Operations Average Emission Factors, Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995*. Emission factors used are based on average measured TOC from component types indicated in gas service at O&G Production Operations. Greenhouse gas emissions from component leaks are calculated according to the procedures in 40 CFR 98 Subpart W.³
- > **Storage Tanks:** Working, breathing and flashing emissions of VOC and HAPs from the produced fluids stored in the tanks at the facility are calculated using API E&P TANK v2.0.
- > **Tank Truck Loading:** Emissions of VOC and HAPs from the loading of organic liquids from storage tanks to tank truck are calculated using U.S. EPA's AP-42 Chapter 5 Section 2 factors.⁴
- > **Haul Roads:** Fugitive dust emitted from facility roadways has been estimated using projected vehicle miles traveled along with U.S. EPA's AP-42 factors for unpaved haul roads.⁵

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

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

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

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

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

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, 100,000 tpy of greenhouse gas pollutants (on a carbon dioxide equivalent [CO₂e] basis), and 100 tpy of all other regulated pollutants.⁶ The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility after the proposed project. Therefore, the wellpad is not a major source for Title V purposes.

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

3.3. NEW SOURCE PERFORMANCE STANDARDS

New Source Performance Standards (NSPS), located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the wellpad.

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 have a capacity of 19,813 gallons or less. As such, Subparts K, Ka, and Kb do not apply to the storage tanks at the wellpad.

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

Subpart OOOO – *Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution*, applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011. This NSPS was published in the Federal Register on August 16, 2012, and amended in the Federal Register on September 23, 2013⁷. 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) existing produced fluid storage vessels at the wellpad. As part of this project, EQT is proposing to install two (2) additional produced fluid storage vessel and one (1) new sand separator storage vessel. The storage vessels at the facility will each have potential VOC emissions less than 6 tpy based on the permit application materials

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

and enforceable limits to be included in the G-70A permit. Note that the uncontrolled VOC emissions from the sand separator tank are less than 6 tpy. 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 0000. 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 0000.

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 JJJJJ – Industrial, Commercial, and Institutional Boilers

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

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

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

3.4.2. 40 CFR 63 Subpart JJJJJ - Industrial, Commercial, and Institutional Boilers

This MACT standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types at area sources. The heaters at the wellpad are natural gas-fired and are specifically exempt from this subpart. Therefore, no sources at the wellpad are subject to any requirements under 40 CFR 63 Subpart JJJJJ.

3.5. WEST VIRGINIA SIP REGULATIONS

The wellpad is potentially subject to regulations contained in the West Virginia Code of State Regulations, Chapter 45 (Code of State Regulations). The Code of State Regulations fall under two main categories, those regulations that are generally applicable (e.g., permitting requirements), and those that have specific applicability (e.g., PM standards for manufacturing equipment).

3.5.1. 45 CSR 2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

45 CSR 2 applies to fuel burning units, defined as equipment burning fuel “for the primary purpose of producing heat or power by indirect heat transfer”. The TEGs and line heaters are fuel burning units and therefore must comply with this regulation. Per 45 CSR 2-3, opacity of emissions from units shall not exceed 10 percent. Per 45 CSR 2-4, PM emissions from units will not exceed a level of 0.09 multiplied by the heat design input in MMBtu/hr of the unit.

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

According to 45 CSR 4-3:

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

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

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

45 CSR 6 applies to activities involving incineration of refuse, defined as “the destruction of combustible refuse by burning in a furnace designed for that purpose. For the purposes of this rule, the destruction of any combustible liquid or gaseous material by burning in a flare or flare stack, thermal oxidizer or thermal catalytic oxidizer stack shall be considered incineration.” The enclosed combustors are incinerators and therefore must comply with this regulation. Per 45 CSR 6-4.3, opacity of emissions from units shall not exceed 20 percent, except as provided by 4.4. PM emissions from 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 any such emissions occur.

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

45 CSR 34-1 incorporates the federal Clean Air Act (CAA) national emissions standards for hazardous air pollutants (NESHAPs) as set forth in 40 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.

3.5.7. Non-Applicability of Other SIP Rules

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

4. G70-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"/> G40-C – Nonmetallic Minerals Processing |
| <input type="checkbox"/> G20-B – Hot Mix Asphalt | <input type="checkbox"/> G50-B – Concrete Batch |
| <input type="checkbox"/> G30-D – Natural Gas Compressor Stations | <input type="checkbox"/> G60-C – Class II Emergency Generator |
| <input type="checkbox"/> G33-A – Spark Ignition Internal Combustion Engines | <input type="checkbox"/> G65-C – Class I Emergency Generator |
| <input type="checkbox"/> G35-A – Natural Gas Compressor Stations (Flare/Glycol Dehydration Unit) | <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: _____ _____	
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 wellpad	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): 017 - 00055	10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only): R13-3064A		

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site: SMI-28 Wellpad	12A. Address of primary operating site: Mailing: _____ Physical: _____ _____	
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. Get on I-64W/I-77N from Maccorkle Ave SE and travel 2.5 miles. Follow I-77N for ~78 miles and take exit 176 to get on US-50E. Follow US-50E for 43.2 miles to reach Maxwell Ridge in Doddridge County. Turn right onto WV-18S and travel 1.9 miles. Turn right onto Maxwell Ridge, the facility will be on your left after ~0.7 miles.		
15A. Nearest city or town: New Milton	16A. County: Doddridge	17A. UTM Coordinates: Northing (KM): 4345 954 Easting (KM): 522 599 Zone: 17
18A. Briefly describe the proposed new operation or change (s) to the facility: Installation of two (2) new wells and associated support equipment at the existing SMI-28 pad.		19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: 39 26262 Longitude: -80 73805

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

11B. Name of 1 st alternate operating site: NA	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): - NA

11C. Name of 2 nd alternate operating site: NA	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? YES NO

— IF YES, please explain: _____

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

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

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

15C. Nearest city or town:	16C. County:	17C. UTM Coordinates: Northing (KM): _____ Easting (KM): _____ Zone: _____
----------------------------	--------------	---

18C. Briefly describe the proposed new operation or change (s) to the facility:	19C. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: _____ Longitude: _____
---	--

20. Provide the date of anticipated installation or change: ____/____/____ <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: ____/____/____
---	--

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 _____ Days per week _____ Weeks per year _____ Percentage of operation _____

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 (*not applicable*)
- 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 _____ Kenneth Kirk – Executive Vice President
(please print or type)

Signature _____
(please use blue ink) Authorized Representative (if applicable) Date 1/21/15

Applicant's Name _____ Mark A. Sowa – Sr. Environmental Coordinator

Phone & Fax _____ 412-395-3654 412-395-7027
Phone Fax

Email _____ msowa@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 natural gas wells and support facilities associated with a natural gas wellpad operation.

The SMI-28 wellpad currently consists of eleven (11) wells, each with the same basic operation. The project proposes to construct and operate two (2) additional wells. The incoming gas stream from the underground wells will pass through a sand separator, where sand, water and residual solids are displaced and transferred to the sand separator tank. The gas then flows into a two phase separator which separates water and condensate from the gas stream. The water and condensate from the separators is transferred to storage vessels, while sand is transferred to a sand separator tank. Emissions from the produced fluid storage vessels are controlled by two (2) enclosed combustors. Once the tanks (sand separator and produced fluid) are filled, the contents are loaded into trucks for transport. The loading operations are vapor balanced, and the recovered vapors are routed to the 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	NA					
Unpaved Haul Roads	PM	4.69	20.55	4.69	20.55	O ^A
	PM ₁₀	1.20	5.24	1.20	5.24	
	PM _{2.5}	0.12	0.52	0.12	0.52	
Loading/Unloading Operations	VOC	0.92	4.04	0.29	1.27	O ^B
	HAP	0.02	0.09	0.01	0.03	
Equipment Leaks	VOC	Does not apply	20.86	Does not apply	20.86	O ^C
	CO _{2e} HAP		1,480 0.81		1,480 0.81	
Blowdown Emissions	NA					
Other	NA					

^A AP-42, Section 13.2.2.

^B AP-42 Section 5.2

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

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

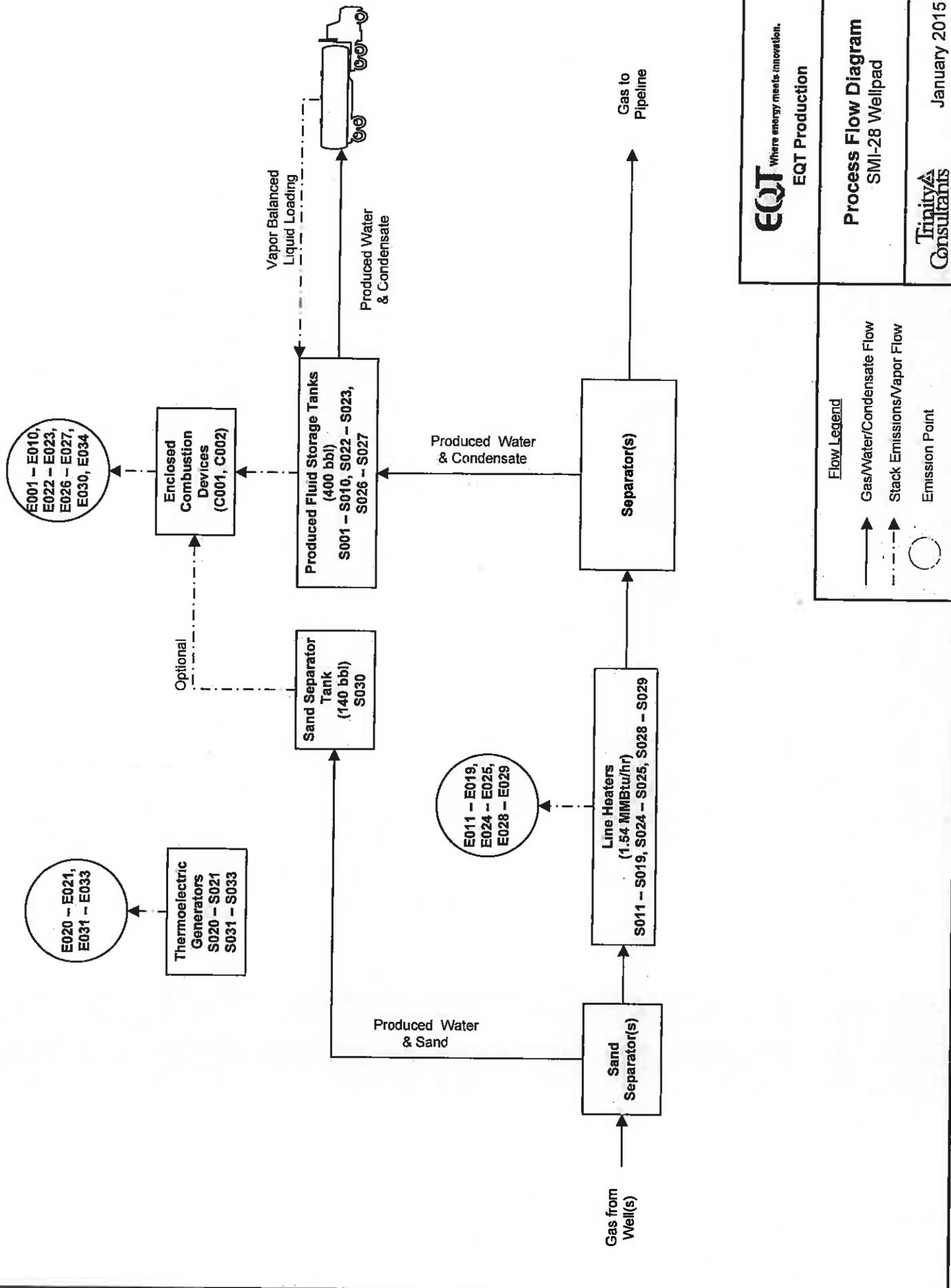
LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components ¹	Number of Components Monitored by Frequency ²	Average Time to Repair (days) ³	Estimated Annual Emission Rate (lb/yr) ⁴
Pumps ⁵	light liquid VOC ^{6,7}	1	TBD	TBD	384
	heavy liquid VOC ⁸	---	TBD	TBD	---
	Non-VOC ⁹	---	TBD	TBD	---
Valves ¹⁰	Gas VOC	455	TBD	TBD	10,492
	Light Liquid VOC	---	TBD	TBD	---
	Heavy Liquid VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
	Gas VOC	41	TBD	TBD	16,470
Safety Relief Valves ¹¹	Non VOC	---	TBD	TBD	---
	VOC	33	TBD	TBD	217
Open-ended Lines ¹²	Non-VOC	---	TBD	TBD	---
	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Sampling Connections ¹³	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Compressors	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Flanges	VOC	2,002	TBD	TBD	14,151
	Non-VOC	---	TBD	TBD	---
Other	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---

1 - 13 See notes on the following page.

