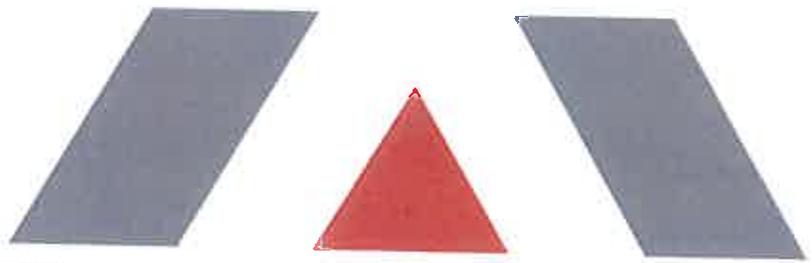
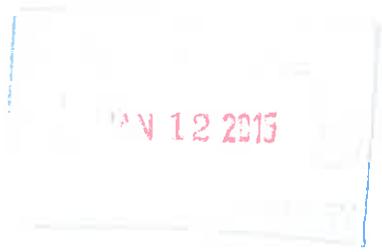


Roy
G70-1402TE
017-00071



PROJECT REPORT
EQT Production
SMI-27 Pad



G70-A General Permit Application



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December 2014



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1. INTRODUCTION

EQT Production Company (EQT) is submitting this general permit application to the West Virginia Department of Environmental Protection (WVDEP) for the modification of the existing G70-A permit for its natural gas production well pad located in Doddridge County, West Virginia (SMI-27 Pad).

1.1. FACILITY AND PROJECT DESCRIPTION

The SMI-27 Pad is a natural gas production facility. The pad consist of nine (9) natural gas wells. Natural gas and liquids (including water and condensate) are extracted from deposits underneath the surface. Natural gas is transported from the well through a glycol dehydration unit (rated up to 70 MMscfd) where the raw gas is dehydrated and then sent to a gas line for additional processing and compression, as necessary. The liquids produced are stored in storage vessels. The SMI-27 Pad was originally permitted under R13 Permit No. R13-3144. The application and subsequent issuance of a G70-A permit incorporated existing equipment at the pad, as well as a dehydrator with associated reboiler and combustor. The SMI-27 Pad is currently operating under G70-A Permit No. G70-A027A.

This application seeks to authorize installation and operation of the following additional equipment at the SMI-27 Pad:

- > Three (3) natural gas wells;
- > Two (2) 400 bbl storage tanks for condensate/water (Vapors from these tanks will be controlled by two existing enclosed combustors (C001- C002), each rated at 11.66 MMBtu/hr.);
- > Three (3) in-line heaters, each rated at 1.54 MMBtu/hr (heat input);
- > One (1) thermoelectric generator (TEG) rate at 0.07 MMbtu/hr (heat input);
- > One (1) 140 barrel (bbl) Sand Separator Tank for produced water and sand (Vapors from this tank may be controlled by the aforementioned combustors. For emission calculation purposes, no control is assumed.); and
- > One (1) 100 bbl Dehydrator Drip Tank associated with the existing dehydration unit (Vapors from this tank will be controlled by the existing dehy combustor, rated at 3.33 MMBtu/hr (C003). Liquid from this tank will be hauled off by tank trucks.).

The following equipment is already permitted and installed at the SMI-27 Pad:

- > One (1) triethylene glycol dehydrator with associated reboiler (1.15 MMbtu/hr duty [input] rating), with emissions from the regenerator controlled by an enclosed combustor (C003. Emissions from the flash tank are routed to the reboiler for control.);
- > Ten (10) 400 bbl storage tanks for condensate/water. (Vapors from the storage tanks are controlled by the aforementioned combustors C001 and C002);
- > Nine (9) in-line heaters, each rated at 1.54 MMBtu/hr (heat input); and
- > Two (2) thermoelectric generators (TEG), each rated at 0.03 MMBtu/hr (heat input).

Additionally, this application seeks to increase the current permit liquid throughput limits of the Produced Fluids Tanks and Liquid Loading at the facility. 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-27 Pad for air permitting purposes if and only if all three elements of the “stationary source” definition above are fulfilled. WVDEP determined that the SMI-27 Pad is a separate stationary source when issuing the original permit and no changes to the information presented in that application have changed. Therefore, the SMI-27 Pad should continue to be considered a separate stationary source with respect to permitting programs, including Title V and Prevention of Significant Deterioration (PSD). As discussed in this application, the facility is a minor source of air emissions with respect to New Source Review (NSR) and Title V permitting. Refer to the regulatory discussion in Section 3 for detailed discussion regarding applicable requirements and compliance demonstration methodology.

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: 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 Data Sheet;
- > Attachment I: Emission 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 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 result from natural gas combustion in the line heaters and thermoelectric generator, as well as emissions from storage of organic liquids in storage tanks and loading of organic liquids into tank trucks. In addition, fugitive emissions will result from component leaks from the operation of the station. The methods by which emissions from each of these source types is 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 Potential emissions of NO_x, CO, PM, SO₂ and GHGs from the combustors are also calculated according to the aforementioned methodologies.
- > **Produced Fluids Storage Tanks, Dehydrator Drip Tank, and Sand Separator Storage Tank:** Working, breathing and flashing emissions of VOC and HAPs from the condensate/water stored in the tanks at the facility are calculated using API E&P TANK v2.0.
- > **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
- > **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 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

It is important to note that additional emission calculations for existing units (e.g., dehydrator, line heater, etc.) were updated based on more recent gas and condensate analyses. However, EQT would like to retain the existing emission limits for the units in question.

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) and new and modified sources of non-attainment pollutants under Non-Attainment New Source Review (NNSR). PSD and NNSR regulations apply when a major source makes a change, such as installing new equipment or modifying existing equipment, and a significant increase in emissions results from the change. The wellpad is not a major source with respect to the NSR program since its potential emissions are below all the NSR/PSD thresholds. As such, NSR/PSD permitting is not triggered by this construction activity. EQT will monitor future construction activities at the site closely and will compare any future increase in emissions with the NSR/PSD thresholds to ensure these activities will not trigger this program.

3.2. TITLE V OPERATING PERMIT PROGRAM

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in West Virginia Code of State Regulations (CSR) 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP, 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). The produced fluids tank, dehydrator drip tank, and sand separator tank each 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. 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 currently ten (10) produced fluids storage vessels at the wellpad. As part of this modification application, EQT is proposing to install two (2) new produced fluids storage vessels, one (1) new sand separator storage vessel and one (1) dehydrator drip fluid storage vessel. The proposed storage vessels will be controlled by the two (2)

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

existing enclosed combustors with destruction efficiencies greater than 95 percent. The storage vessels at the facility will each have potential VOC emissions below 6 tpy based on the manufacturer-guaranteed controls. As such, per 60.5365(e), the tanks are not storage vessel affected facilities under this 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

Glycol dehydration units are potentially subject to Subpart HH, NESHAP from Natural Gas Production Facilities. This standard applies to such units at natural gas production facilities that are major or area sources of HAP emissions. The existing SMI-27 wellpad is an area source of HAP emissions. Even though the TEG dehydration unit at the wellpad is considered an affected area source, it is exempt from the requirements of § 63.764(d)(2) since the actual average benzene emissions from the glycol dehydration unit process vent to the atmosphere is less than 0.90 Mg (1.0 TPY), as determined by the procedures specified in § 63.772(b)(2). However, the facility must maintain records as required in §63.774(d)(1).

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 proposed project does not include any of the aforementioned sources as such, this subpart will not apply.

3.5. WEST VIRGINIA SIP REGULATIONS

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

3.5.1. 45 CSR 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.

3.5.2. 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 this unit shall not exceed 20 percent, except as provided by 4.4. PM emissions from this unit will not exceed the levels calculated in accordance with 6-4.1.

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

45 CSR 16-1 incorporates the federal Clean Air Act (CAA) standards of performance for new stationary sources set forth in 40 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.

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

According to 45 CSR 17-3.1:

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

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

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

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

3.5.6. 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.

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 production wellsite	8a. Standard Industrial Classification Classification (SIC) code: 1311	AND	8b. North American Industry System (NAICS) code: 211111
9. DAQ Plant ID No. (for existing facilities only): 017-0071	10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only): _____ G70-A027A _____ _____		

A: PRIMARY OPERATING SITE INFORMATION

<p>11A. Facility name of primary operating site:</p> <p>SMI-27 Pad</p> <hr/>	<p>12A. Address of primary operating site:</p> <p>Mailing: 625 Liberty Avenue, Suite 1700, Pittsburgh, PA 15222</p> <p>Physical:</p> <hr/>	
<p>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</p> <p>— IF YES, please explain: Property is leased and held under production rights</p> <hr/> <p>— IF NO, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.</p>		
<p>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;</p> <p>— 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.</p> <p>From Shirley, WV, head east on WV-23 toward Co Rd 64/Braden Hill for 2.2 miles. Turn right onto Co Rte 3/Big Flint Road. Proceed 1.8 miles. Facility will be on the left.</p>		
<p>15A. Nearest city or town:</p> <p>New Milton</p>	<p>16A. County:</p> <p>Doddridge</p>	<p>17A. UTM Coordinates:</p> <p>Northing (KM): 4,357.597</p> <p>Easting (KM): 526.084</p> <p>Zone: 17</p>
<p>18A. Briefly describe the proposed new operation or change (s) to the facility:</p> <p>Installation of wells, well production support equipment and increase in produced water/condensate throughput at the existing wellpad.</p>		<p>19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):</p> <p>Latitude: <u>39.367439</u></p> <p>Longitude: <u>-80.697198</u></p>

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

<p>11B. Name of 1st alternate operating site:</p> <p><u>N/A</u></p> <hr/>	<p>12B. Address of 1st alternate operating site:</p> <p>Mailing: _____ Physical: _____</p> <hr/>
<p>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</p> <p>— IF YES, please explain: _____</p> <hr/> <p>— IF NO, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.</p>	
<p>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;</p> <p>— 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.</p> <hr/> <hr/> <hr/>	

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

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

11C. Name of 2 nd alternate operating site: _____ N/A	12C. Address of 2 nd alternate operating site: Mailing: _____ Physical: _____
--	---

13C. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? 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: _____ / _____ / _____ ASAP <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: _____ / _____ / _____ ASAP
--	--

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

Hours per day 24 Days per week 7 Weeks per year 52 Percentage of operation 100

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

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

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

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

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

- ATTACHMENT A : CURRENT BUSINESS CERTIFICATE
- ATTACHMENT B: PROCESS DESCRIPTION
- ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS
- ATTACHMENT D: PROCESS FLOW DIAGRAM
- ATTACHMENT E: PLOT PLAN
- ATTACHMENT F: AREA MAP
- ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM
- ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS
- ATTACHMENT I: EMISSIONS CALCULATIONS
- ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT
- ATTACHMENT K: ELECTRONIC SUBMITTAL (*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 11/7/2015

Applicant's Name _____ Mark Sowa -- Sr. Environmental Coordinator

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

Email _____ msowa@eqt.com

ATTACHMENT A

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 three (3) natural gas wells, three (3) line heaters, two (2) storage vessels for produced fluids, one (1) thermoelectric generator, one (1) sand separator tank, and one (1) dehydrator drip tank at an existing natural gas production wellpad operation (SMI-27). The project also seeks to increase produced water/condensate throughput for existing sources at the wellpad.

The SMI-27 wellpad currently consists of nine (9) wells, each with the same basic operation. The incoming gas stream from the underground wells will pass through a sand separator, where sand, water and residual solids are displaced and transferred to the sand separator tank. The gas then flows into a three phase separator which separates water and condensate from the gas stream. The water and condensate in the separator will be transferred to storage vessels. Emissions from the storage vessels are controlled by two (2) enclosed combustors (C001-C002). The wet gas is processed through a tri-ethylene glycol dehydrator prior to sending to the gas line. Liquids from the dehydrator contact tower, BTEX blow case and flash gas tank are transferred to the dehydrator drip tank. Emissions from the dehydrator unit and dehydrator drip tank are controlled by a separate enclosed combustor (C003). Once the tanks (i.e. sand separator, condensate, and dehydrator drip tank) are filled, the contents are loaded into trucks for transport. Liquid loading for the sand separator and condensate tanks is vapor balanced. 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	N/A	---	---	---	---	---
Unpaved Haul Roads	PM	11.45	50.16	11.45	50.16	---
	PM ₁₀	2.92	12.78	2.92	12.78	
	PM _{2.5}	0.29	1.28	0.29	1.28	
Loading/Unloading Operations	VOC	1.07	4.67	0.36	1.56	O ^A
	HAP	0.02	0.11	0.01	0.04	
Equipment Leaks	VOC	Does not apply	20.53	Does not apply	20.53	O ^B
	CO _{2e} HAP	Does not apply	1,373 1.89	Does not apply	1,373 1.89	
Blowdown Emissions	N/A	---	---	---	---	---
Other	N/A	---	---	---	---	---

^A AP-42 Section 5.2.

^B 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, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂O, N₂, O₂, and Noble Gases.

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

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

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

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components	Number of Components Monitored by Frequency	Average Time to Repair (days)	Estimated Annual Emission Rate (lb/yr) ¹
Pumps	light liquid VOC	1	TBD	TBD	384
	heavy liquid VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Valves	Gas VOC	469	TBD	TBD	10,815
	Light Liquid VOC	---	TBD	TBD	---
	Heavy Liquid VOC	---	TBD	TBD	---
Safety Relief Valves	Non-VOC	---	TBD	TBD	---
	Gas VOC	38	TBD	TBD	15,264
	Non VOC	---	TBD	TBD	---
Open-ended Lines	VOC	32	TBD	TBD	210
	Non-VOC	---	TBD	TBD	---
	VOC	---	TBD	TBD	---
Sampling Connections	Non-VOC	---	TBD	TBD	---
	VOC	---	TBD	TBD	---
Compressors	Non-VOC	---	TBD	TBD	---
	VOC	---	TBD	TBD	---
Flanges	VOC	2,034	TBD	TBD	14,377
	Non-VOC	---	TBD	TBD	---
Other	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---

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

ATTACHMENT D

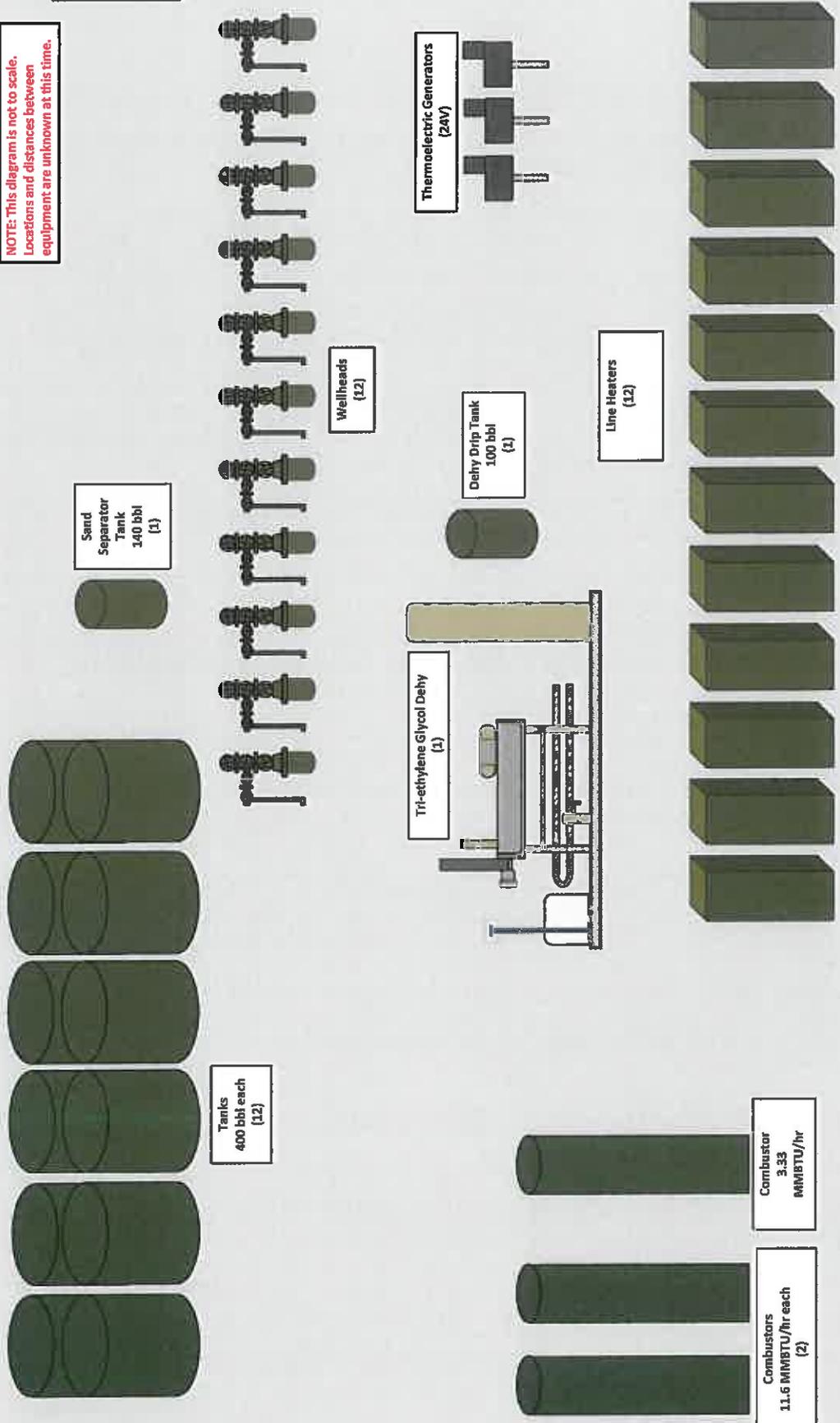
Process Flow Diagram

ATTACHMENT E

Plot Plan

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

Entrance to SM127 pad



ATTACHMENT F

Area Map

ATTACHMENT F: AREA MAP



Figure 1 - Map of SMI-27 Location

UTM Northing (KM): 4,357.597
UTM Easting (KM): 526.084
Elevation: 1,197 ft

ATTACHMENT G

Emission Unit Data Sheets and G70-A Section Applicability Form

**General Permit G70-A Registration
Section Applicability Form**

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

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

Section 5	Natural Gas Well Affected Facility	<input checked="" type="checkbox"/>
Section 6	Storage Vessels*	<input checked="" type="checkbox"/>
Section 7	Gas Producing Units, In-Line Heaters, Heater Treaters, and Glycol Dehydration Reboilers	<input checked="" type="checkbox"/>
Section 8	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO)	<input type="checkbox"/>
Section 9	<i>Reserved</i>	<input type="checkbox"/>
Section 10	Natural gas-fired Compressor Engine(s) (RICE) **	<input type="checkbox"/>
Section 11	Tank Truck Loading Facility ***	<input checked="" type="checkbox"/>
Section 12	Standards of Performance for Storage Vessel Affected Facilities (NSPS, Subpart OOOO)	<input type="checkbox"/>
Section 13	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (NSPS, Subpart JJJJ)	<input type="checkbox"/>
Section 14	Control Devices not subject to NSPS, Subpart OOOO	<input checked="" type="checkbox"/>
Section 15	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (40CFR63, Subpart ZZZZ)	<input type="checkbox"/>
Section 16	Glycol Dehydration Units	<input checked="" type="checkbox"/>
Section 17	Dehydration Units With Exemption from NESHAP Standard, Subpart HH § 63.764(d) (40CFR63, Subpart HH)	<input checked="" 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 Fluids Storage Tank	2013/2014	400 bbl	Modification: Increase throughput	C001 & C002
S002	E002	Produced Fluids Storage Tank	2013/2014	400 bbl	Modification: Increase throughput	C001 & C002
S003	E003	Produced Fluids Storage Tank	2013/2014	400 bbl	Modification: Increase throughput	C001 & C002
S004	E004	Produced Fluids Storage Tank	2013/2014	400 bbl	Modification: Increase throughput	C001 & C002
S005	E005	Produced Fluids Storage Tank	2013/2014	400 bbl	Modification: Increase throughput	C001 & C002
S006	E006	Produced Fluids Storage Tank	2013/2014	400 bbl	Modification: Increase throughput	C001 & C002
S007	E007	Produced Fluids Storage Tank	2013/2014	400 bbl	Modification: Increase throughput	C001 & C002
S008	E008	Produced Fluids Storage Tank	2013/2014	400 bbl	Modification: Increase throughput	C001 & C002
S009	E009	Produced Fluids Storage Tank	2013/2014	400 bbl	Modification: Increase throughput	C001 & C002
S010	E010	Produced Fluids Storage Tank	2013/2014	400 bbl	Modification: Increase throughput	C001 & C002
S011	E011	Line heater	2013	1.54 MMBtu/hr	Existing, No change	None
S012	E012	Line heater	2013	1.54 MMBtu/hr	Existing, No change	None
S013	E013	Line heater	2013	1.54 MMBtu/hr	Existing, No change	None
S014	E014	Line heater	2013	1.54 MMBtu/hr	Existing, No change	None
S015	E015	Line heater	2013	1.54 MMBtu/hr	Existing, No change	None
S016	E016	Line heater	2013	1.54 MMBtu/hr	Existing, No change	None
S017	E017	Line heater	2013	1.54 MMBtu/hr	Existing, No change	None
S018	E018	Line heater	2013	1.54 MMBtu/hr	Existing, No change	None
S019	E019	Line heater	2013	1.54 MMBtu/hr	Existing, No change	None
S020	E020	Thermoelectric Generators	2013	0.029 MMBtu/hr	Existing, No change	None
S021	E021	Thermoelectric Generators	2013	0.029 MMBtu/hr	Existing, No change	None
S022	E022	Dehydration Unit	2014	70 MMSCFD	Existing, No change	C003
S023	E023	Reboiler	2014	1.15 MMBtu/hr	Existing, No change	None
S024	E024	Liquid Loading	2013/2014	NA	Modification: Increase throughput	C001 & C002
S025	E025	Produced Fluids Storage Tank	TBD	400 bbl	New	C001 & C002
S026	E026	Produced Fluids Storage Tank	TBD	400 bbl	New	C001 & C002
S027	E027	Line heater	TBD	1.54 MMBtu/hr	New	None
S028	E028	Line heater	TBD	1.54 MMBtu/hr	New	None

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 Instructions and Forms

S029	E029	Line heater	TBD	1.54 MMBtu/hr	New	None
S030	E030	Sand Separator Tank	TBD	140 bbl	New	C001 & C002
S031	E031	Dehydrator Drip Tank	TBD	100 bbl	New	C003
S032	E032	Thermoelectric Generator	TBD	0.07 MMBtu/hr	New	None

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

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

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:	
047-017-06051	047-017-06062
047-017-06054	047-017-06063
047-017-06057	TBD
047-017-06058	TBD
047-017-06059	TBD
047-017-06060	
047-017-06061	

Note: This is the same API well number(s) provided in the well completion notification and as provided to the WVDEP, Office of Oil and Gas for the well permit. The API number may be provided on the application without the state code (047).