ATTACHMENT D

Process Flow Diagram



Flow Legend

- Gas/Water/Condensate Flow
- - - - - Stack Emissions/Vapor Flow
- Emission Point

EQT Where energy meets innovation.
EQT Production

Process Flow Diagram
SMI-28 Wellpad

Trinity
Consultants

January 2015

ATTACHMENT E

Plot Plan

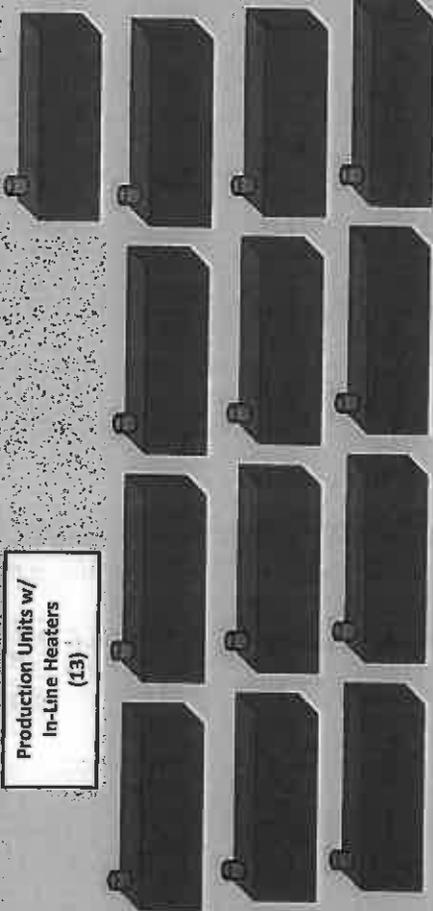
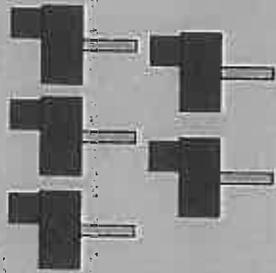
NOTE: This diagram is not to scale.
Locations and distances between surface
equipment are not known at this time.

Entrance to SMI-28 pad

Sand Separator
Tank
140 bbl
(1)

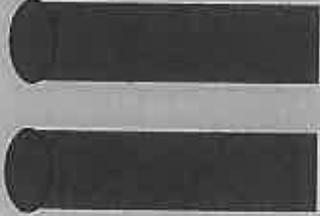
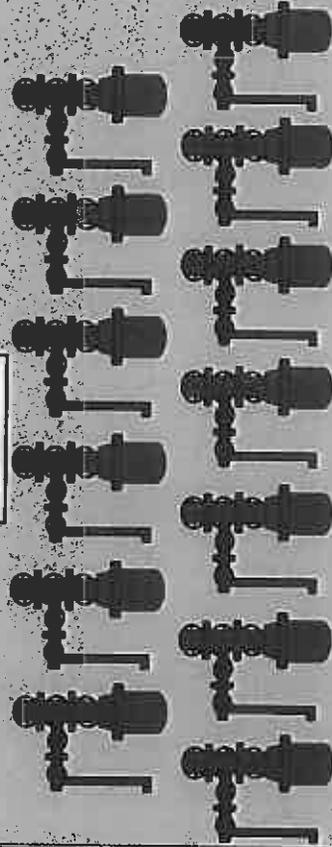


Thermoelectric
Generators
(5)

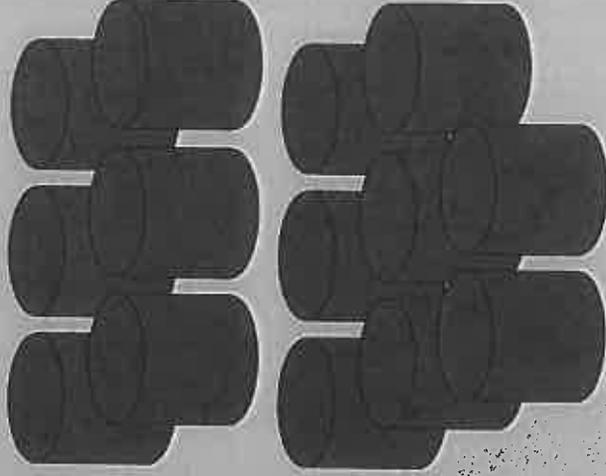


Production Units w/
In-Line Heaters
(13)

Wellheads (13)



Combustors
11.66 MMBTU/hr
(each)



Produced Fluid Tanks
400 bbl
(14)

Attachment E
SMI-28 Well Pad Plot Plan

ATTACHMENT F

Area Map

ATTACHMENT F: AREA MAP

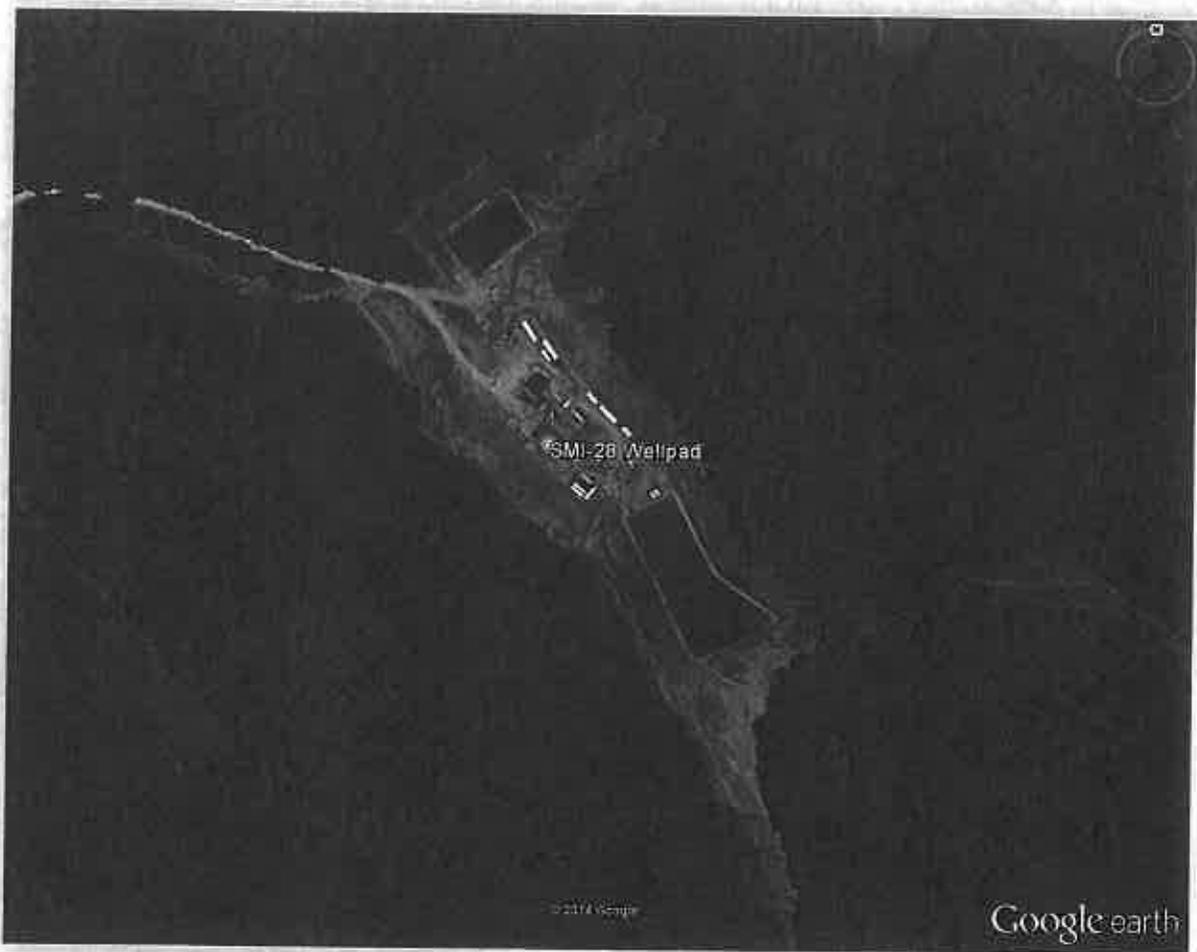


Figure 1 - Map of SMI-28 Location

UTM Northing (KM)	4,345.954
UTM Easting (KM)	522.599
Elevation (m)	381

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	E001	Produced Fluid ¹ Condensate Storage Tank	2013	16,800 gallon	Existing	C001 & C002
S002	E002	Produced Fluid Condensate Storage Tank	2013	16,800 gallon	Existing	C001 & C002
S003	E003	Produced Fluid Condensate Storage Tank	2013	16,800 gallon	Existing	C001 & C002
S004	E004	Produced Fluid Condensate Storage Tank	2013	16,800 gallon	Existing	C001 & C002
S005	E005	Produced Fluid Condensate Storage Tank	2013	16,800 gallon	Existing	C001 & C002
S006	E006	Produced Fluid Condensate Storage Tank	2013	16,800 gallon	Existing	C001 & C002
S007	E007	Produced Fluid Condensate Storage Tank	2013	16,800 gallon	Existing	C001 & C002
S008	E008	Produced Fluid Condensate Storage Tank	2013	16,800 gallon	Existing	C001 & C002
S009	E009	Produced Fluid Condensate Storage Tank	2013	16,800 gallon	Existing	C001 & C002
S010	E010	Produced Fluid Condensate Storage Tank	2013	16,800 gallon	Existing	C001 & C002
S011	E011	Line Heater	2013	1.54 MMBtu/hr	Existing	None
S012	E012	Line Heater	2013	1.54 MMBtu/hr	Existing	None
S013	E013	Line Heater	2013	1.54 MMBtu/hr	Existing	None
S014	E014	Line Heater	2013	1.54 MMBtu/hr	Existing	None
S015	E015	Line Heater	2013	1.54 MMBtu/hr	Existing	None
S016	E016	Line Heater	2013	1.54 MMBtu/hr	Existing	None
S017	E017	Line Heater	2013	1.54 MMBtu/hr	Existing	None
S018	E018	Line Heater	2013	1.54 MMBtu/hr	Existing	None
S019	E019	Line Heater	2013	1.54 MMBtu/hr	Existing	None
S020	E020	Thermoelectric Generator	2013	0.029 MMBtu/hr	Existing	None
S021	E021	Thermoelectric Generator	2013	0.029 MMBtu/hr	Existing	None
S022	E022	Produced Fluid Condensate Storage Tank	2014	16,800 gallon	Existing	C001 & C002
S023	E023	Produced Fluid Condensate Storage Tank	2014	16,800 gallon	Existing	C001 & C002
S024	E024	Line Heater	2014	1.54 MMBtu/hr	Existing	None
S025	E025	Line Heater	2014	1.54 MMBtu/hr	Existing	None
S026	E026	Produced Fluid Storage Tank	TBD	16,800 gallon	New	C001 & C002