Every oil and gas well permitted in West Virginia since 1929 has been issued an API (American Petroleum Institute) number. This API is used by agencies to identify and track oil and gas wells.

The API number has the following format: 047-001-00001

*Where,
047 = State code. The state code for WV is 047.
001 = County Code. County codes are odd numbers, beginning with 001 (Barbour) and continuing to 109 (Wyoming).
00001 = Well number. Each well will have a unique well number.*

STORAGE VESSEL EMISSION UNIT DATA SHEET

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

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name SMI-27 Wellpad	2. Tank Name Produced Fluids Tank
3. Emission Unit ID number S001 through S010, S025 through S026	4. Emission Point ID number E001 through E010, E025 through E026
5. Date Installed or Modified (<i>for existing tanks</i>) S001 – S010: Installed 2013; Modified 2014 S025 – S026: Installation TBD	6. Type of change: <input type="checkbox"/> New construction <input type="checkbox"/> New stored material <input checked="" type="checkbox"/> Other
7A. Description of Tank Modification (<i>if applicable</i>) S001 – S010: Modification - Increase throughput S025 – S026: New	
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.)	11B. Average Vapor Space Height (ft.)
12. Nominal Capacity (<i>specify barrels or gallons</i>). This is also known as "working volume. 400 bbl	
13A. Maximum annual throughput (gal/yr) ~47,139,456 (All Tanks: S001-S010, S025-S026, S031)	13B. Maximum daily throughput (gal/day) ~129,149 (All Tanks: S001-S010, S025-S026, S031)
14. Number of tank turnovers per year ~2,806 (All Tanks: S001-S010, S025-S026, S031)	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 ___ horizontal ___ flat roof <input checked="" type="checkbox"/> cone roof ___ dome roof ___ other (describe) <input type="checkbox"/> External Floating Roof ___ pontoon roof ___ double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof ___ vertical column support ___ self-supporting <input type="checkbox"/> Variable Vapor Space ___ lifter roof ___ diaphragm <input type="checkbox"/> Pressurized ___ spherical ___ cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

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

24. Is the tank a Vertical Fixed Roof Tank ? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		24A. If yes, for dome roof provide radius (ft):		24B. If yes, for cone roof, provide slop (ft/ft):	
25. Complete item 25 for Floating Roof Tanks <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/>					
25A. Year Internal Floaters Installed:					
25B. Primary Seal Type (<i>check one</i>): <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? (<i>check one</i>) <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: Elkins, West Virginia					
28. Daily Avg. Ambient Temperature (°F): 49.06			29. Annual Avg. Maximum Temperature (°F): 61.16		
30. Annual Avg. Minimum Temperature (°F): 36.97			31. Avg. Wind Speed (mph): 6.17		
32. Annual Avg. Solar Insulation Factor (BTU/ft ² -day): 1,193.89			33. Atmospheric Pressure (psia): 14.73		
LIQUID INFORMATION:					
34. Avg. daily temperature range of bulk liquid (°F): 51.30		34A. Minimum (°F):		34B. Maximum (°F):	
35. Avg. operating pressure range of tank (psig): 0.2564		35A. Minimum (psig): 0.1955		35B. Maximum (psig): 0.3338	
36A. Minimum liquid surface temperature (°F): 46.54			36B. Corresponding vapor pressure (psia): 0.1955		
37A. Avg. liquid surface temperature (°F): 55.41			37B. Corresponding vapor pressure (psia): 0.2564		
38A. Maximum liquid surface temperature (°F): 64.27			38B. Corresponding vapor pressure (psia): 0.3338		
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:		N/A			
39C. Liquid density (lb/gal):		TBD			
39D. Liquid molecular weight (lb/lb-mole):		TBD			
39E. Vapor molecular weight (lb/lb-mole):		24.2771			
39F. Maximum true vapor pressure (psia):		TBD			
39G. Maxim Reid vapor pressure (psia):		TBD			
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-27 Wellpad	2. Tank Name Sand Separator Tank
3. Emission Unit ID number S030	4. Emission Point ID number E030
5. Date Installed or Modified (for existing tanks) 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 (if applicable) Installation of one new tank	
7B. Will more than one material be stored in this tank? If so, a separate form must be completed for each material. <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 (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 140 bbl	
9A. Tank Internal Diameter (ft.) ~10	9B. Tank Internal Height (ft.) ~10
10A. Maximum Liquid Height (ft.) ~10	10B. Average Liquid Height (ft.) ~5
11A. Maximum Vapor Space Height (ft.) ~10	11B. Average Vapor Space Height (ft.) ~5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume. 140 bbl	
13A. Maximum annual throughput (gal/yr) ~141,120	13B. Maximum daily throughput (gal/day) ~387
14. Number of tank turnovers per year ~24	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 ___ vertical <input checked="" type="checkbox"/> horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe) <input type="checkbox"/> External Floating Roof ___ pontoon roof ___ double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof ___ vertical column support ___ self-supporting <input type="checkbox"/> Variable Vapor Space ___ lifter roof ___ diaphragm <input type="checkbox"/> Pressurized ___ spherical ___ 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 Vacuum Setting Pressure Setting)
<input type="checkbox"/> Other ¹ (describe)	<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: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunit lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) Welded		
20A. Shell Color: Gray	20B. Roof Color: Gray	20C. Year Last Painted:
21. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable		
22A. Is the tank heated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?
23. Operating Pressure Range (psig): -0.2 to 0.70 psig		
24. Is the tank a Vertical Fixed Roof Tank? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):
25. Complete item 25 for Floating Roof Tanks <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/>		
25A. Year Internal Floaters Installed:		

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25B. Primary Seal Type (<i>check one</i>): <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? (<i>check one</i>) <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: Elkins, West Virginia			
28. Daily Avg. Ambient Temperature (°F): 49.06		29. Annual Avg. Maximum Temperature (°F): 61.16	
30. Annual Avg. Minimum Temperature (°F): 36.97		31. Avg. Wind Speed (mph): 6.17	
32. Annual Avg. Solar Insulation Factor (BTU/ft ² -day): 1,193.89		33. Atmospheric Pressure (psia): 14.73	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.30		34B. Maximum (°F):	
35. Avg. operating pressure range of tank (psig): 0.2564		35B. Maximum (psig): 0.3338	
36A. Minimum liquid surface temperature (°F): 45.54		36B. Corresponding vapor pressure (psia): 0.1955	
37A. Avg. liquid surface temperature (°F): 55.41		37B. Corresponding vapor pressure (psia): 0.2564	
38A. Maximum liquid surface temperature (°F): 64.27		38B. Corresponding vapor pressure (psia): 0.3338	
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:	N/A		
39C. Liquid density (lb/gal):	TBD		
39D. Liquid molecular weight (lb/lb-mole):	TBD		
39E. Vapor molecular weight (lb/lb-mole):	24.2771		
39F. Maximum true vapor pressure (psia):	TBD		
39G. Maxim Reid vapor pressure (psia):	TBD		
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-27 Wellpad	2. Tank Name Dehydrator Drip Tank
3. Emission Unit ID number S031	4. Emission Point ID number E031
5. Date Installed or Modified (for existing tanks) TBD	6. Type of change: <input checked="" type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other
7A. Description of Tank Modification (if applicable) Installation of one new tank	
7B. Will more than one material be stored in this tank? If so, a separate form must be completed for each material. <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 (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 100 bbl	
9A. Tank Internal Diameter (ft.) ~8	9B. Tank Internal Height (ft.) ~11
10A. Maximum Liquid Height (ft.) ~11	10B. Average Liquid Height (ft.) ~5.5
11A. Maximum Vapor Space Height (ft.) ~11	11B. Average Vapor Space Height (ft.) ~5.5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume. 100 bbl	
13A. Maximum annual throughput (gal/yr) ~47,139,456 (All Tanks: S001-S010, S025-S026, S031)	13B. Maximum daily throughput (gal/day) ~129,149 (All Tanks: S001-S010, S025-S026, S031)
14. Number of tank turnovers per year ~2,806 (All Tanks: S001-S010, S025-S026, S031)	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 ___ horizontal ___ flat roof <input checked="" type="checkbox"/> cone roof ___ dome roof ___ other (describe) <input type="checkbox"/> External Floating Roof ___ pontoon roof ___ double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof ___ vertical column support ___ self-supporting <input type="checkbox"/> Variable Vapor Space ___ lifter roof ___ diaphragm <input type="checkbox"/> Pressurized ___ spherical ___ 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

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<input checked="" type="checkbox"/> Yes		<input type="checkbox"/> No	
25. Complete item 25 for Floating Roof Tanks <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/>			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type (<i>check one</i>): <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? (<i>check one</i>) <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: Elkins, West Virginia			
28. Daily Avg. Ambient Temperature (°F): 49.06		29. Annual Avg. Maximum Temperature (°F): 61.15	
30. Annual Avg. Minimum Temperature (°F): 36.97		31. Avg. Wind Speed (mph): 6.17	
32. Annual Avg. Solar Insulation Factor (BTU/ft ² -day): 1,193.89		33. Atmospheric Pressure (psia): 13.73	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.30	34A. Minimum (°F):	34B. Maximum (°F):	
35. Avg. operating pressure range of tank (psig): 0.2564	35A. Minimum (psig): 0.1955	35B. Maximum (psig): 0.3338	
36A. Minimum liquid surface temperature (°F): 45.54		36B. Corresponding vapor pressure (psia): 0.1955	
37A. Avg. liquid surface temperature (°F): 55.41		37B. Corresponding vapor pressure (psia): 0.2564	
38A. Maximum liquid surface temperature (°F): 64.27		38B. Corresponding vapor pressure (psia): 0.3338	
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):	TBD		
39D. Liquid molecular weight (lb/lb-mole):	TBD		
39E. Vapor molecular weight (lb/lb-mole):	24.2771		
39F. Maximum true vapor pressure (psia):	TBD		
39G. Maxim Reid vapor pressure (psia):	TBD		
39H. Months Storage per year. From:	12 (All year)		
To:			

NATURAL GAS FIRED FUEL BURNING UNITS EMISSION DATA SHEET

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

Emission Unit ID # ¹	Emission Point ID# ²	Emission Unit Description (Manufacturer / Model #)	Year Installed/ Modified	Type ³ and Date of Change	Control Device ⁴	Design Heat Input (mmBtu/hr) ⁵	Fuel Heating Value (Btu/scf) ⁶
S011	E011	Line Heater	2013	Existing, No change	None	1.54	1,254
S012	E012	Line Heater	2013	Existing, No change	None	1.54	1,254
S013	E013	Line Heater	2013	Existing, No change	None	1.54	1,254
S014	E014	Line Heater	2013	Existing, No change	None	1.54	1,254
S015	E015	Line Heater	2013	Existing, No change	None	1.54	1,254
S016	E016	Line Heater	2013	Existing, No change	None	1.54	1,254
S017	E017	Line Heater	2013	Existing, No change	None	1.54	1,254
S018	E018	Line Heater	2013	Existing, No change	None	1.54	1,254
S019	E019	Line Heater	2013	Existing, No change	None	1.54	1,254
S020	E020	Thermoelectric Generator	2013	Existing, No change	None	0.029	1,254
S021	E021	Thermoelectric Generator	2013	Existing, No change	None	0.029	1,254
S027	E027	Line heater	TBD	New	None	1.54	1,254
S028	E028	Line heater	TBD	New	None	1.54	1,254
S029	E029	Line heater	TBD	New	None	1.54	1,254
S032	E032	Thermoelectric Generator	TBD	New	None	0.07	1,254

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.