¹ Please note that EQT is requesting that the names of the existing tanks be revised to 'Produced Fluid' Storage Tanks to more accurately reflect their contents

S027	E027	Produced Fluid Storage Tank	TBD	16,800 gallon	New	C001 & C002
S028	E028	Line Heater	TBD	1.54 MMBtu/hr	New	None
S029	E029	Line Heater	TBD	1.54 MMBtu/hr	New	None
S030	E030	Sand Separator Tank	TBD	140 bbl	New	C001 & C002 (optional)
S031	E031	Thermoelectric Generator	TBD	0.07 MMBtu/hr	New	None
S032	E032	Thermoelectric Generator	TBD	0.07 MMBtu/hr	New	None
S033	E033	Thermoelectric Generator	TBD	0.07 MMBtu/hr	New	None
S034	E034	Liquid Loading	2013	NA	Existing	C001 & C002

¹ For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S, ... or other appropriate designation.

² For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.

³ New, modification, removal

⁴ For Control Devices use the following numbering system: 1C, 2C, 3C, ... or other appropriate designation.

NATURAL GAS WELL AFFECTED FACILITY DATA SHEET

Complete this data sheet if you are the owner or operator of a gas well affected facility for which construction, modification, or reconstruction commenced after August 23, 2011. This form must be completed for natural gas well affected facilities regardless of when flowback operations occur (or have occurred).

Please provide the API number(s) for each NG well at this facility:	
47-017-06136	47-017-06215
47-017-06137	47-017-06216
47-017-06116	47-017-06291
47-017-06115	47-017-06186
47-017-06135	47-107-06588
47-017-06214	TBD
47-017-06217	

Note: This is the same API well number(s) provided in the well completion notification and as provided to the WYDEP, 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 SMI-28 Wellpad	2. Tank Name Produced Fluid Storage Tanks
3. Emission Unit ID number S001 – S010, S022 – S023 (Existing), S026 – S027 (New)	4. Emission Point ID number E001 – E010, E022 – E023 (Existing), E026 – E027 (New)
5. Date Installed or Modified (<i>for existing tanks</i>) S001 – S010 (2013), S022 – S023 (2014)	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>) No changes to existing tanks. Installation of two new tanks.	
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	
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	
13A. Maximum annual throughput (gal/yr) ~2,536,049 (each tank)	13B. Maximum daily throughput (gal/day) ~6,948 (each tank)
14. Number of tank turnovers per year ~151 (each 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 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	
---	--

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):			
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: Charleston, West Virginia			
28. Daily Avg. Ambient Temperature (°F) 54.98		29. Annual Avg. Maximum Temperature (°F) 65.75	
30. Annual Avg. Minimum Temperature (°F) 44.22		31. Avg. Wind Speed (mph) 6.05	
32. Annual Avg. Solar Insulation Factor (BTU/ft ² -day) 1,250.57		33. Atmospheric Pressure (psia) 14.25	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F) 57.22	34A. Minimum (°F):	34B. Maximum (°F):	
35. Avg. operating pressure range of tank (psig): 0.3068	35A. Minimum (psig):	35B. Maximum (psig):	
36A. Minimum liquid surface temperature (°F) 52.97	36B. Corresponding vapor pressure (psia) 0.2378		
37A. Avg. liquid surface temperature (°F) 61.57	37B. Corresponding vapor pressure (psia) 0.3068		
38A. Maximum liquid surface temperature (°F) 70.18	38B. Corresponding vapor pressure (psia) 0.3932		
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 Water/Condensate		
39B. CAS number	TBD		
39C. Liquid density (lb/gal)	IBD		
39D. Liquid molecular weight (lb/lb-mole)	IBD		
39E. Vapor molecular weight (lb/lb-mole)	23.93		
39F. Maximum true vapor pressure (psia)	0.39		
39G. Maximum Reid vapor pressure (psia)	IBD		
39H. Months Storage per year From:	12 (All year)		
To:			

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 SMI-28 Wellpad	2. Tank Name Sand Separator Tank
3. Emission Unit ID number S030	4. Emission Point ID number E030
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>) Installation of one new tank	
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	
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	
13A. Maximum annual throughput (gal/yr) ~141,120	13B. Maximum daily throughput (gal/day) ~387
14. Number of tank turnovers per year ~24	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 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 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) (Optional)	
<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 (All tanks)		Estimation Method ¹
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
See Attached Emission Calculations									

¹ EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)
Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

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

TANK CONSTRUCTION AND OPERATION INFORMATION

19 Tank Shell Construction
 Riveted Gunitite lined Epoxy-coated rivets Other (describe) Welded

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

21 Shell Condition (if metal and unlined):
 No Rust Light Rust Dense Rust Not applicable

22A. Is the tank heated? Yes No 22B. If yes, operating temperature. 22C. If yes, how is heat provided to tank?

23 Operating Pressure Range (psig) -0.03 to 0.70 psig

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

25 Complete item 25 for Floating Roof Tanks Does not apply

25A. Year Internal Floaters Installed

25B Primary Seal Type (check one): Metallic (mechanical) shoe seal Liquid mounted resilient seal

<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):			
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 Charleston, West Virginia			
28. Daily Avg Ambient Temperature (°F) 54.98		29. Annual Avg Maximum Temperature (°F) 65.75	
30. Annual Avg Minimum Temperature (°F) 44.22		31. Avg Wind Speed (mph) 6.05	
32. Annual Avg Solar Insulation Factor (BTU/ft ² -day) 1,250.57		33. Atmospheric Pressure (psia) 14.25	
LIQUID INFORMATION:			
34. Avg daily temperature range of bulk liquid (°F) 57.22	34A. Minimum (°F):	34B. Maximum (°F):	
35. Avg. operating pressure range of tank (psig) 0.3068	35A. Minimum (psig):	35B. Maximum (psig):	
36A. Minimum liquid surface temperature (°F) 52.97	36B. Corresponding vapor pressure (psia) 0.2378		
37A. Avg liquid surface temperature (°F) 61.57	37B. Corresponding vapor pressure (psia) 0.3068		
38A. Maximum liquid surface temperature (°F) 70.18	38B. Corresponding vapor pressure (psia) 0.3932		
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 Water/Sand		
39B. CAS number	IBD		
39C. Liquid density (lb/gal).	IBD		
39D. Liquid molecular weight (lb/lb-mole):	IBD		
39E. Vapor molecular weight (lb/lb-mole):	23.93		
39F. Maximum true vapor pressure (psia):	0.39		
39G. Maxim Reid vapor pressure (psia):	IBD		
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
S011	E011	Line Heater	2013	Existing, No change	None	1.54	1,050
S012	E012	Line Heater	2013	Existing, No change	None	1.54	1,050
S013	E013	Line Heater	2013	Existing, No change	None	1.54	1,050
S014	E014	Line Heater	2013	Existing, No change	None	1.54	1,050
S015	E015	Line Heater	2013	Existing, No change	None	1.54	1,050
S016	E016	Line Heater	2013	Existing, No change	None	1.54	1,050
S017	E017	Line Heater	2013	Existing, No change	None	1.54	1,050
S018	E018	Line Heater	2013	Existing, No change	None	1.54	1,050
S019	E019	Line Heater	2013	Existing, No change	None	1.54	1,050
S020	E020	Thermoelectric Generator	2013	Existing, No change	None	0.029	1,050
S021	E021	Thermoelectric Generator	2013	Existing, No change	None	0.029	1,050
S024	E024	Line Heater	2014	Existing, No change	None	1.54	1,050
S025	E025	Line Heater	2014	Existing, No change	None	1.54	1,050
S028	E028	Line Heater	TBD	New	None	1.54	1,050
S029	E029	Line Heater	TBD	New	None	1.54	1,050
S031	E031	Thermoelectric Generator	TBD	New	None	0.07	1,050
S032	E032	Thermoelectric Generator	TBD	New	None	0.07	1,050
S033	E033	Thermoelectric Generator	TBD	New	None	0.07	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: S034 – Liquid Loading		2. Emission Point ID: E034		3. Year Installed/ Modified: NA	
4. Emission Unit Description: Loss of vapors from loading of trucks					
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: NA					
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.	Oct. - Dec.	
hours/day	As needed	As needed	As needed	As needed	
days/week	As needed	As needed	As needed	As needed	
9. Bulk Liquid Data (add pages as necessary):					
Liquid Name		Condensate and Produced Water			
Max. daily throughput (1000 gal/day)		Variable			
Max. annual throughput (1000 gal/yr)		~35,646			
Loading Method ¹		Vapor Balanced			
Max. Fill Rate (gal/min)		TBD			
Average Fill Time (min/loading)		TBD			
Max. Bulk Liquid Temperature (°F)		Ambient			
True Vapor Pressure ²		0.39 psia (estimate)			
Cargo Vessel Condition ²		TBD			
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 0.29 HAP 0.01		
	Annual (ton/yr)	VOC 1.27 HAP 0.03		
Estimation Method ⁵				
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 IO = 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.	
<p>MONITORING Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment/air pollution control device.</p> <p>None</p>	<p>RECORDKEEPING Please describe the proposed recordkeeping that will accompany the monitoring.</p> <p>None</p>
<p>REPORTING Please describe the proposed frequency of reporting of the recordkeeping.</p> <p>None</p>	<p>TESTING Please describe any proposed emissions testing for this process equipment/air pollution control device.</p> <p>None</p>
<p>11. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty:</p> <p>None</p>	

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: 2013 <input type="checkbox"/> New	
3. Maximum Rated Total Flow Capacity: ~130 scf/min (each) ~188,380 scfd (each)	4. Maximum Design Heat Input: 11.66 MMBtu/hr (each)	5. Design Heat Content: 1,050 BTU/scf

Control Device Information

6. Select the type of vapor combustion control device being used: Enclosed Combustion Device
 Elevated Flare Ground Flare Thermal Oxidizer Completion Combustion Device

7. Manufacturer: LEED Fabrication Model No.: Enclosed Combustor 48"	8. Hours of operation per year: 8,760
--	---------------------------------------

9. List the emission units whose emissions are controlled by this vapor combustion control device:
(Emission Point ID# E001 – E010, E022 – E023, E026 – E027, E030, E034)

10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
S001 – S010, S022 – S023	Existing Produced Fluid Storage Tanks	S034	Vapors from Liquid Loading
S026 – S027	New Condensate Storage Tanks		
S030 (Optional)	New Sand Separator Storage Tank		

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

11. Assist Type <input type="checkbox"/> Steam - <input type="checkbox"/> Air - <input type="checkbox"/> Pressure - <input checked="" type="checkbox"/> Non -	12. Flare Height 25 ft	13. Tip Diameter ~4 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): ~131	16. Heat value of waste gas stream (BTU/ft ³): Variable	17. Temperature of the emissions stream (°F): ~70	18. Exit Velocity of the emissions stream (scf/min)
---	--	--	---

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 (each)	~25	~26,335	<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	100	≥ 98
VOC	100	≥ 98
HAP	100	≥ 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 Operations Manual		
34. Additional Information Attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
<i>Please attach a copy of manufacturer's data sheet.</i> <i>Please attach a copy of manufacturer's drawing.</i> <i>Please attach a copy of the manufacturer's performance testing.</i>		

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



**Environmental Control Equipment
Data Sheet**

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RFQ No.:		Checked:	SG		
Ref. P&ID:		Approved:	MS		
Supplier:	LEED FABRICATION				
Model No.:	L30-0011-00				

Client:	
Site:	
Unit/Lease:	

GENERAL

Design Code:		NDE:	LEED Fabrication Standards
Service:		Customer Specs:	<input type="checkbox"/> Yes
Description:	Standard Dual Stage 48 High Efficiency Combustor		<input checked="" type="checkbox"/> No

PROCESS DATA

Gas Composition	mol %	Process Conditions:		
		Variable	Value	Units
Methane		Flow Rate	Up to 140	Mscfd
Ethane		Pressure	Up to 12	oz/in2
Propane		Temperature		°F
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 0.10 oz/in2		
N2				
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	304 SS
		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	304 SS
		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	304 SS
	<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
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Supplier:	LEED FABRICATION				
Model No.:	L30-0011-00				

Client:	
Site:	
Unit/Lease:	

EQUIPMENT SPECIFICATION

56	Flame Detection:	<input type="checkbox"/> Thermocouple	<input checked="" type="checkbox"/> Ionization Rod	Auxiliary Equipment		
57		<input type="checkbox"/> UV Scanner		Valves	NA	
58	General Configuration:			Blowers	NA	
59				Dampers	NA	
60				Inlet KO / Liquid Seal	NA	
61				Flame / Detonation Arrestor	Yes	
62				Instrumentation & Controls		
63				Solenoids / Shut-Off Valves	Check with Sales for available config.	
64				Flow Meters	NA	
65				Calorimeter	NA	
66				Pressure Switches/Transmitters	NA	
67				Thermocouples	Check with Sales for available config.	
68		Temperature Switches/Transmitters	NA			
69		BMS	Check with Sales for available config.			
70		CEMS	NA			
71		Other	NA			
72						
73						
74						
75						

FABRICATION AND INSPECTION

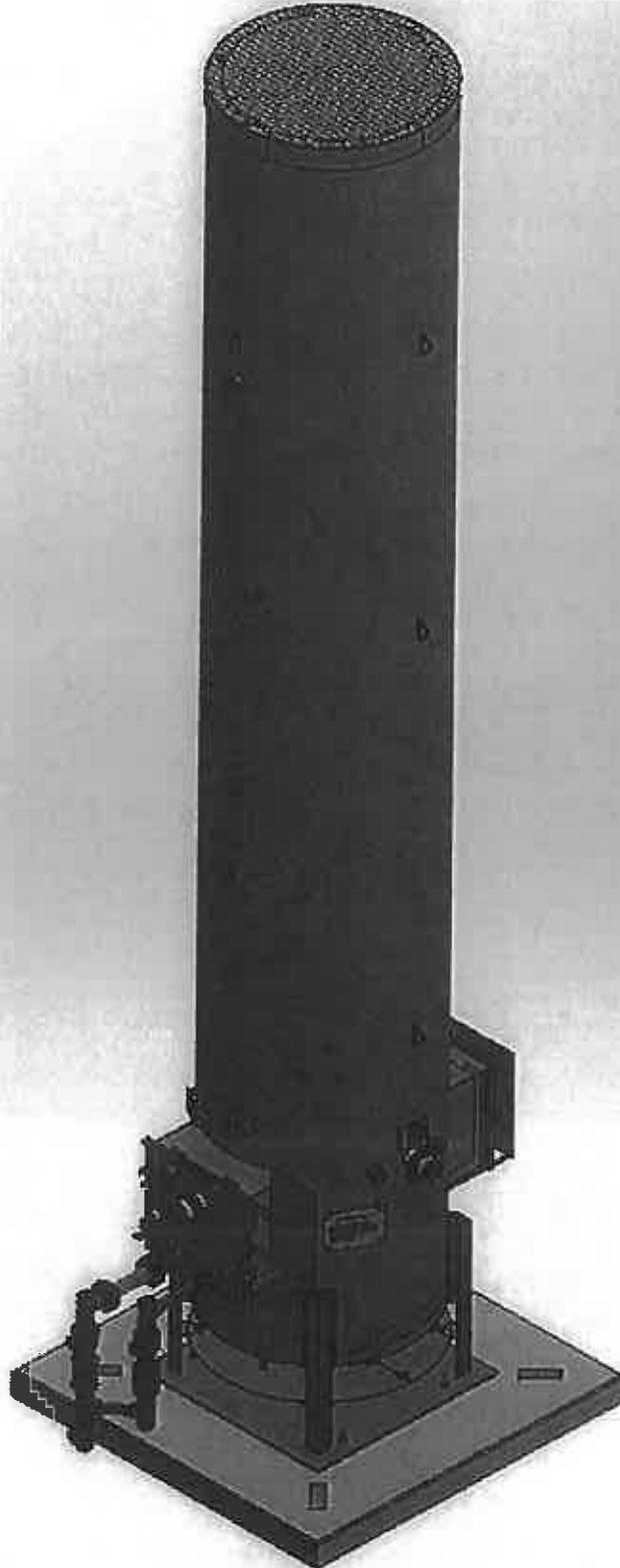
76	Special requirements	<input type="checkbox"/> Skid Mounted	<input checked="" type="checkbox"/> Concrete Pad	Equipment Info	
77		<input type="checkbox"/> Other		Component	Weight / Dimensions
78				Burner	
79	Inspection	<input checked="" type="checkbox"/> Vendor Standard		Burner Assembly	
80		<input type="checkbox"/> Other Specify:		Stack	
81	Material Certification	<input checked="" type="checkbox"/> Vendor Standard		Stack Assembly	48" OD x 25' H
82		<input type="checkbox"/> MTR		Pilot Tip	
83		<input type="checkbox"/> Certificate of Compliance		Pilot Line(s)	
84		<input type="checkbox"/> Other (Specify):		Stack Assembly	
85	NDE	<input checked="" type="checkbox"/> Vendor Standard		Auxiliary Equipment	
86		<input type="checkbox"/> Radiography Specify:		Blowers	
87		<input type="checkbox"/> Ultrasonic Specify:		Inlet KO / Liquid Seal	
88		<input type="checkbox"/> Liquid Penetrant		Flame / Detonation Arrestor	
89		<input type="checkbox"/> Magnetic Particles		Skid	
90		<input type="checkbox"/> PMI Specify:		Instrumentation & Controls	
91		<input type="checkbox"/> Other Specify:		BMS	
92	Surface Preparation	<input checked="" type="checkbox"/> Vendor Standard		Control Panel	
93		<input type="checkbox"/> Other Specify:			
94	Paint System	<input checked="" type="checkbox"/> Vendor Standard			
95		<input type="checkbox"/> Other Specify:			
96	Finished Color	<input checked="" type="checkbox"/> Vendor Standard			
97		<input type="checkbox"/> Other Specify:			
98					
99	Additional Notes:				



Environmental Control Equipment
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Ref P&ID:	-	Approved:	MS		
Client:		Supplier:	LEED FABRICATION		
Site:		Model No.:	L30-0011-00		
Unit/Lease:		Remarks:			

GENERAL ARRANGEMENT



ATTACHMENT I

Emission Calculations

Company Name: **EOT Production, LLC**
 Facility Name: **SMI-28 Wellpad**
 Project Description: **G-70A Permit Application**

Produced Fluid Storage Tanks

Throughput Parameter	Value	Units
Operational Hours	8,760	hrs/yr
Total Condensate Throughput ¹	6,476	bbl/month
Total Produced Water Throughput	63,969	bbl/month

¹ Condensate throughput only. For calculation purposes, produced water is assumed to contain 1% condensate.

Description	Potential Throughput ¹ (gal/yr)
Produced Water and Condensate	35,504,692

¹ Based on maximum historical produced water and condensate throughput for wellpad, and scaled based on total number of wells.

Storage Tanks (400 bbl. each) - Uncontrolled (Per tank)

Constituent	Total Emissions ¹	
	lb/hr	tpy
Methane	23.212	101.668
Ethane	30.937	135.502
Propane	29.512	129.264
Isobutane	7.094	31.070
n-Butane	11.311	49.543
Isopentane	2.694	11.799
n-Pentane	1.761	7.712
n-Hexane	0.241	1.056
Other Hexanes	0.596	2.609
Heptanes	0.251	1.100
Benzene	0.006	0.025
Toluene	0.009	0.040
Ethylbenzene	<0.001	0.002
Xylenes	0.005	0.020
2,2,4-Trimethylpentane	0.220	0.963
C8+ Heavies	0.111	0.487
Total Emissions:	108.255	474.155
Total VOC Emissions:	53.810	235.687
Total HAP Emissions:	0.482	2.110

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 7/22/2014 condensate sample from Well No. 514139.

Control Efficiency of Combustor	98%	
Pilot Rating	0.03 MMBtu/hr	Max pilot fuel usage for Leed Enclosed Combustor
Combustor Rating	11.66 MMBtu/hr	Max input from Leed Enclosed Combustor Operations Manual

Company Name: EQT Production, LLC
 Facility Name: SML-28 Wellpad
 Project Description: G-70A Permit Application

Produced Fluid Storage Tanks

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

Constituent	Total Emissions	
	lb/hr	tpy
Methane	0.464	2.033
Ethane	0.619	2.710
Propane	0.590	2.585
Isobutane	0.142	0.621
n-Butane	0.226	0.991
Isopentane	0.054	0.236
n-Pentane	0.035	0.154
n-Hexane	0.005	0.021
Other Hexanes	0.012	0.052
Heptanes	0.005	0.022
Benzene	<0.001	0.001
Toluene	<0.001	0.001
Ethylbenzene	<0.001	<0.001
Xylenes	<0.001	<0.001
2,2,4-Trimethylpentane	0.004	0.019
C8+ Heavies	0.002	0.009
Total Emissions:	2.165	9.483
Total VOC Emissions:	1.076	4.714
Total HAP Emissions:	0.010	0.042

Enclosed Combustor Emissions¹

Pollutant ²	Emission Factor (lb/MMBtu)	Combustor Potential Emissions		Pilot Potential Emissions	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
NO _x	0.095	1.110	4.864	0.003	0.011
CO	0.080	0.933	4.086	0.002	0.009
PM/PM ₁₀	0.007	0.084	0.370	1.9E-04	0.001
SO ₂	0.001	0.007	0.029	1.5E-05	6.59E-05
CO ₂ (Natural Gas Firing)	116.997	1364.189	5975.146	3.081	13.495
CH ₄ (Natural Gas Firing)	0.002	0.026	0.113	5.8E-05	2.54E-04
N ₂ O (Natural Gas Firing)	2.2E-04	0.003	0.011	5.8E-06	2.54E-05

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

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

Company Name: EQT Production, LLC
 Facility Name: SMI-28 Wellpad
 Project Description: G-70A Permit Application

Sand Separator Tank

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

¹ Conservatively assumes 2 turnovers/month of sand and produced water. Assumes produced fluid is 1% condensate.