GLYCOL DEHYDRATION EMISSION UNIT DATA SHEET

General Glycol Dehydration Unit Data		Manufacturer and Model		Valerus			
				Max Dry Gas Flow Rate (mmscf/day)		70	
				Design Heat Input (mmBtu/hr)		1.15	
				Design Type (DEG or TEG)		TEG	
				Source Status ²		ES	
				Date Installed/Modified/Removed ³		2014	
				Regenerator Still Vent APCD ⁴		FL – Flare; Flash Tank to Reboiler	
				Control Device ID ⁴		FL- C003	
				Fuel HV (Btu/scf)		1,254	
				H ₂ S Content (gr/100 scf)		0	
				Operation (hrs/yr)		8760	
Emission Unit ID/ Emission Point ID ¹	Vent	Reference ⁵	Potential Emissions ⁶	lbs/hr	tons/yr		
S022/E022	Reboiler Vent	AP-42	NO _x	0.09	0.40		
		AP-42	CO	0.08	0.34		
		AP-42	VOC	0.01	0.02		
		AP-42	SO ₂	<0.01	<0.01		
		AP-42	PM	0.01	0.03		
		AP-42	CO _{2e}	135	592		
S023/E023	Glycol Regenerator Still Vent (Regenerator and Flash Tank Combined)	GRI-GLYCalc™	VOC	9.16	40.13		
		GRI-GLYCalc™	Benzene	0.09	0.37		
		GRI-GLYCalc™	Ethylbenzene	0.12	0.52		
		GRI-GLYCalc™	Toluene	0.43	1.90		
		GRI-GLYCalc™	Xylenes	1.17	5.14		
		GRI-GLYCalc™	n-Hexane	0.29	1.27		

1. Enter the appropriate Emission Unit ID Numbers and Emission Point ID Numbers for the glycol dehydration unit reboiler vent and glycol regenerator still vent. The glycol dehydration unit reboiler vent and glycol regenerator still vent should be designated RBV-1 and RSV-1, respectively. If the compressor station incorporates multiple glycol dehydration units, a *Glycol Dehydration Emission Unit Data Sheet* shall be completed for each, using Source Identification #s RBV-2 and RSV-2, RBV-3 and RSV-3, etc.
2. Enter the Source Status using the following codes:

NS Construction of New Source	ES Existing Source
MS Modification of Existing Source	RS Removal of Source

3. Enter the date (or anticipated date) of the glycol dehydration unit's installation (construction of source), modification or removal.
4. Enter the Air Pollution Control Device (APCD) type designation using the following codes and the control device ID number:

NA	None	CD	Condenser
FL	Flare	CC	Condenser/Combustion Combination
TO	Thermal Oxidizer		
5. Enter the Potential Emissions Data Reference designation using the following codes:

MD	Manufacturer's Data	AP	AP-42	
GR	GRI-GLYCalc™	OT	Other _____	(please list)
6. Enter the Reboiler Vent and Glycol Regenerator Still Vent Potential to Emit (PTE) for the listed regulated pollutants in lbs per hour and tons per year. The Glycol Regenerator Still Vent potential emissions may be determined using the most recent version of the thermodynamic software model GRI-GLYCalc™ (Radian International LLC & Gas Research Institute). Attach all referenced Potential Emissions Data (or calculations) and the GRI-GLYCalc *Aggregate Calculations Report* to this *Glycol Dehydration Emission Unit Data Sheet(s)*. This PTE data shall be incorporated in the *Emissions Summary Sheet*.

Include a copy of the GRI-GLYCalc™ analysis. This includes a printout of the aggregate calculations report, which shall include emissions reports, equipment reports, and stream reports.

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: S024	2. Emission Point ID: E024	3. Year Installed/ Modified: 2013		
4. Emission Unit Description: Liquid Loading				
5. Loading Area Data:				
5A. Number of pumps: 1	5B. Number of liquids loaded:1	5C. Maximum number of tank trucks loading at one time: 1		
6. Describe cleaning location, compounds and procedure for tank trucks:				
7. Are tank trucks pressure tested for leaks at this or any other location? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If YES, describe:				
8. Projected Maximum Operating Schedule (for rack or transfer point as a whole):				
Maximum	Jan. - Mar.	Apr. - June	July - Sept.	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 <i>(add pages as necessary)</i> :			
Liquid Name	Produced Water and Condensate		
Max. daily throughput (1000 gal/day)	Variable		
Max. annual throughput (1000 gal/yr)	~47,280		
Loading Method ¹	SUB		
Max. Fill Rate (gal/min)			
Average Fill Time (min/loading)			
Max. Bulk Liquid Temperature (°F)	51.30		
True Vapor Pressure ²	0.3338		
Cargo Vessel Condition ³	Unknown		
Control Equipment or Method ⁴	VB, FL		
Minimum collection efficiency (%)	70		
Minimum control efficiency (%)	95		
<i>* Continued on next page</i>			

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Maximum Emission Rate	Loading (lb/hr)	VOC: 0.36 HAP: 0.01		
	Annual (ton/yr)	VOC: 1.56 HAP: 0.04		
Estimation Method ⁵		EPA		
Notes:				
¹ BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill				
² At maximum bulk liquid temperature				
³ B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)				
⁴ List as many as apply (complete and submit appropriate <i>Air Pollution Control Device Sheets as Attachment "H"</i>): CA = Carbon Adsorption VB = Dedicated Vapor Balance (closed system) ECD = Enclosed Combustion Device F = Flare TO = Thermal Oxidation or Incineration				
⁵ EPA = EPA Emission Factor as stated in AP-42 MB = Material Balance TM = Test Measurement based upon test data submittal O = other (describe)				

10. Proposed Monitoring, Recordkeeping, Reporting, and Testing	
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.	
MONITORING <i>Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment/air pollution control device.</i> None	RECORDKEEPING <i>Please describe the proposed recordkeeping that will accompany the monitoring.</i> None
REPORTING <i>Please describe the proposed frequency of reporting of the recordkeeping.</i> None	TESTING <i>Please describe any proposed emissions testing for this process equipment/air pollution control device.</i> None
11. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty: N/A	

ATTACHMENT H

Air Pollution Control Device Data Sheet

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: ~7,800 scfh 188,000 scfd		4. Maximum Design Heat Input: 11.66 MMBtu/hr	5. Design Heat Content: 1,254 BTU/scf
Control Device Information			
6. Select the type of vapor combustion control device being used: <input checked="" type="checkbox"/> Enclosed Combustion Device <input type="checkbox"/> Elevated Flare <input type="checkbox"/> Ground Flare <input type="checkbox"/> Thermal Oxidizer <input type="checkbox"/> Completion Combustion Device			
7. Manufacturer: LEED Fabrication Model No.: Enclosed Combustor 48"		8. Hours of operation per year: 8,760	
9. List the emission units whose emissions are controlled by this vapor combustion control device: (Emission Point ID#: <u>E001-E010</u> , <u>E025-E026</u> , <u>E030</u> , <u>E024</u>)			
10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
S001-S010, S025-S026	Produced Fluids Storage Tanks	S024	Vapors from Liquid Loading
S030 (Optional)	Sand Separator Tank		
<i>If this vapor combustor controls emissions from more than six emission units, please attach additional pages.</i>			
11. Assist Type		12. Flare Height	13. Tip Diameter:
<input type="checkbox"/> Steam - <input type="checkbox"/> Air - <input type="checkbox"/> Pressure - <input checked="" type="checkbox"/> Non - NA		25 ft	~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):	16. Heat value of waste gas stream (BTU/ft ³)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (ft/s)
~130	Variable	~70	
19. Provide an attachment with the characteristics of the waste gas stream to be burned. <i>See attached emission calculations.</i>			

Pilot Information				
20. Type/Grade of pilot fuel:	21. Number of pilot lights:	22. Fuel flow rate to pilot flame per pilot (scf/hr):	23. Heat input per pilot (BTU/hr):	24. Will automatic re-ignition be used?
Pipeline quality Natural Gas	1 (each)	~25	0.03 MMBtu/hr	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
25. If automatic re-ignition will be used, describe the method: N/A				
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	≥ 95
VOC	100	≥ 95
HAP	100	≥ 95
32. Has the control device been tested by the manufacturer and certified? Yes – pending certification from EPA		
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. Please attach a copy of manufacturer's drawing. 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**

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

GENERAL

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

PROCESS DATA

Gas Composition:	mol %	Process Conditions:		
		Variable	Value	Units
4 Methane		Flow Rate	Up to 140	Mscfd
5 Ethane		Pressure	Up to 12	oz/in2
6 Propane		Temperature		°F
7 I-Butane		Molecular Weight		
8 n-Butane		Process/Waste Stream	<input checked="" type="checkbox"/> Gas	<input type="checkbox"/> Liquid
9 I-Pentane		Detailed Process Description / Process Notes:		
10 n-Pentane		1. Turndown 10:1. Based on an expected normal operating rate indicated above.		
11 n-Hexane		2. DRE: 98 % operating at design conditions		
12 CO2		3. Burner Pressure Drop: Min. 0.10 oz/in2		
13 N2				
14 Helium				
15 H2O				
16 C7				
17 C8				
18 C9				
19 C10				
20 C11+				
21 TOTAL				
Other Components:	PPMV	Available Utilities:		
22 H2S		Fuel / Pilot Gas	Min. 30psig Natural Gas /Propane 40-50 SCFH	
23 Benzene		Instrument Air	NA	
24 Toluene		Power	120 V / 60 Hz or Solar Power	
25 E-Benzene		Steam	NA	
26 Xylene		Purge Gas		

DESIGN DATA

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

EQUIPMENT SPECIFICATION

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



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Site:		Model No.:	130-0011-00		
Unit/Lease:		Remarks:			

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:



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Unit/Lease:		Model No.:	L30-0011-00		

GENERAL ARRANGEMENT



AIR POLLUTION CONTROL DEVICE

Vapor Combustion Control Device Sheet

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

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.