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	0.137	0.600
Ethane	0.182	0.799
Propane	0.175	0.765
Isobutane	0.043	0.189
n-Butane	0.063	0.276
Isopentane	0.010	0.045
n-Pentane	0.006	0.027
n-Hexane	0.001	0.003
Other Hexanes	0.002	0.008
Heptanes	0.001	0.003
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	0.003
C8+ Heavies	<0.001	0.001
Total Emissions:	0.623	2.727
Total VOC Emissions:	0.302	1.323
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 7/22/2014 condensate sample from Well No. 514139. An operating pressure of 1,000 psi was used since this tank is upstream of the GPU.

Company Name: EOT Production, LLC
 Facility Name: SML-28 Wellpad
 Project Description: G-70A Permit Application

Sand Separator Tank

Sand Separator Tank (140 bbl) - Controlled (Per tank)

Constituent	Total Emissions	
	lb/hr	tpy
Methane	0.137	0.600
Ethane	0.182	0.799
Propane	0.175	0.765
Isobutane	0.043	0.189
n-Butane	0.063	0.276
Isopentane	0.010	0.045
n-Pentane	0.006	0.027
n-Hexane	0.001	0.003
Other Hexanes	0.002	0.008
Heptanes	0.001	0.003
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	0.003
C8+ Heavies	<0.001	0.001
Total Emissions:	0.623	2.727
Total VOC Emissions:	0.302	1.323
Total HAP Emissions:	0.002	0.010

¹ Vapors may be routed to the same combustor(s) controlling the other storage tanks on this pad at 98% control efficiency. However, no control is assumed.

Company Name: EOT Production, LLC
 Facility Name: SMI-28 Wellpad
 Project Description: G-70A Permit 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	0.147	0.642
CO	84	0.123	0.539
SO ₂	0.6	0.001	0.004
PM Total	7.6	0.011	0.049
PM Condensable	5.7	0.008	0.037
PM ₁₀ (Filterable)	1.9	0.003	0.012
PM _{2.5} (Filterable)	1.9	0.003	0.012
VOC	5.5	0.008	0.035
Lead	5.0E-04	7.3E-07	3.2E-06
CO ₂ (Natural Gas Firing) ⁴	122,847	179.996	788.382
CH ₄ (Natural Gas Firing) ⁴	2.3	0.003	0.015
N ₂ O (Natural Gas Firing) ⁴	0.23	3.4E-04	0.001

Company Name: EQT Production, LLC
 Facility Name: SMI-28 Wellpad
 Project Description: G-70A Permit Application

Line Heaters

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf) ¹	Potential Emissions	
		(lb/hr) ²	(tons/yr) ³
HAPs:			
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	4.8E-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

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:
 Facility Name:
 Project Description:

EOT Production, LLC
SMI-28 Wellpad
G-70A Permit Application

Thermoelectric Generators (TEGs)

Parameter	Value	Units
Manufacturer	Global Thermoelectric	
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,050	BTU/scf
Heat Input	0.03	MMBtu/hr (each)
Fuel Consumption ¹	2.78E-05	MMscf/hr (each)
Potential Annual Hours of Operation	8,760	hr/yr

¹ Global Thermoelectric specification sheet states 700 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	2.8E-03	1.2E-02
CO	84	2.3E-03	1.0E-02
SO ₂	0.6	1.7E-05	7.3E-05
PM Total	7.6	2.1E-04	9.2E-04
PM Condensable	5.7	1.6E-04	6.9E-04
PM ₁₀ (Filterable)	1.9	5.3E-05	2.3E-04
PM _{2.5} (Filterable)	1.9	5.3E-05	2.3E-04
VOC	5.5	1.5E-04	6.7E-04
Lead	5.0E-04	1.4E-08	6.1E-08
CO ₂ (Natural Gas Firing) ⁴	122,847	3.4E+00	1.5E+01
CH ₄ (Natural Gas Firing) ⁴	2.3	6.4E-05	2.8E-04
N ₂ O (Natural Gas Firing) ⁴	0.23	6.4E-06	2.8E-05

Company Name: EOT Production, LLC
 Facility Name: SMI-28 Wellpad
 Project Description: G-70A Permit Application

Thermoelectric Generators (TEGs)

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf) ¹	Potential Emissions	
		(lb/hr) ²	(tons/yr) ³
HAPs:			
Methylnaphthalene (2-)	2.4E-05	6.7E-10	2.9E-09
3-Methylchloranthrene	1.8E-06	5.0E-11	2.2E-10
7,12-Dimethylbenz(a)anthracene	1.6E-05	4.4E-10	1.9E-09
Acenaphthene	1.8E-06	5.0E-11	2.2E-10
Acenaphthylene	1.8E-06	5.0E-11	2.2E-10
Anthracene	2.4E-06	6.7E-11	2.9E-10
Benz(a)anthracene	1.8E-06	5.0E-11	2.2E-10
Benzene	2.1E-03	5.8E-08	2.6E-07
Benzo(a)pyrene	1.2E-06	3.3E-11	1.5E-10
Benzo(b)fluoranthene	1.8E-06	5.0E-11	2.2E-10
Benzo(g,h,i)perylene	1.2E-06	3.3E-11	1.5E-10
Benzo(k)fluoranthene	1.8E-06	5.0E-11	2.2E-10
Chrysene	1.8E-06	5.0E-11	2.2E-10
Dibenzo(a,h)anthracene	1.2E-06	3.3E-11	1.5E-10
Dichlorobenzene	1.2E-03	3.3E-08	1.5E-07
Fluoranthene	3.0E-06	8.3E-11	3.7E-10
Fluorene	2.8E-06	7.8E-11	3.4E-10
Formaldehyde	7.5E-02	2.1E-06	9.1E-06
Hexane	1.8E+00	5.0E-05	2.2E-04
Indo(1,2,3-cd)pyrene	1.8E-06	5.0E-11	2.2E-10
Naphthalene	6.1E-04	1.7E-08	7.4E-08
Phenanthrene	1.7E-05	4.7E-10	2.1E-09
Pyrene	5.0E-06	1.4E-10	6.1E-10
Toluene	3.4E-03	9.4E-08	4.1E-07
Arsenic	2.0E-04	5.6E-09	2.4E-08
Beryllium	1.2E-05	3.3E-10	1.5E-09
Cadmium	1.1E-03	3.1E-08	1.3E-07
Chromium	1.4E-03	3.9E-08	1.7E-07
Cobalt	8.4E-05	2.3E-09	1.0E-08
Manganese	3.8E-04	1.1E-08	4.6E-08
Mercury	2.6E-04	7.2E-09	3.2E-08
Nickel	2.1E-03	5.8E-08	2.6E-07
Selenium	2.4E-05	6.7E-10	2.9E-09
Total HAP		5.2E-05	2.3E-04

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

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

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

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

Company Name: EQF Production, LLC
 Facility Name: SMI-28 Wellpad
 Project Description: G-70A Permit Application

Thermoelectric Generators (TEGs)

Parameter	Value	Units
Manufacturer	Global Thermoelectric	
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,050	BTU/scf
Heat Input	0.07	MMBtu/hr (each)
Fuel Consumption ¹	6.73E-05	MMscf/hr (each)
Potential Annual Hours of Operation	8,760	hr/yr

¹ Global Thermoelectric specification sheet states 1695 ft³/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	6.7E-03	2.9E-02
CO	84	5.7E-03	2.5E-02
SO ₂	0.6	4.0E-05	1.8E-04
PM Total	7.6	5.1E-04	2.2E-03
PM Condensable	5.7	3.8E-04	1.7E-03
PM ₁₀ (Filterable)	1.9	1.3E-04	5.6E-04
PM _{2.5} (Filterable)	1.9	1.3E-04	5.6E-04
VOC	5.5	3.7E-04	1.6E-03
Lead	5.0E-04	3.4E-08	1.5E-07
CO ₂ (Natural Gas Firing) ⁴	122,847	8.3E+00	3.6E+01
CH ₄ (Natural Gas Firing) ⁴	2.3	1.6E-04	6.8E-04
N ₂ O (Natural Gas Firing) ⁴	0.23	1.6E-05	6.8E-05

Company Name: EOT Production, LLC
 Facility Name: SMI-28 Wellpad
 Project Description: G-70A Permit Application

Thermoelectric Generators (TEGs)

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf) ¹	Potential Emissions	
		(lb/hr) ²	(tons/yr) ³
HAPs:			
Methylnaphthalene (2-)	2.4E-05	1.6E-09	7.1E-09
3-Methylchloranthrene	1.8E-06	1.2E-10	5.3E-10
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.1E-09	4.7E-09
Acenaphthene	1.8E-06	1.2E-10	5.3E-10
Acenaphthylene	1.8E-06	1.2E-10	5.3E-10
Anthracene	2.4E-06	1.6E-10	7.1E-10
Benz(a)anthracene	1.8E-06	1.2E-10	5.3E-10
Benzene	2.1E-03	1.4E-07	6.2E-07
Benzo(a)pyrene	1.2E-06	8.1E-11	3.5E-10
Benzo(b)fluoranthene	1.8E-06	1.2E-10	5.3E-10
Benzo(g,h,i)perylene	1.2E-06	8.1E-11	3.5E-10
Benzo(k)fluoranthene	1.8E-06	1.2E-10	5.3E-10
Chrysene	1.8E-06	1.2E-10	5.3E-10
Dibenzo(a,h)anthracene	1.2E-06	8.1E-11	3.5E-10
Dichlorobenzene	1.2E-03	8.1E-08	3.5E-07
Fluoranthene	3.0E-06	2.0E-10	8.8E-10
Fluorene	2.8E-06	1.9E-10	8.2E-10
Formaldehyde	7.5E-02	5.0E-06	2.2E-05
Hexane	1.8E+00	1.2E-04	5.3E-04
Indo(1,2,3-cd)pyrene	1.8E-06	1.2E-10	5.3E-10
Naphthalene	6.1E-04	4.1E-08	1.8E-07
Phenanthrene	1.7E-05	1.1E-09	5.0E-09
Pyrene	5.0E-06	3.4E-10	1.5E-09
Toluene	3.4E-03	2.3E-07	1.0E-06
Arsenic	2.0E-04	1.3E-08	5.9E-08
Beryllium	1.2E-05	8.1E-10	3.5E-09
Cadmium	1.1E-03	7.4E-08	3.2E-07
Chromium	1.4E-03	9.4E-08	4.1E-07
Cobalt	8.4E-05	5.7E-09	2.5E-08
Manganese	3.8E-04	2.6E-08	1.1E-07
Mercury	2.6E-04	1.7E-08	7.7E-08
Nickel	2.1E-03	1.4E-07	6.2E-07
Selenium	2.4E-05	1.6E-09	7.1E-09
Total HAP		1.3E-04	5.6E-04

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

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

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

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

Company Name: EOT Production, LLC
 Facility Name: SML-28 Wellhead
 Project Description: G-70A Permit Application