General Information

1. Control Device ID#: C003	2. Installation Date: 2014 <input type="checkbox"/> New	
3. Maximum Rated Total Flow Capacity: ~2,243 scfh 53,820 scfd	4. Maximum Design Heat Input: 3.33 MMBtu/hr	5. Design Heat Content: 1,254 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 24"

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#: E022, E031)

10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
S022	Dehydration Unit		
S031	Dehy Drip Tank		

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

11. Assist Type	12. Flare Height	13. Tip Diameter:	14. Was the design per §60.18?
<input type="checkbox"/> Steam - <input type="checkbox"/> Air - <input type="checkbox"/> Pressure - <input checked="" type="checkbox"/> Non - NA	~20 ft	~2 ft	<input type="checkbox"/> Yes <input type="checkbox"/> No NA

Waste Gas Information

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

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

Pilot Information				
20. Type/Grade of pilot fuel:	21. Number of pilot lights:	22. Fuel flow rate to pilot flame per pilot (scf/hr):	23. Heat input per pilot (BTU/hr):	24. Will automatic re-ignition be used?
Pipeline quality Natural Gas	1	~25	0.03 MMBtu/hr	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
25. If automatic re-ignition will be used, describe the method: N/A				
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? Yes – pending certification from EPA		
33. Describe all operating ranges and maintenance procedures required by the manufacturer to maintain warranty: See Attached		
34. Additional Information Attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <i>Please attach a copy of manufacturer's data sheet. Please attach a copy of manufacturer's drawing. Please attach a copy of the manufacturer's performance testing.</i>		

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



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Unit/Lease:		Remarks:	-		
		Model No.:	L30-0006-00		

GENERAL

1 Design Code:		NDE:	LEED Fabrication Standards		
2 Service:		Customer Specs:	<input type="checkbox"/> Yes		
3 Description:	Standard Single Stage 24 High Efficiency Combustor		<input checked="" type="checkbox"/> No		

PROCESS DATA

Gas Composition:	mol %	Process Conditions:		
		Variable	Value	Units
4 Methane		Flow Rate	Up to 40	Mscfd
5 Ethane		Pressure	Up to 12	oz/in2
6 Propane		Temperature		°F
7 I-Butane		Molecular Weight		
8 n-Butane		Process/Waste Stream	<input checked="" type="checkbox"/> Gas	<input type="checkbox"/> Liquid
9 I-Pentane		Detailed Process Description / Process Notes:		
10 n-Pentane		1. Turndown 10:1. Based on an expected normal operating rate indicated above.		
11 n-Hexane		2. DRE: 98% operating at design conditions		
12 CO2		3. Burner Pressure Drop: Min. 0.10 oz/in2		
13 N2				
14 Helium				
15 H2O				
16 C7				
17 C8				
18 C9				
19 C10				
20 C11+				
	TOTAL			

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

DESIGN DATA

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

EQUIPMENT SPECIFICATION

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



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		Model No.:	L30-0006-00		

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	24" OD x 24' 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					

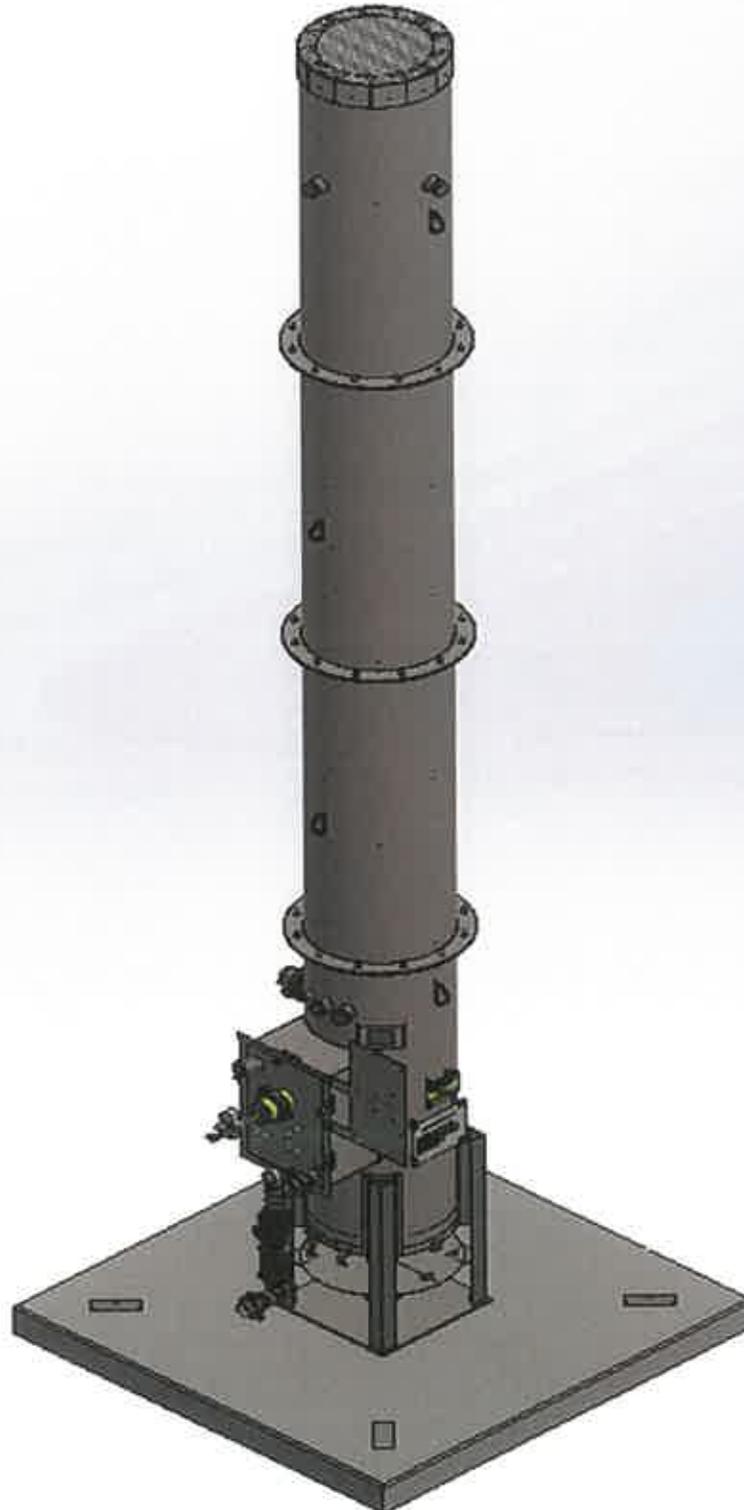
Additional Notes:



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Unit/Lease:		Remarks:	-		
		Model No.:	L30-0006-00		

GENERAL ARRANGEMENT



ATTACHMENT I

Emission Calculations

Company Name: EQT Production, LLC
Facility Name: SMI-27 Wellpad
Project Description: G-70A Permit Application

Produced Fluids Storage Tanks & Dehy Drip Tank

Throughput Parameter	Value	Units
Operational Hours	8,760	hrs/yr
Total Condensate Throughput	8,541	bbbl/month
Total Produced Water Throughput	84,989	bbbl/month

Description	Potential Throughput ¹ (gal/yr)
Produced Water and Condensate	47,139,456

¹ Based on maximum historical produced water and condensate throughput for wellpad, and scaled based on total number of wells.
² Potential liquid throughput is representative of liquid produced from each well, and liquid accumulated in the dehydrator drip tank.

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

Constituent	Total Emissions ¹	
	lb/hr	tpy
Methane	6.368	27.894
Ethane	2.079	9.104
Propane	1.634	7.158
Isobutane	0.984	4.308
n-Butane	2.994	13.115
Isopentane	1.941	8.503
n-Pentane	1.619	7.093
n-Hexane	0.585	2.562
Other Hexanes	0.870	3.811
Heptanes	1.143	5.008
Benzene	0.017	0.076
Toluene	0.051	0.223
Ethylbenzene	0.003	0.013
Xylenes	0.004	0.018
2,2,4-Trimethylpentane	0.002	0.007
C8+ Heavies	0.869	3.808
Total Emissions:	21.275	93.184
Total VOC Emissions:	12.718	55.704
Total HAP Emissions:	0.662	2.900

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 9/29/2014 condensate sample from CPT-11 wellpad (Well #514317).

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

Company Name: EQT Production, LLC
 Facility Name: SMI-27 Wellpad
 Project Description: G-70A Permit Application

Produced Fluids Storage Tanks & Dehy Drip Tank

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

Constituent	Total Emissions	
	lb/hr	tpy
Methane	0.318	1.395
Ethane	0.104	0.455
Propane	0.082	0.358
Isobutane	0.049	0.215
n-Butane	0.150	0.656
Isopentane	0.097	0.425
n-Pentane	0.081	0.355
n-Hexane	0.029	0.128
Other Hexanes	0.044	0.191
Heptanes	0.057	0.250
Benzene	0.001	0.004
Toluene	0.003	0.011
Ethylbenzene	<0.001	0.001
Xylenes	<0.001	0.001
2,2,4-Trimethylpentane	<0.001	<0.001
C8+ Heavies	0.044	0.191
Total Emissions:	1.064	4.659
Total VOC Emissions:	0.636	2.785
Total HAP Emissions:	0.033	0.145

¹ Emissions from the condensate storage tanks are controlled by the two existing 48" enclosed combustor (C001-C002). The dehydrator drip tank will be controlled by the existing 24" enclosed combustor (C003).

Enclosed Combustor Emissions ¹

Pollutant ²	Emission Factor (lb/MMBtu)	Combustor Potential Emissions		Pilot Potential Emissions	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
NO _x	8.0E-02	9.3E-01	4.1E+00	2.1E-03	9.2E-03
CO	6.7E-02	7.8E-01	3.4E+00	1.8E-03	7.7E-03
PM/PM ₁₀	6.1E-03	7.1E-02	3.1E-01	1.6E-04	7.0E-04
SO ₂	4.8E-04	5.6E-03	2.4E-02	1.3E-05	5.5E-05
CO ₂ (Natural Gas Firing)	116.997	1364.189	5975.146	3.081	13.495
CH ₄ (Natural Gas Firing)	2.2E-03	2.6E-02	1.1E-01	5.8E-05	2.5E-04
N ₂ O (Natural Gas Firing)	2.2E-04	2.6E-03	1.1E-02	5.8E-06	2.5E-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:
 Facility Name:
 Project Description:

EOT Production, LLC
SMI-27 Wellpad
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.

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	0.057	0.249
Ethane	0.015	0.067
Propane	0.008	0.033
Isobutane	0.003	0.011
n-Butane	0.006	0.027
Isopentane	0.004	0.018
n-Pentane	0.004	0.017
n-Hexane	0.002	0.009
Other Hexanes	0.003	0.013
Heptanes	0.004	0.018
Benzene	<0.001	<0.001
Toluene	<0.001	0.001
Ethylbenzene	<0.001	<0.001
Xylenes	<0.001	<0.001
2,2,4-Trimethylpentane	<0.001	<0.001
C8+ Heavies	0.002	0.013
Total Emissions:	0.110	0.480
Total VOC Emissions:	0.036	0.158
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 9/29/2014 condensate sample from CPT-11 wellpad (Well #514317).

Company Name: EQT Production, LLC
 Facility Name: SMI-27 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	0.057	0.249
Ethane	0.015	0.067
Propane	0.008	0.033
Isobutane	0.003	0.011
n-Butane	0.006	0.027
Isopentane	0.004	0.018
n-Pentane	0.004	0.017
n-Hexane	0.002	0.009
Other Hexanes	0.003	0.013
Heptanes	0.004	0.018
Benzene	<0.001	<0.001
Toluene	<0.001	0.001
Ethylbenzene	<0.001	<0.001
Xylenes	<0.001	<0.001
2,2,4-Trimethylpentane	<0.001	<0.001
C8+ Heavies	0.002	0.013
Total Emissions:	0.110	0.480
Total VOC Emissions:	0.036	0.158
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 95% control efficiency. However, no control is assumed.