Fugitive Components

Facility Equipment Type	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

Table W-1B to Subpart W of Part 96 --- Default Average Component Counts for Major Onshore Natural Gas Producer

Fugitive Emissions from Component Leaks

Equipment Type	Service	Emission Factors ¹ (kg/hr/source)	Facility Equipment Count (units)	TOC Total Fugitive Emissions (lb/hr)	TOC Annual Fugitive Emissions (tpy)
Valves	Gas	0.00597	455	5.99	26.23
Pump Seals	Light Liquid	0.019900	1	0.04	0.19
Pressure Relief Valves	Gas	0.104000	41	9.40	41.17
Connectors	All	0.001830	2,002	8.08	35.38
Open-Ended Lines	All	0.001700	33	0.12	0.54
Emission Totals:				23.63	103.51

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). SOCFI factors were used as it was representative of natural gas liquids extraction

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

VOC and HAP Weight Fractions¹

Service	Weight Fraction VOC	Weight Fraction Hexane	Weight Fraction Benzene	Weight Fraction Toluene	Weight Fraction 2,4-trimethylpentane	Weight Fraction Xylene
Gas	0.200	3.6E-03	5.2E-04	2.6E-04	3.1E-03	3.0E-04
Light Liquid	1.000	<0.001	<0.001	<0.001	<0.001	<0.001
All	0.200	3.6E-03	5.2E-04	2.6E-04	3.1E-03	3.0E-04

¹ All weight fractions from the same representative gas analyses used for other emission calculation

Company Name: EOI Production, LLC
 Facility Name: SML-28 Wellpad
 Project Description: G-70A Permit Application

Fugitive Components

Pollutant	Hourly Fugitive Emissions (lb/hr)	Annual Fugitive Emissions (tpy)
VOC	4.762	20.86
Hexane	0.086	0.375
Benzene	0.012	0.054
Toluene	0.006	0.027
Ethylbenzene	0.001	0.003
2,2,4-trimethylpentane	0.072	0.315
Xylene	0.007	0.031
Total HAP	0.18	0.81

GHG Fugitive Emissions from Component Leaks

Component	Component Count	GHG Emission Factor (scf/hr/component)	CH ₄ Emissions ^{3,4} (tpy)	CO ₂ Emissions ^{3,4} (tpy)	CO ₂ e Emissions ⁵ (tpy)
Connectors	2,002	3.0E-03	8.6E-01	6.4E-03	2.2E+01
Open-Ended Lines	33	6.1E-02	2.9E-01	2.1E-03	7.2E+00
Pressure Relief Devices	41	4.0E-02	2.4E-01	1.8E-03	5.9E+00
Pneumatic Devices	65	6.0E+00	5.6E+01	4.2E-01	1.4E+03
Valves	455	2.7E-02	1.8E+00	1.3E-02	4.4E+01
Total			59.2	0.440	1480

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 NPS OOOO limits
³ Calculated in accordance with Equations W-31, W-35 and W-36 in Subpart W of 40 CFR 98.
⁴ Mole fractions of CH₄ and CO₂ based on gas analysis:
 CH₄: 77.49% CO₂: 0.21%
 Carbon, Dioxide (CO₂): 1 Methane (CH₄): 25

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: **SML-2B Wellpad**
 Project Description: **G-70A Permit 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	1.00	saturation factor for vapor balancing (AP-42 Table 5.2-1)
Collection Efficiency	70%	collection efficiency for non-MSPS/MACT annual leak tested trucks
Control Efficiency	98%	control efficiency of combustor(s)
P	0.39	max. true vapor pressure of liquid loaded (psia) - EPA TANKS Data
M	23.93	molecular weight of vapors (lb/lb-mol) - EPA TANKS Data
T	516.9	temperature of liquid loaded (deg R) - EPA TANKS Data

Description	Loading Losses (lb/10 ³ gal)	Maximum Throughput ¹ (gal)	VOC Emissions	
			Uncontrolled (tpy)	Controlled (tpy)
Liquid Hauling	0.2	35,645,812	4.04	1.27

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

Speciated HAP Emission Potential:

Constituent	mol%	True Vapor Pressure of Organic Compound in liquid (psia) ²	Partial Vapor Pressure (psia)	Mole Fraction	Molecular Weight	VOC Vapor Weight	Speciated Weight Fraction	Speciated Liquid Loading Emissions (tpy) ³
Methane	0.095	---	---	---	---	---	---	---
Ethane	0.602	---	---	---	---	---	---	---
Propane	1.646	127.310	2.10	0.32	44.10	14.13	0.20	0.25
Isobutane	0.867	46.110	0.40	0.06	58.12	3.55	0.05	0.06
n-Butane	2.986	32.045	0.96	0.15	58.12	8.51	0.12	0.15
Isopentane	3.103	12.530	0.39	0.06	72.15	4.29	0.06	0.08
n-Pentane	3.943	8.433	0.33	0.05	72.15	3.67	0.05	0.06
n-Hexane	4.692	2.436	0.11	0.02	85.67	1.50	0.02	0.03
Other Hexanes	4.939	2.436	0.12	0.02	86.18	1.59	0.02	0.03
Heptanes	14.686	0.735	0.11	0.02	97.88	1.62	0.03	0.03
Benzene	0.200	1.508	3.0E-03	4.6E-04	78.11	0.04	5.0E-04	6.3E-04
Toluene	1.138	0.425	4.8E-03	7.4E-04	92.14	0.07	9.4E-04	1.2E-03
Ethylbenzene	0.155	0.151	2.3E-04	3.6E-05	106.17	3.8E-03	5.3E-05	6.7E-05
Xylenes	1.763	0.180	3.2E-03	4.8E-04	106.17	0.05	7.1E-04	9.1E-04
2,2,4-Trimethylpentane	0.031	0.596	1.8E-04	2.8E-05	114.23	3.2E-03	4.5E-05	5.7E-05
C8+ Heavies	59.154	3.4	2.01	0.31	107.73	33.14	0.46	0.58
	100.0		6.54			72.15	1.00	
Total Emissions:								1.27
Total HAP Emissions:								0.029

¹ An atmospheric analysis of a representative condensate sample (from wellpad OXF-131, Well #5124A1) 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 * Calculated Controlled Liquid Loading Emissions (tpy). As methane and ethane will flash off prior to loading, the emissions from these constituents are not included in the speciation.

Company Name: EQT Production, LLC
 Facility Name: SMI-28 Wellpad
 Project Description: G-70A Permit Application

Haul Roads

Estimated Potential Road Fugitive Emissions

Unpaved Road Emissions

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

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

Description	Weight of Empty Truck (tons)	Weight of Truck w/ Max Load (tons)	Mean Vehicle Weight (tons)	Length of Unpaved Road Traveled (mile/trip)	Trips Per Year	Mileage Per Year	Control (%)	Emissions (tpy)		
								PM	PM ₁₀	PM _{2.5}
Liquids Hauling	20	40	30	1.07	8,911	9,519	0	20.39	5.20	0.52
Employee Vehicles	3	3	3	1.07	200	214	0	0.16	0.04	<0.01
Total Potential Emissions								20.55	5.24	0.524

Company Name: EOI Production, LLC
 Facility Name: SMI-28 Wellpad
 Project Description: G-70A Permit Application

Combustor Flow Rate Calculations

TANK GAS STREAM (FROM E&P TANK v2.0)					
Component	lb/hr	lb-mol/hr	mol%	MW lb/lb-mol	MW in Mixture
Carbon Dioxide	4.136	0.094	0.002	44.010	0.083
Nitrogen	<0.001	<0.001	<0.001	28.000	<0.001
Methane	325.105	20.268	0.408	16.040	6.546
Ethane	133.300	14.410	0.290	30.070	8.725
Propane	413.343	9.373	0.189	44.100	8.323
Isobutane	99.359	1.710	0.034	58.120	2.001
n-Butane	158.417	2.726	0.055	58.120	3.190
Isopentane	37.726	0.523	0.011	72.150	0.760
n-Pentane	24.660	0.342	0.007	72.150	0.497
n-Hexane	3.375	0.039	0.001	85.667	0.068
Cyclohexane	<0.001	<0.001	<0.001	84.160	<0.001
Other Hexanes	8.346	0.097	0.002	86.177	0.168
Heptanes	3.515	0.036	0.001	97.890	0.071
2,2,4-Trimethylpentane	3.081	0.027	0.001	114.230	0.062
Benzene	0.084	0.001	2.2E-05	78.110	0.002
Toluene	0.126	0.001	2.8E-05	92.140	0.003
Ethylbenzene	<0.001	<0.001	<0.001	106.170	<0.001
Xylenes	0.070	0.001	1.3E-05	106.170	0.001
C8 + Heavies	1.554	0.014	2.9E-04	107.726	0.031

Total	1516.21	49.66		30.53	lb/lbmole
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1 Representative gas stream from the produced water storage tanks is flowing to the combustor.

Combustor Rating	11.66 MMBtu/hr	Max. input from Leed Enclosed Combustor Operations Manual
Pilot Rating	0.03 MMBtu/hr	Max. pilot fuel usage for Leed Enclosed Combustor
Pilot Rating	26,315 btu/hr	
Pilot Fuel Usage	25 scf/hr	
Combustor Flow Capacity	188.38 MSCFD	Max. flowrate from LEED Combustor Operations Manual
	7,849 scf/hr	
	131 scf/min	

Enclosed Combustor Mass Flow Rate (C001)

$$\frac{7,849 \text{ scf}}{\text{hr}} \times \frac{1 \text{ lbmole}}{379 \text{ scf}} \times 30.53 \frac{\text{lb}}{\text{lbmole}} = \frac{632 \text{ lb}}{\text{hr}}$$

Enclosed Combustor Mass Flow Rate (C002)

$$\frac{7,849 \text{ scf}}{\text{hr}} \times \frac{1 \text{ lbmole}}{379 \text{ scf}} \times 30.53 \frac{\text{lb}}{\text{lbmole}} = \frac{632 \text{ lb}}{\text{hr}}$$

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

Company Name: EQT Production, LLC
 Facility Name: SMI-28 Wellpad
 Project Description: G-70A Permit Application

Gas Analysis

Sample Location: Average of OXF127, OXF134, OXF136, OXF138, OXF150, OXF153, WEU1 & WEU2
 HHV (Btu/scf): 1,050

Constituent	Molecular Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	44.01	0.004	0.443
Nitrogen	28.01	0.006	0.615
Methane	16.04	0.595	59.519
Ethane	30.07	0.208	20.801
Propane	44.10	0.097	9.672
Isobutane	58.12	0.016	1.611
n-Butane	58.12	0.032	3.200
Isopentane	72.15	0.009	0.945
n-Pentane	72.15	0.010	0.957
n-Hexane	86.18	0.004	0.363
Cyclohexane	84.16	0.001	0.061
Other Hexanes	86.18	0.005	0.532
Heptanes	100.21	0.004	0.429
2,2,4-Trimethylpentane	114.23	0.003	0.305
Benzene*	78.11	0.001	0.052
Toluene*	92.14	2.6E-04	0.026
Ethylbenzene*	106.17	2.6E-05	0.003
Xylenes*	106.16	3.0E-04	0.030
C8 + Heavies	114.23	0.004	0.370
Totals		1.00	100