Company Name: EOT Production, LLC
Facility Name: SMI-27 Wellpad
Project Description: G-70A Permit Application

Line Heaters

Parameter	Value	Units
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,254	BTU/scf
Heat Input	1.54	MMBtu/hr (each)
Fuel Consumption	1.23E-03	MMscf/hr (each)
Potential Annual Hours of Operation	8,760	hr/yr

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf) ¹	Potential Emissions	
		(lb/hr) ²	(tons/yr) ³
NO _x	100	1.2E-01	5.4E-01
CO	84	1.0E-01	4.5E-01
SO ₂	0.6	7.4E-04	3.2E-03
PM Total	7.6	9.3E-03	4.1E-02
PM Condensable	5.7	7.0E-03	3.1E-02
PM ₁₀ (Filterable)	1.9	2.3E-03	1.0E-02
PM _{2.5} (Filterable)	1.9	2.3E-03	1.0E-02
VOC	5.5	6.7E-03	3.0E-02
Lead	5.0E-04	6.1E-07	2.7E-06
CO ₂ (Natural Gas Firing) ⁴	146,761	180	788
CH ₄ (Natural Gas Firing) ⁴	2.8	3.4E-03	1.5E-02
N ₂ O (Natural Gas Firing) ⁴	0.28	3.4E-04	1.5E-03

Company Name: EQT Production, LLC
Facility Name: SMI-27 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	2.9E-08	1.3E-07
3-Methylchloranthrene	1.8E-06	2.2E-09	9.7E-09
7,12-Dimethylbenz(a)anthracene	1.6E-05	2.0E-08	8.6E-08
Acenaphthene	1.8E-06	2.2E-09	9.7E-09
Acenaphthylene	1.8E-06	2.2E-09	9.7E-09
Anthracene	2.4E-06	2.9E-09	1.3E-08
Benz(a)anthracene	1.8E-06	2.2E-09	9.7E-09
Benzene	2.1E-03	2.6E-06	1.1E-05
Benzo(a)pyrene	1.2E-06	1.5E-09	6.4E-09
Benzo(b)fluoranthene	1.8E-06	2.2E-09	9.7E-09
Benzo(g,h,i)perylene	1.2E-06	1.5E-09	6.4E-09
Benzo(k)fluoranthene	1.8E-06	2.2E-09	9.7E-09
Chrysene	1.8E-06	2.2E-09	9.7E-09
Dibenzo(a,h) anthracene	1.2E-06	1.5E-09	6.4E-09
Dichlorobenzene	1.2E-03	1.5E-06	6.4E-06
Fluoranthene	3.0E-06	3.7E-09	1.6E-08
Fluorene	2.8E-06	3.4E-09	1.5E-08
Formaldehyde	7.5E-02	9.2E-05	4.0E-04
Hexane	1.8E+00	2.2E-03	9.7E-03
Indo(1,2,3-cd)pyrene	1.8E-06	2.2E-09	9.7E-09
Naphthalene	6.1E-04	7.5E-07	3.3E-06
Phenanthrene	1.7E-05	2.1E-08	9.1E-08
Pyrene	5.0E-06	6.1E-09	2.7E-08
Toluene	3.4E-03	4.2E-06	1.8E-05
Arsenic	2.0E-04	2.5E-07	1.1E-06
Beryllium	1.2E-05	1.5E-08	6.4E-08
Cadmium	1.1E-03	1.3E-06	5.9E-06
Chromium	1.4E-03	1.7E-06	7.5E-06
Cobalt	8.4E-05	1.0E-07	4.5E-07
Manganese	3.8E-04	4.7E-07	2.0E-06
Mercury	2.6E-04	3.2E-07	1.4E-06
Nickel	2.1E-03	2.6E-06	1.1E-05
Selenium	2.4E-05	2.9E-08	1.3E-07
Total HAP		2.3E-03	1.0E-02

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

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

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

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

Company Name:
 Facility Name:
 Project Description:

EOT Production, LLC
SMI-27 Wellpad
G-70A Permit Application

Thermoelectric Generators (TEGs)

Parameter	Value	Units
Manufacturer	Global Thermoelectric	
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,254	BTU/scf
Heat Input	0.03	MMBtu/hr (each)
Fuel Consumption ¹	2.33E-05	MMscf/hr (each)
Potential Annual Hours of Operation	8,760	hr/yr

¹ Global Thermoelectric specification sheet states 700 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	2.3E-03	1.0E-02
CO	84	2.0E-03	8.6E-03
SO ₂	0.6	1.4E-05	6.1E-05
PM Total	7.6	1.8E-04	7.7E-04
PM Condensable	5.7	1.3E-04	5.8E-04
PM ₁₀ (Filterable)	1.9	4.4E-05	1.9E-04
PM _{2.5} (Filterable)	1.9	4.4E-05	1.9E-04
VOC	5.5	1.3E-04	5.6E-04
Lead	5.0E-04	1.2E-08	5.1E-08
CO ₂ (Natural Gas Firing) ⁴	146,761	3	15
CH ₄ (Natural Gas Firing) ⁴	2.8	6.4E-05	2.8E-04
N ₂ O (Natural Gas Firing) ⁴	0.28	6.4E-06	2.8E-05

Company Name: EOT Production, LLC
 Facility Name: SMI-27 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	5.6E-10	2.4E-09
3-Methylchloranthrene	1.8E-06	4.2E-11	1.8E-10
7,12-Dimethylbenz(a)anthracene	1.6E-05	3.7E-10	1.6E-09
Acenaphthene	1.8E-06	4.2E-11	1.8E-10
Acenaphthylene	1.8E-06	4.2E-11	1.8E-10
Anthracene	2.4E-06	5.6E-11	2.4E-10
Benz(a)anthracene	1.8E-06	4.2E-11	1.8E-10
Benzene	2.1E-03	4.9E-08	2.1E-07
Benzo(a)pyrene	1.2E-06	2.8E-11	1.2E-10
Benzo(b)fluoranthene	1.8E-06	4.2E-11	1.8E-10
Benzo(g,h,i)perylene	1.2E-06	2.8E-11	1.2E-10
Benzo(k)fluoranthene	1.8E-06	4.2E-11	1.8E-10
Chrysene	1.8E-06	4.2E-11	1.8E-10
Dibenzo(a,h) anthracene	1.2E-06	2.8E-11	1.2E-10
Dichlorobenzene	1.2E-03	2.8E-08	1.2E-07
Fluoranthene	3.0E-06	7.0E-11	3.1E-10
Fluorene	2.8E-06	6.5E-11	2.9E-10
Formaldehyde	7.5E-02	1.7E-06	7.6E-06
Hexane	1.8E+00	4.2E-05	1.8E-04
Indo(1,2,3-cd)pyrene	1.8E-06	4.2E-11	1.8E-10
Naphthalene	6.1E-04	1.4E-08	6.2E-08
Phenanthrene	1.7E-05	4.0E-10	1.7E-09
Pyrene	5.0E-06	1.2E-10	5.1E-10
Toluene	3.4E-03	7.9E-08	3.5E-07
Arsenic	2.0E-04	4.7E-09	2.0E-08
Beryllium	1.2E-05	2.8E-10	1.2E-09
Cadmium	1.1E-03	2.6E-08	1.1E-07
Chromium	1.4E-03	3.3E-08	1.4E-07
Cobalt	8.4E-05	2.0E-09	8.6E-09
Manganese	3.8E-04	8.8E-09	3.9E-08
Mercury	2.6E-04	6.0E-09	2.6E-08
Nickel	2.1E-03	4.9E-08	2.1E-07
Selenium	2.4E-05	5.6E-10	2.4E-09
Total HAP		4.4E-05	1.9E-04

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

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

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

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

Company Name: EQT Production, LLC
Facility Name: SMI-27 Wellpad
Project Description: G-70A Permit Application

Thermoelectric Generator (TEG)

Parameter	Value	Units
Manufacturer	Global Thermoelectric	
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,254	BTU/scf
Heat Input	0.07	MMBtu/hr (each)
Fuel Consumption ¹	5.63E-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	5.6E-03	2.5E-02
CO	84	4.7E-03	2.1E-02
SO ₂	0.6	3.4E-05	1.5E-04
PM Total	7.6	4.3E-04	1.9E-03
PM Condensable	5.7	3.2E-04	1.4E-03
PM ₁₀ (Filterable)	1.9	1.1E-04	4.7E-04
PM _{2.5} (Filterable)	1.9	1.1E-04	4.7E-04
VOC	5.5	3.1E-04	1.4E-03
Lead	5.0E-04	2.8E-08	1.2E-07
CO ₂ (Natural Gas Firing) ⁴	146,761	8	36
CH ₄ (Natural Gas Firing) ⁴	2.8	1.6E-04	6.8E-04
N ₂ O (Natural Gas Firing) ⁴	0.28	1.6E-05	6.8E-05

Company Name:
 Facility Name:
 Project Description:

EOT Production, LLC
SMI-27 Wellpad
G-70A Permit Application

Thermoelectric Generator (TEG)

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	1.4E-09	5.9E-09
3-Methylchloranthrene	1.8E-06	1.0E-10	4.4E-10
7,12-Dimethylbenz(a)anthracene	1.6E-05	9.0E-10	3.9E-09
Acenaphthene	1.8E-06	1.0E-10	4.4E-10
Acenaphthylene	1.8E-06	1.0E-10	4.4E-10
Anthracene	2.4E-06	1.4E-10	5.9E-10
Benz(a)anthracene	1.8E-06	1.0E-10	4.4E-10
Benzene	2.1E-03	1.2E-07	5.2E-07
Benzo(a)pyrene	1.2E-06	6.8E-11	3.0E-10
Benzo(b)fluoranthene	1.8E-06	1.0E-10	4.4E-10
Benzo(g,h,i)perylene	1.2E-06	6.8E-11	3.0E-10
Benzo(k)fluoranthene	1.8E-06	1.0E-10	4.4E-10
Chrysene	1.8E-06	1.0E-10	4.4E-10
Dibenzo(a,h) anthracene	1.2E-06	6.8E-11	3.0E-10
Dichlorobenzene	1.2E-03	6.8E-08	3.0E-07
Fluoranthene	3.0E-06	1.7E-10	7.4E-10
Fluorene	2.8E-06	1.6E-10	6.9E-10
Formaldehyde	7.5E-02	4.2E-06	1.8E-05
Hexane	1.8E+00	1.0E-04	4.4E-04
Indo(1,2,3-cd)pyrene	1.8E-06	1.0E-10	4.4E-10
Naphthalene	6.1E-04	3.4E-08	1.5E-07
Phenanthrene	1.7E-05	9.6E-10	4.2E-09
Pyrene	5.0E-06	2.8E-10	1.2E-09
Toluene	3.4E-03	1.9E-07	8.4E-07
Arsenic	2.0E-04	1.1E-08	4.9E-08
Beryllium	1.2E-05	6.8E-10	3.0E-09
Cadmium	1.1E-03	6.2E-08	2.7E-07
Chromium	1.4E-03	7.9E-08	3.5E-07
Cobalt	8.4E-05	4.7E-09	2.1E-08
Manganese	3.8E-04	2.1E-08	9.4E-08
Mercury	2.6E-04	1.5E-08	6.4E-08
Nickel	2.1E-03	1.2E-07	5.2E-07
Selenium	2.4E-05	1.4E-09	5.9E-09
Total HAP		1.1E-04	4.7E-04

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

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

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

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

Company Name: EOT Production, LLC
 Facility Name: SML-27 Wellhead
 Project Description: G-70A Permit Application

Triethylene Glycol Dehydrator

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY			
Controlled Regenerator Emissions			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon Dioxide	0.75	0.03	0.01
Methane	0.0198	0.474	0.0866
Ethane	0.0548	1.314	0.2399
Propane	0.0559	1.342	0.2448
Isobutane	0.0177	0.424	0.0774
n-Butane	0.0428	1.027	0.1873
Isopentane	0.0155	0.373	0.0681
n-Pentane	0.0168	0.404	0.0737
n-Hexane*	0.0351	0.841	0.1536
Cyclohexane	0.0357	0.856	0.1562
Other Hexanes	0.0452	1.084	0.1978
Heptanes	0.1660	3.983	0.7270
2,2,4-Trimethylpentane*	0.0529	1.269	0.2316
Benzene*	0.0674	1.618	0.2952
Toluene*	0.3720	8.927	1.6292
Ethylbenzene*	0.1079	2.5890	0.4726
Xylenes*	1.1019	26.445	4.8261
C8 + Heavier Hydrocarbons	0.8786	21.086	3.8483
Total Emissions	3.0857	74.056	13.5152
Total Hydrocarbon Emissions	3.0857	74.056	13.5152
Total VOC Emissions	3.0111	72.267	13.1888
Total HAP Emissions	1.7370	41.689	7.6082