* Per email from Regina Henry, EQT, to Tom Muscenti, Trinity, on 10/10/2012

TOC (Total)	98.87
VOC (Total)	18.55
HAP (Total)	0.78

2015-0107_EQT_SMI-28_Produced Fluid Tanks.txt

* Project Setup Information

Project File : \\tsclient\Z\Client\EQT Corporation\west Virginia\WV
Production Wells\143901.0023\SMI 28\03 Draft\2015-0107 SMI 28 - G70 Draft\Attach I -
Emission Calcs\E&P TANK\2015-0107_EQT_SMI-28_Produced Fluid Tanks.ept
Flowsheet Selection : Oil Tank with Separator
Calculation Method : RVP Distillation
Control Efficiency : 98.0%
Known Separator Stream : Low Pressure Oil
Entering Air Composition : No

Filed Name : EQT - SMI-28 Produced Fluids Tanks
Well Name : PTE for G-70A Application
Date : 2015.01.07

* Data Input

Separator Pressure : 200.00[psig]
Separator Temperature : 60.00[F]
Ambient Pressure : 14.70[psia]
Ambient Temperature : 55.00[F]
C10+ SG : 0.7498
C10+ MW : 122.375

-- Low Pressure Oil

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.1260
4	N2	0.0000
5	C1	27.1290
6	C2	19.2910
7	C3	12.6670
8	i-C4	3.0470
9	n-C4	6.5440
10	i-C5	3.2910
11	n-C5	3.1030
12	C6	3.0460
13	C7	4.3100
14	C8	0.8600
15	C9	2.9760
16	C10+	6.9020
17	Benzene	0.0450
18	Toluene	0.2900
19	E-Benzene	0.0500
20	Xylenes	0.6010
21	n-C6	1.6660
22	2,2,4-Trimethylp	4.0560

-- sales oil

2015-0107_EQT_SMI-28_Produced Fluid Tanks.txt

Production Rate : 16.7 [bbl/day]
 Days of Annual Operation : 365 [days/year]
 API Gravity : 59.11
 Reid Vapor Pressure : 10.60 [psia]

 * Calculation Results
 *

-- Emission Summary

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]	
Total HAPs	2.110	0.482	0.042	0.010	
Page 1					E&P TANK
Total HC	472.857	107.958	9.457	2.159	
VOCs, C2+	371.189	84.746	7.424	1.695	
VOCs, C3+	235.687	53.810	4.714	1.076	

Uncontrolled Recovery Info.

Vapor	32.2500	[MSCFD]
HC Vapor	32.1900	[MSCFD]
GOR	1931.14	[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	1.295	0.296	1.295	0.296
4	N2	0.000	0.000	0.000	0.000
5	C1	101.668	23.212	2.033	0.464
6	C2	135.502	30.937	2.710	0.619
7	C3	129.264	29.512	2.585	0.590
8	i-C4	31.070	7.094	0.621	0.142
9	n-C4	49.543	11.311	0.991	0.226
10	i-C5	11.799	2.694	0.236	0.054
11	n-C5	7.712	1.761	0.154	0.035
12	C6	2.609	0.596	0.052	0.012
13	C7	1.100	0.251	0.022	0.005
14	C8	0.061	0.014	0.001	0.000
15	C9	0.065	0.015	0.001	0.000
16	C10+	0.361	0.082	0.007	0.002
17	Benzene	0.025	0.006	0.001	0.000
18	Toluene	0.040	0.009	0.001	0.000
19	E-Benzene	0.002	0.000	0.000	0.000
20	Xylenes	0.020	0.005	0.000	0.000
21	n-C6	1.056	0.241	0.021	0.005
22	224Trimethylp	0.963	0.220	0.019	0.004
	Total	474.155	108.255	9.483	2.165

-- Stream Data

No. Component	MW	LP Oil	Flash Oil	sale Oil	Flash Gas	W&S Gas
Total Emissions		mol %	mol %	mol %	mol %	mol %

2015-0107_EQT_SMI-28_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	0.1260	0.0076	0.0000	0.2044	0.0479
0.1895						
4 N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000						
5 C1	16.04	27.1290	0.3865	0.0000	44.8460	2.4326
40.8074						
6 C2	30.07	19.2910	2.5913	0.0009	30.3546	16.3057
29.0169						
7 C3	44.10	12.6670	7.3136	0.3528	16.2137	44.1724
18.8759						
8 i-C4	58.12	3.0470	3.8331	2.2634	2.5262	12.1447
3.4421						
9 n-C4	58.12	6.5440	10.1727	8.6373	4.1400	18.3038
5.4886						
10 i-C5	72.15	3.2910	6.9844	7.7297	0.8441	3.0386
1.0530						
11 n-C5	72.15	3.1030	6.9616	7.8923	0.5467	2.0335
0.6882						
12 C6	86.16	3.0460	7.4124	8.6906	0.1532	0.6443
0.2000						
13 C7	100.20	4.3100	10.7366	12.7134	0.0524	0.2690
0.0730						
14 C8	114.23	0.8600	2.1546	2.5587	0.0023	0.0149
0.0035						
15 C9	128.28	2.9760	7.4651	8.8717	0.0020	0.0169
0.0034						
16 C10+	122.38	6.9020	17.3021	20.5532	0.0119	0.0869
0.0190						
17 Benzene	78.11	0.0450	0.1106	0.1302	0.0015	0.0068
0.0020						
18 Toluene	92.13	0.2900	0.7248	0.8597	0.0019	0.0107
0.0028						
19 E-Benzene	106.17	0.0500	0.1254	0.1489	0.0001	0.0005
0.0001						
20 Xylenes	106.17	0.6010	1.5070	1.7905	0.0008	0.0055
0.0012						
21 n-C6	86.18	1.6660	4.0912	4.8137	0.0593	0.2654
0.0789						
22 224Trimethylp	114.24	4.0560	10.1194	11.9927	0.0390	0.1998
0.0543						
MW	52.82	89.17	97.02	28.74	47.57	
30.53						
Stream Mole Ratio	1.0000	0.3985	0.3352	0.6015	0.0633	
0.6648						
Heating Value	[BTU/SCF]			1688.76	2699.50	
1785.00						
Gas Gravity	[Gas/Air]			0.99	1.64	
1.05						
Bubble Pt. @ 100F	[psia]	1042.54	51.00	11.15		
RVP @ 100F	[psia]	325.00	33.10	10.60		

Page 2-----E&P TANK

Spec. Gravity @ 100F 0.546 0.670 0.685

* Project Setup Information *

Project File : Z:\Client\EQT Corporation\West Virginia\WV Production Wells\143901.0023\SMI 28\03 Draft\2014-1013 SMI 28 - G70 Draft\Attach I - Emission Calcs\E&P TANK\2014-1029_EQT_SMI-28_SandTrapTank.ept

Flowsheet Selection : Oil Tank with Separator

Calculation Method : RVP Distillation

Control Efficiency : 98.0%

Known Separator Stream : Low Pressure Oil

Entering Air Composition : No

Filed Name : EQT - SMI-28 Sand Separator Tank

Well Name : PTE for G-70A Application

Date : 2014.10.20

* Data Input *

Separator Pressure : 1000.00[psig]

Separator Temperature : 60.00[F]

Ambient Pressure : 14.70[psia]

Ambient Temperature : 55.00[F]

C10+ SG : 0.7498

C10+ MW : 122.375

-- Low Pressure Oil -----

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.1260
4	N2	0.0000
5	C1	27.1290
6	C2	19.2910
7	C3	12.6670
8	i-C4	3.0470
9	n-C4	6.5440
10	i-C5	3.2910
11	n-C5	3.1030
12	C6	3.0460
13	C7	4.3100
14	C8	0.8600
15	C9	2.9760
16	C10+	6.9020
17	Benzene	0.0450
18	Toluene	0.2900
19	E-Benzene	0.0500
20	Xylenes	0.6010
21	n-C6	1.6660
22	2,2,4-Trimethylp	4.0560

-- Sales Oil -----

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

* Calculation Results *

-- Emission Summary -----

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
Total HAPs	0.010	0.002	0.000	0.000
Page 1----- E&P TANK				
Total HC	2.722	0.621	0.054	0.012
VOCs, C2+	2.122	0.484	0.042	0.010
VOCs, C3+	1.323	0.302	0.026	0.006

Uncontrolled Recovery Info.

Vapor 188.3600 x1E-3 [MSCFD]
 HC Vapor 188.0000 x1E-3 [MSCFD]
 GOR 1883.60 [SCF/bbl]

-- Emission Composition -----

No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
1	H2S	0.000	0.000	0.000	0.000
2	O2	0.000	0.000	0.000	0.000
3	CO2	0.008	0.002	0.008	0.002
4	N2	0.000	0.000	0.000	0.000
5	C1	0.600	0.137	0.012	0.003
6	C2	0.799	0.182	0.016	0.004
7	C3	0.765	0.175	0.015	0.003
8	i-C4	0.189	0.043	0.004	0.001
9	n-C4	0.276	0.063	0.006	0.001
10	i-C5	0.045	0.010	0.001	0.000
11	n-C5	0.027	0.006	0.001	0.000
12	C6	0.008	0.002	0.000	0.000
13	C7	0.003	0.001	0.000	0.000
14	C8	0.000	0.000	0.000	0.000
15	C9	0.000	0.000	0.000	0.000
16	C10+	0.001	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	0.003	0.001	0.000	0.000
22	224Trimethylp	0.003	0.001	0.000	0.000
	Total	2.727	0.623	0.055	0.012

-- Stream Data -----

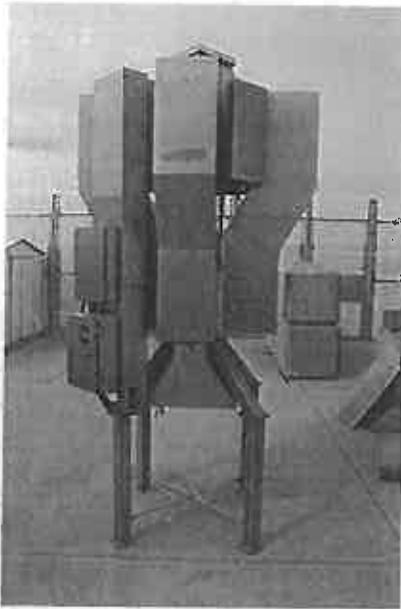
No. Component	MW	LP Oil	Flash Oil	Sale Oil	Flash Gas	W&S Gas	Total Emissions
	mol %	mol %	mol %	mol %	mol %	mol %	
1 H2S	34.80	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2 O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3 CO2	44.01	0.1260	0.0124	0.0000	0.2244	0.0471	0.1914
4 N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5 C1	16.04	27.1290	0.5415	0.0000	50.1673	2.0509	41.2089
6 C2	30.07	19.2910	4.4518	0.0005	32.1493	16.8599	29.3027
7 C3	44.10	12.6670	11.8139	0.2195	13.4062	44.1345	19.1272
8 i-C4	58.12	3.0470	4.8888	2.0109	1.4511	12.9112	3.5847
9 n-C4	58.12	6.5440	11.7497	9.0588	2.0332	19.2516	5.2389
10 i-C5	72.15	3.2910	6.7355	8.3102	0.3063	2.3461	0.6861
11 n-C5	72.15	3.1030	6.4764	8.2777	0.1800	1.4549	0.4173
12 C6	86.16	3.0460	6.5128	8.7011	0.0420	0.4125	0.1110
13 C7	100.20	4.3100	9.2702	12.5378	0.0120	0.1612	0.0398
14 C8	114.23	0.8600	1.8520	2.5133	0.0004	0.0085	0.0019
15 C9	128.28	2.9760	6.4101	8.7063	0.0003	0.0092	0.0020
16 C10+	122.38	6.9020	14.8646	20.1780	0.0024	0.0527	0.0117
17 Benzene	78.11	0.0450	0.0965	0.1295	0.0004	0.0043	0.0011
18 Toluene	92.13	0.2900	0.6242	0.8458	0.0004	0.0064	0.0015
19 E-Benzene	106.17	0.0500	0.1077	0.1462	0.0000	0.0003	0.0001
20 Xylenes	106.17	0.6010	1.2944	1.7576	0.0001	0.0031	0.0007
21 n-C6	86.18	1.6660	3.5710	4.7923	0.0153	0.1662	0.0434
22 224Trimethylp	114.24	4.0560	8.7266	11.8143	0.0089	0.1192	0.0294

MW	52.82	83.57	96.61	26.18	47.20	30.09	
Stream Mole Ratio	1.0000	0.4642	0.3417	0.5358	0.1226	0.6583	
Heating Value [BTU/SCF]				1551.58	2680.24	1761.71	
Gas Gravity [Gas/Air]				0.90	1.63	1.04	
Bubble Pt. @ 100F [psia]	1042.54	75.56	11.11				
RVP @ 100F [psia]	325.00	49.02	10.61				

Page 2-----E&P TANK

Spec. Gravity @ 100F	0.546	0.658	0.684				
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Model 1500 Thermoelectric Generators



Hazardous Area Generator

Global Thermoelectric's Model 1500 Thermoelectric Generator is Class 1, Div II Hazardous area rated. With no moving parts, it is a reliable, low maintenance source of DC electrical power for any application where regular utilities are unavailable or unreliable.