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY			
Flash Gas Emissions			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon Dioxide	1.61	0.07	0.01
Methane	6.2220	149.328	27.2523
Ethane	4.6801	112.321	20.4986
Propane	2.2554	54.130	9.8787
Isobutane	0.4631	11.115	2.0286
n-Butane	0.8520	20.447	3.7316
Isopentane	0.2623	6.295	1.1488
n-Pentane	0.2275	5.461	0.9966
n-Hexane*	0.2552	6.124	1.1177
Cyclohexane	0.0635	1.525	0.2782
Other Hexanes	0.4349	10.437	1.9048
Heptanes	0.5738	13.772	2.5134
2,2,4-Trimethylpentane*	0.3579	8.590	1.5677
Benzene*	0.0180	0.431	0.0787
Toluene*	0.0618	1.484	0.2709
Ethylbenzene*	0.0100	0.241	0.0439
Xylenes*	0.0713	1.712	0.3124
C8 + Heavier Hydrocarbons	0.2438	5.851	1.0678
Total Emissions	17.0527	409.265	74.6908
Total Hydrocarbon Emissions	17.0527	409.265	74.6908
Total VOC Emissions	6.1506	147.616	26.9398
Total HAP Emissions	0.7743	18.582	3.3912

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY ¹			
Controlled Total Emission Rates			
Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon Dioxide	2.3600	0.098	0.0179
Methane	6.2418	149.802	27.3389
Ethane	4.7349	113.635	20.7385
Propane	2.3113	55.472	10.1235
Isobutane	0.4808	11.539	2.1060
n-Butane	0.8948	21.474	3.9189
Isopentane	0.2778	6.668	1.2169
n-Pentane	0.2443	5.865	1.0703
n-Hexane*	0.2903	6.965	1.2713
Cyclohexane	0.0992	2.381	0.4344
Other Hexanes	0.4801	11.521	2.1026
Heptanes	0.7398	17.755	3.2404
2,2,4-Trimethylpentane*	0.4108	9.859	1.7993
Benzene*	0.0854	2.049	0.3739
Toluene*	0.4338	10.411	1.9001
Ethylbenzene*	0.1179	2.830	0.5165
Xylenes*	1.1732	28.157	5.1385
C8 + Heavier Hydrocarbons	1.1224	26.937	4.9161
Total Emissions	20.1384	483.321	88.2060
Total Hydrocarbon Emission:	20.1384	483.321	88.2060
Total VOC Emissions	9.1617	219.883	40.1286
Total HAP Emissions	2.5113	60.271	10.9994

Enclosed Combustor Emissions (C003)

Pollutant	Emission Factor ¹ (lb/MMBtu)	Combustor Potential Emissions		Pilot Potential Emissions	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)
NO _x	0.080	0.265	1.163	0.002	0.010
CO	0.067	0.223	0.977	0.002	0.009
PM/PM ₁₀	0.006	0.020	0.088	1.8E-04	0.001
SO ₂	4.8E-04	0.002	0.007	1.4E-05	6.3E-05
CO ₂ ^d (Natural Gas Firing)	116.997	389.601	1706.452	3.510	15.373
CH ₄ ^d (Natural Gas Firing)	0.002	0.007	0.032	6.6E-05	2.9E-04
N ₂ O ^d (Natural Gas Firing)	2.2E-04	0.001	0.003	6.6E-06	2.9E-05

Combustor Rating	3.33 MMBtu/hr
Pilot Rating	0.03 MMBtu/hr
Pilot Rating	30,000 btu/hr
Pilot Fuel Usage	24 scf/hr
Combustor Flow Capacity	53.82 MSCFD
	2,243 scf/hr
	37 scf/min

Max. flowrate from LEED Combustor Operations Manual

* HAPs

¹ Based on GRI GlyCalc 4.0 run at dry gas flowrate of 70 MMscf/day and T and P of 80°F and 1,000 psig, respectively, emissions from the regenerator will be controlled by an enclosed combustor at 98% destruction efficiency. The flash tank emissions will be routed to the reboiler for control, and excess will also be routed to the enclosed combustor. Emissions from the regenerator still are based on conservative estimates and do not include the control by the BTEX condenser unit.

Company Name: EOT Production, LLC
Facility Name: SMI-27 Wellpad
Project Description: G-70A Permit Application

Reboiler

Parameter	Value	Units
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,254	BTU/scf
Heat Input	1.15	MMBtu/hr
Fuel Consumption	9.20E-04	MMscf/hr
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	9.2E-02	4.0E-01
CO	84	7.7E-02	3.4E-01
SO ₂	0.6	5.5E-04	2.4E-03
PM Total	7.6	6.99E-03	3.06E-02
PM Condensable	5.7	5.2E-03	2.3E-02
PM ₁₀ (Filterable)	1.9	1.7E-03	7.7E-03
PM _{2.5} (Filterable)	1.9	1.7E-03	7.7E-03
VOC	5.5	5.1E-03	2.2E-02
Lead	5.0E-04	4.6E-07	2.0E-06
CO ₂ (Natural Gas Firing) ⁴	146,761	135	591
CH ₄ (Natural Gas Firing) ⁴	2.8	2.5E-03	1.1E-02
N ₂ O (Natural Gas Firing) ⁴	0.28	2.5E-04	1.1E-03

Company Name:
 Facility Name:
 Project Description:

EOT Production, LLC
SMI-27 Wellpad
G-70A Permit Application

Reboiler

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	2.2E-08	9.7E-08
3-Methylchloranthrene	1.8E-06	1.7E-09	7.3E-09
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.5E-08	6.4E-08
Acenaphthene	1.8E-06	1.7E-09	7.3E-09
Acenaphthylene	1.8E-06	1.7E-09	7.3E-09
Anthracene	2.4E-06	2.2E-09	9.7E-09
Benz(a)anthracene	1.8E-06	1.7E-09	7.3E-09
Benzene	2.1E-03	1.9E-06	8.5E-06
Benzo(a)pyrene	1.2E-06	1.1E-09	4.8E-09
Benzo(b)fluoranthene	1.8E-06	1.7E-09	7.3E-09
Benzo(g,h,i)perylene	1.2E-06	1.1E-09	4.8E-09
Benzo(k)fluoranthene	1.8E-06	1.7E-09	7.3E-09
Chrysene	1.8E-06	1.7E-09	7.3E-09
Dibenzo(a,h) anthracene	1.2E-06	1.1E-09	4.8E-09
Dichlorobenzene	1.2E-03	1.1E-06	4.8E-06
Fluoranthene	3.0E-06	2.8E-09	1.2E-08
Fluorene	2.8E-06	2.6E-09	1.1E-08
Formaldehyde	7.5E-02	6.9E-05	3.0E-04
Hexane	1.8E+00	1.7E-03	7.3E-03
Indo(1,2,3-cd)pyrene	1.8E-06	1.7E-09	7.3E-09
Naphthalene	6.1E-04	5.6E-07	2.5E-06
Phenanthrene	1.7E-05	1.6E-08	6.8E-08
Pyrene	5.0E-06	4.6E-09	2.0E-08
Toluene	3.4E-03	3.1E-06	1.4E-05
Arsenic	2.0E-04	1.8E-07	8.1E-07
Beryllium	1.2E-05	1.1E-08	4.8E-08
Cadmium	1.1E-03	1.0E-06	4.4E-06
Chromium	1.4E-03	1.3E-06	5.6E-06
Cobalt	8.4E-05	7.7E-08	3.4E-07
Manganese	3.8E-04	3.5E-07	1.5E-06
Mercury	2.6E-04	2.4E-07	1.0E-06
Nickel	2.1E-03	1.9E-06	8.5E-06
Selenium	2.4E-05	2.2E-08	9.7E-08
Total HAP		1.7E-03	7.6E-03

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

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

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

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

Company Name: ECOT Production, LLC
 Facility Name: SML-27 Wellpad
 Project Description: G-70A Permit Application

Fugitive Components

Component Counts

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

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

Fugitive Emissions from Component Leaks

Equipment Type	Service	Emission Factors ¹ (kg/hr/source)	Facility Equipment Count ² (units)	TOC Total Fugitive Emissions (lb/yr)	TOC Annual Fugitive Emissions (tpy)
Valves	Gas	5.97E-03	469	6.17	27.04
Pump Seals	Light Liquid	1.99E-02	1	0.04	0.19
Pressure Relief Valves	Gas	1.04E-01	38	8.71	38.16
Connectors	All	1.83E-03	2,034	8.21	35.94
Open-Ended Lines	All	1.70E-03	32	0.12	0.53
Emission Totals:				23.26	101.86

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). SOCMF 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 Ethylbenzene	Weight Fraction 2,2,4-trimethylpentane	Weight Fraction Xylene
Gas	0.200	5.3E-03	1.5E-04	6.3E-04	1.5E-04	1.1E-02	1.2E-03
Light Liquid	1.000	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
All	0.200	5.3E-03	1.5E-04	6.3E-04	1.5E-04	1.1E-02	1.2E-03

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

Company Name: EOT Production, LLC
 Facility Name: SML-27 Wellhead
 Project Description: G-70A Permit Application

Fugitive Components

VOC and HAP Fugitive Emissions

Pollutant	Hourly Fugitive Emissions (lb/hr)	Annual Fugitive Emissions (tpy)
VOC	4.69	20.5
Hexane	1.2E-01	5.4E-01
Benzene	3.5E-03	1.5E-02
Toluene	1.5E-02	6.4E-02
Ethylbenzene	3.6E-03	1.6E-02
2,2,4-trimethylpentane	2.6E-01	1.1E+00
Xylene	2.8E-02	1.2E-01
Total HAP	4.3E-01	1.9E+00

GHG Fugitive Emissions from Component Leaks

Component	Component Count ¹	GHG Emission Factor ² (scf/hr/component)	CH ₄ Emissions ^{3,4} (tpy)	CO ₂ Emissions ^{3,4} (tpy)	CO ₂ e Emissions ⁵ (tpy)
Connectors	2,034	3.0E-03	8.8E-01	6.5E-03	22
Open-Ended Lines	32	6.1E-02	2.8E-01	2.1E-03	7
Pressure Relief Devices	38	4.0E-02	2.2E-01	1.6E-03	5
Pneumatic Devices	60	6.00	51.7	0.384	1293
Valves	469	2.7E-02	1.8E+00	1.4E-02	45
Total			54.9	0.408	1373

¹ The component count for pneumatics assumes 5 pneumatics per well
² Population emission factors for gas service in the Eastern U.S. from Table W-1A of Subpart W - Default Whole Gas Emission Factors for Onshore Production, 40 CFR 98, Subpart W, except for pneumatics, which are set at NSPS OOOO limits.
³ Calculated in accordance with Equations W-31, W-35 and W-36 in Subpart W of 40 CFR 98.
⁴ Mole fractions of CH₄ and CO₂ based on gas analysis:

CH ₄ :	77.49%	CO ₂ :	0.21%
Carbon Dioxide (CO ₂):	1	Methane (CH ₄):	25

Company Name: **EOT Production, LLC**
 Facility Name: **SML-27 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-NSPS/MACT annual leak tested trucks
Control Efficiency	95%	control efficiency of combustor(s)
P	0.33	max true vapor pressure of liquid loaded (psia) - EPA TANKS Data
M	24.28	molecular weight of vapors (lb/lb-mol) - EPA TANKS Data
T	511.0	temperature of liquids loaded (deg R) - EPA TANKS Data