Power Specifications

Power Rating at 20°C
500 Watts at 24 volts
750m Elevation

Electrical

Adjustment: 24 V 24 - 30 Volts
Reverse current protection included.

Output: Terminal block which accepts up to 00 AWG wire. Opening for two 3/4" conduit in the lower side of the electrical box.

Fuel

Natural Gas:	48.0 m ³ /day (1695 Sft ³ /day) 1000 BTU/Sft ³ (37.7 MJ/SM ³) gas max 115 mg/Sm ³ (~170 ppm) H ₂ S max 120 mg/Sm ³ H ₂ O max 1% free O ₂
Propane:	n/a at this time
Max. Supply Pressure:	172 kPa (25 psi)
Min. Supply Pressure:	103 kPa (15 psi)
Fuel Connection:	1/4" MNPT

Environmental

Ambient Operation Temperature: Max. 45°C (115°F) Min. -40°C (-40°F).
Operating Conditions: Unsheltered operation
Please contact Global for operating conditions below -40°C or above +45°C.

Materials of Construction

Cabinet:	316 SS
Cooling Type:	Natural Convection
Fuel System:	Aluminum & Stainless Steel

Standard Features

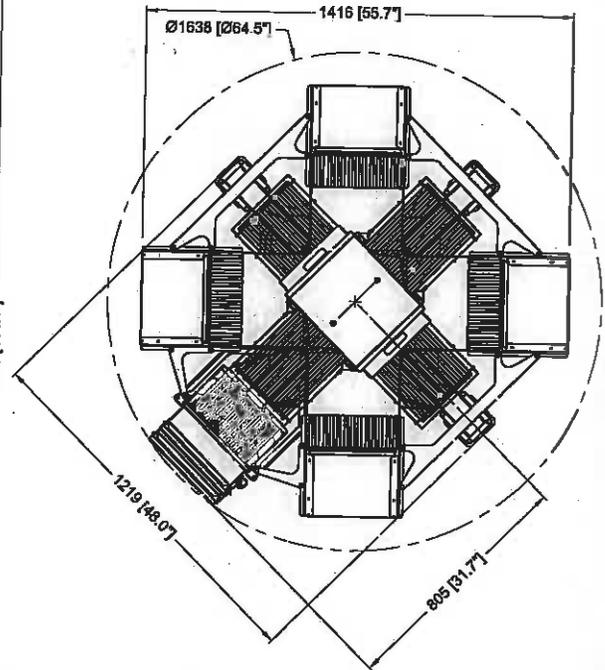
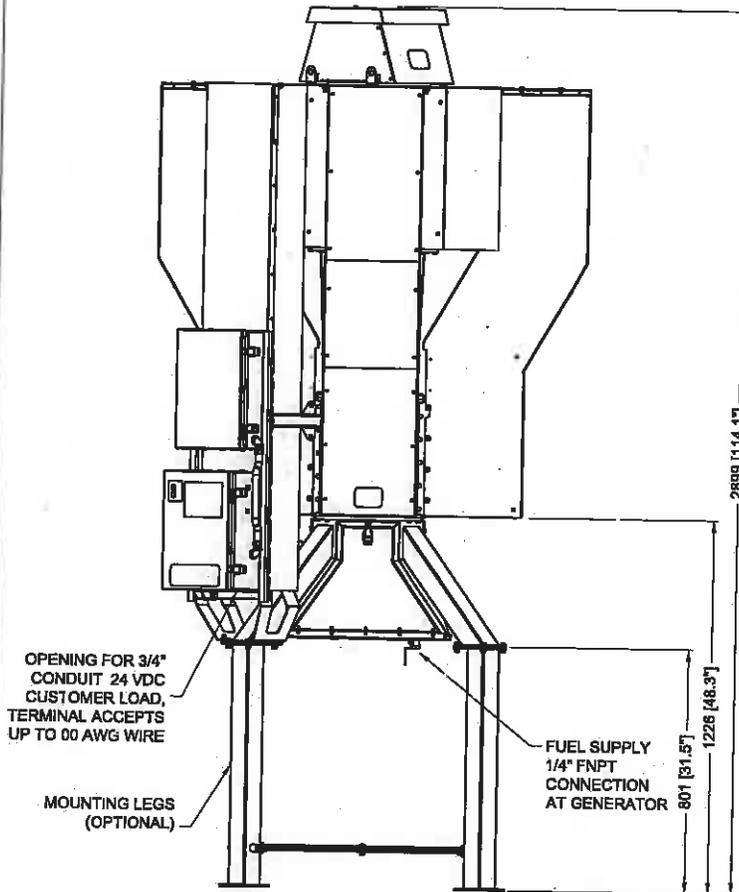
- Automatic Spark Ignition (SI)
- Automatic Fuel Shut-off (SO)
- Fuel Filter
- Low Voltage Alarm Contacts (VSR)
- CSA Certification
 - Class 1, Div II, Group D, Temp T3

Note: Specifications shown are for standard configurations. Global Thermoelectric's Integrated Systems Engineering Department is available to design custom voltages, fuel supply systems and non-standard operating temperatures.



Typical Installation

Rev 04-12



- NOTES:
1. GENERATOR WEIGHT: 700 kg [1530 lb]
 2. DIMENSIONS IN mm, [INCHES].

42362 rev1



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Corporate Office
 9, 3700 - 78 Avenue SE
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 P.O. Box 38624
 Houston, TX 77238
 Phone: (281) 445-1515
 Fax: (281) 445-6060
 Toll Free: 1 800 848-4113

Model 1500 Thermoelectric Generator

ATTACHMENT J

Class I Legal Advertisement

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that EQT Production has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Class II General Permit (G70-A) for the existing natural gas production wellpad SMI-28. The facility is located in Doddridge County, West Virginia, about 6.3 miles northwest of New Milton, WV at 39.26262 N, -80.73805 W.

The applicant estimates the potential to discharge the following Regulated Air Pollutants associated with this facility:

Pollutant	Emissions (tons per year)
NO _x	18.18
CO	15.27
VOC	89.56
SO ₂	0.11
PM	21.93
Total HAPs	1.57
Carbon Dioxide Equivalents (CO ₂ e)	24,559

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

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.

Dated this the 21st day of January, 2015.

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

ATTACHMENT K

Electronic Submittal (*not applicable*)

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 <i>(Speciate VOCs & HAPs)</i>	Maximum Potential Uncontrolled Emissions ³		Maximum Potential Controlled Emissions ⁴		Emission Form or Phase <i>(At exit conditions, Solid, Liquid or Gas/Vapor)</i>	Est. Method Used ⁵
		ID No.	Source	ID No.	Device Type		lb/hr	ton/yr	lb/hr	ton/yr		
E001 - E010, E022 - E023, E026 - E027 (Total - All Prod Fluid Tanks)	Upward vertical stack	S001 - S010, S022 - S023, S026 - S027	Produced Fluids Tanks	C001 C002	Combustor(s)	VOC	753.34	3299.62	15.05	66.00	Gas/Vapor	E&P TANK v2.0
						HAPs	6.75	29.54	0.14	0.59		
E011 - E019, E024 - E025, E028 - E029 (Total - All Heaters)	Upward vertical stack	S011 - S019, S024 - S025, S028 - S029	Line Heaters	None	-	NOx	1.90	8.34	1.90	8.34	Gas/Vapor	AP-42
						CO	1.60	7.01	1.60	7.01		
						PM/PM10/PM2.5	0.14	0.63	0.14	0.63		
						SO2	0.01	0.05	0.01	0.05		
						VOC	0.10	0.46	0.10	0.46		
						CO2e	2,342	10,260	2,342	10,260		
E020 - E021 (TEGs - 0.03 MMBtu/hr)	Upward vertical stack	S020 - S021	TEGs	None	-	NOx	0.01	0.02	0.01	0.02	Gas/Vapor	AP-42
						CO	<0.01	0.02	<0.01	0.02		
						PM/PM10/PM2.5	<0.01	<0.01	<0.01	<0.01		
						SO2	<0.01	<0.01	<0.01	<0.01		
						VOC	<0.01	<0.01	<0.01	<0.01		
						CO2e	7	30	7	30		
E030	Upward vertical stack	S030	Sand Separator Tank	C001 C002 (optional)	Combustor(s)	VOC	0.30	1.32	0.30	1.32	Gas/Vapor	E&P TANK v2.0
						HAPs	<0.01	0.01	<0.01	0.01		
E031 - E033 (TEGs - 0.07 MMBtu/hr)	Upward vertical stack	S031 - S033	TEGs	None	-	NOx	0.02	0.09	0.02	0.09	Gas/Vapor	AP-42
						CO	0.02	0.07	0.02	0.07		
						PM/PM10/PM2.5	<0.01	<0.01	<0.01	<0.01		
						SO2	<0.01	<0.01	<0.01	<0.01		
						VOC	<0.01	<0.01	<0.01	<0.01		
CO2e	25	109	25	109								

E034	Upward vertical stack	S034	Liquid Loading	C001 C002	Combustor r(s)	VOC	0.92	4.04	0.29	1.27	AP-42
C001 C002	Upward vertical stack	C001 C002	Combustor(s)	NA	—	HAPs	0.02	0.09	0.01	0.03	AP-42
						NOx	2.23	9.75	2.23	9.75	
						CO	1.87	8.19	1.87	8.19	
						PM/PM10/PM2.5	0.17	0.74	0.17	0.74	
						SO2	0.01	0.06	0.01	0.06	
	VOC	---	---	---	---	---	---	---	---		
	CO2e				2,900	12,701	2,900	12,701	12,701		

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. Specify 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, SO_x, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂C, 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: M.B = material balance; ST = stack test (give date of test); EE = engineering estimate; M = modeling; O = other (specify).