Description	Loading Losses (lb/10 ³ gal)	Maximum Throughput ¹ (gal)	VOC Emissions ²	
			Uncontrolled (tpy)	Controlled (tpy)
Liquids Hauling	0.2	47,280,576	4.67	1.56

¹ Sum of the annual throughput from each well at the pad including the sand separator tank, and dehydrator drip tank

Speciated HAP Emission Potential:

Constituent	mol% ¹	True Vapor Pressure of Organic Compounds in liquid (psia) ²	Partial Vapor Pressure (psia)	Mole Fraction	Molecular Weight	VOC Vapor Weight	Speciated Weight Fraction	Speciated Liquid Loading Emissions (tpy) ³
Methane	0.095	---	---	---	---	---	---	---
Ethane	0.602	---	---	---	---	---	---	---
Propane	1.646	127.310	2.1E+00	3.2E-01	4.4E+01	1.4E+01	2.0E-01	3.1E-01
Isobutane	0.867	46.110	4.0E-01	6.1E-02	5.8E+01	3.6E+00	4.9E-02	7.7E-02
n-Butane	2.986	32.045	9.6E-01	1.5E-01	5.8E+01	8.5E+00	1.2E-01	1.8E-01
Isopentane	3.103	12.530	3.9E-01	5.9E-02	7.2E+01	4.3E+00	5.9E-02	9.3E-02
n-Pentane	3.943	8.433	3.3E-01	5.1E-02	7.2E+01	3.7E+00	5.1E-02	8.0E-02
n-Hexane	4.692	2.436	1.1E-01	1.7E-02	8.6E+01	1.5E+00	2.1E-02	3.2E-02
Other Hexanes	4.939	2.436	1.2E-01	1.8E-02	8.6E+01	1.6E+00	2.2E-02	3.4E-02
Heptanes	14.686	0.735	1.1E-01	1.7E-02	9.8E+01	1.6E+00	2.2E-02	3.5E-02
Benzene	0.200	1.508	3.0E-03	4.6E-04	7.8E+01	3.6E-02	5.0E-04	7.8E-04
Toluene	1.138	0.425	4.8E-03	7.4E-04	9.2E+01	6.8E-02	9.4E-04	1.5E-03
Ethylbenzene	0.155	0.151	2.3E-04	3.6E-05	1.1E+02	3.8E-03	5.3E-05	8.3E-05
Xylenes	1.763	0.180	3.2E-03	4.8E-04	1.1E+02	5.1E-02	7.1E-04	1.1E-03
2,2,4-Trimethylpentane	0.031	0.596	1.8E-04	2.8E-05	1.1E+02	3.2E-03	4.5E-05	7.0E-05
C8+ Heavies	59.154	3.400	2.0E+00	3.1E-01	1.1E+02	3.3E+01	4.6E-01	7.2E-01
	100.0		6.54			72.15	1.00	
Total Emissions:								1.56
Total HAP Emissions:								0.036

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

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

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

Company Name: EQT Production, LLC
Facility Name: SMI-27 Wellpad
Project Description: G-70A Permit Application

Haul Roads

Estimated Potential Road Fugitive Emissions

Unpaved Road Emissions

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

	PM	PM₁₀	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	1.97	11,820	23,282	0	49.86	12.71	1.271
Employee Vehicles	3	3	3	1.97	200	394	0	0.30	0.08	0.01
Total Potential Emissions								50.16	12.78	1.28

Company Name: EQT Production, LLC
 Facility Name: SML-27 Wellpad
 Project Description: G-70A Permit Application

Combustor Flow Rate Calculations

TANK GAS STREAM (FROM E&P TANK v2.0)					
Component	lb/hr	lb-mol/hr	mol%	MW lb/lb-mol	MW in Mixture
Carbon Dioxide	0.114	2.6E-03	3.3E-04	44.01	0.01
Methane	76.473	4.8E+00	6.0E-01	16.04	9.67
Ethane	24.963	8.3E-01	1.0E-01	30.07	3.16
Propane	19.616	4.4E-01	5.6E-02	44.10	2.48
Isobutane	11.811	2.0E-01	2.6E-02	58.12	1.49
n-Butane	35.934	6.2E-01	7.8E-02	58.12	4.54
Isopentane	23.296	3.2E-01	4.1E-02	72.15	2.95
n-Pentane	19.432	2.7E-01	3.4E-02	72.15	2.46
n-Hexane	7.022	8.2E-02	1.0E-02	85.67	0.89
Other Hexanes	10.443	1.2E-01	1.5E-02	86.18	1.32
Heptanes	13.720	1.4E-01	1.8E-02	97.88	1.73
2,2,4-Trimethylpentane	0.024	2.1E-04	2.7E-05	114.23	0.00
Benzene	0.204	2.6E-03	3.3E-04	78.11	0.03
Toluene	0.612	6.6E-03	8.4E-04	92.14	0.08
Ethylbenzene	0.036	3.4E-04	4.3E-05	106.17	0.00
Xylenes	0.048	4.5E-04	5.7E-05	106.17	0.01
C8 + Heavies	10.430	9.7E-02	1.2E-02	107.73	1.32
Total	254.18	7.91		32.14	lb/lbmole

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

C001 & C002		
Combustor Rating	11.66 MMBtu/hr	Max. input from Leed Enclosed Combustor Operations Manual
Pilot Rating	0.03 MMBtu/hr	Max. pilot fuel usage for Leed Enclosed Combustor
Pilot Rating	26,335 btu/hr	
Pilot Fuel Usage	21 scf/hr	
Combustor Flow Capacity	188.38 MSCFD	Max. flowrate from LEED Combustor Operations Manual
	7,849 scf/hr	
	131 scf/min	

Enclosed Combustor Mass Flow Rate (C001)

$$\frac{7,849 \text{ scf}}{\text{hr}} \times \frac{1 \text{ lbmole}}{379 \text{ scf}} \times 32.14 \frac{\text{lb}}{\text{lbmole}} = 666 \frac{\text{lb}}{\text{hr}}$$

Enclosed Combustor Mass Flow Rate (C002)

$$\frac{7,849 \text{ scf}}{\text{hr}} \times \frac{1 \text{ lbmole}}{379 \text{ scf}} \times 32.14 \frac{\text{lb}}{\text{lbmole}} = 666 \frac{\text{lb}}{\text{hr}}$$

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

20141216_EQT_SMI-27_Produced Fluids Tanks.txt

* Project Setup Information
*

Project File : \\tsclient\Z\Client\EQT Corporation\west Virginia\WV
Production Wells\143901.0023\SMI 27\03 Draft\2014-1212_SMI-27_G70 Draft_Add 3
Wells\Attach I - Emission Calcs\E&P Tank\20141216_EQT_SMI-27_Produced Fluids
Tanks.ept
Flowsheet Selection : Oil Tank with Separator
Calculation Method : RVP Distillation
Control Efficiency : 95.0%
Known Separator Stream : Low Pressure Oil
Entering Air Composition : No

Filed Name : EQT - SMI-27 Produced Fluids Storage Tanks
Date : 2014.12.12

* Data Input
*

Separator Pressure : 1158.00[psig]
Separator Temperature : 60.00[F]
Ambient Pressure : 14.70[psia]
Ambient Temperature : 55.00[F]
C10+ SG : 0.7644
C10+ MW : 129.318

-- Low Pressure Oil

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.0650
4	N2	0.0000
5	C1	10.3080
6	C2	1.7950
7	C3	0.9640
8	i-C4	0.4580
9	n-C4	1.5070
10	i-C5	1.8930
11	n-C5	2.4250
12	C6	4.7170
13	C7	17.7350
14	C8	24.8040
15	C9	13.5310
16	C10+	13.6070
17	Benzene	0.1520
18	Toluene	1.3930
19	E-Benzene	0.2100
20	Xylenes	0.3170
21	n-C6	4.0910
22	224Trimethylp	0.0280

-- Sales Oil

20141216_EQT_SMI-27_Produced Fluids Tanks.txt

Production Rate : 35[bb1/day]
 Days of Annual Operation : 365 [days/year]
 API Gravity : 56.11
 Reid Vapor Pressure : 2.15[psia]

 * Calculation Results
 *

-- Emission Summary

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
Total HAPS	2.900	0.662	0.145	0.033
Total HC	92.702	21.165	4.635	1.058
Page 1	E&P TANK			
VOCs, C2+	64.808	14.796	3.240	0.740
VOCs, C3+	55.704	12.718	2.785	0.636

Uncontrolled Recovery Info.

Vapor	6.0100	[MSCFD]
HC Vapor	5.9900	[MSCFD]
GOR	171.71	[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	0.483	0.110	0.483	0.110
4	N2	0.000	0.000	0.000	0.000
5	C1	27.894	6.368	1.395	0.318
6	C2	9.104	2.079	0.455	0.104
7	C3	7.158	1.634	0.358	0.082
8	i-C4	4.308	0.984	0.215	0.049
9	n-C4	13.115	2.994	0.656	0.150
10	i-C5	8.503	1.941	0.425	0.097
11	n-C5	7.093	1.619	0.355	0.081
12	C6	3.811	0.870	0.191	0.044
13	C7	5.008	1.143	0.250	0.057
14	C8	2.595	0.592	0.130	0.030
15	C9	0.596	0.136	0.030	0.007
16	C10+	0.617	0.141	0.031	0.007
17	Benzene	0.076	0.017	0.004	0.001
18	Toluene	0.223	0.051	0.011	0.003
19	E-Benzene	0.013	0.003	0.001	0.000
20	Xylenes	0.018	0.004	0.001	0.000
21	n-C6	2.562	0.585	0.128	0.029
22	2,2,4-Trimethylp	0.007	0.002	0.000	0.000
	Total	93.184	21.275	4.659	1.064

-- Stream Data

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

20141216_EQT_SMI-27_Produced Fluids 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	0.0650	0.0079	0.0000	0.4496	0.1625
0.3788						
4 N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000						
5 C1	16.04	10.3080	0.4648	0.0000	76.5899	9.5704
60.0761						
6 C2	30.07	1.7950	0.4322	0.0000	10.9716	8.9000
10.4612						
7 C3	44.10	0.9640	0.5635	0.0020	3.6610	11.5649
5.6085						
8 i-C4	58.12	0.4580	0.3875	0.0224	0.9327	7.5410
2.5610						
9 n-C4	58.12	1.5070	1.3929	0.2043	2.2756	24.6819
7.7966						
10 i-C5	72.15	1.8930	1.9962	1.4417	1.1984	12.8601
4.0719						
11 n-C5	72.15	2.4250	2.6175	2.2237	1.1285	10.3345
3.3969						
12 C6	86.16	4.7170	5.3024	5.3693	0.7750	3.9921
1.5677						
13 C7	100.20	17.7350	20.2319	21.0388	0.9213	4.4217
1.7838						
14 C8	114.23	24.8040	28.4308	29.7741	0.3818	2.1106
0.8078						
15 C9	128.28	13.5310	15.5304	16.2989	0.0675	0.4727
0.1674						
16 C10+	129.32	13.6070	15.6179	16.3910	0.0659	0.4697
0.1654						
17 Benzene	78.11	0.1520	0.1720	0.1765	0.0174	0.0840
0.0338						
18 Toluene	92.13	1.3930	1.5936	1.6642	0.0420	0.2106
0.0835						
19 E-Benzene	106.17	0.2100	0.2409	0.2526	0.0020	0.0115
0.0043						
20 xylenes	106.17	0.3170	0.3637	0.3815	0.0025	0.0155
0.0057						
21 n-C6	86.18	4.0910	4.6219	4.7256	0.5161	2.5910
1.0274						
22 224Trimethylp	114.24	0.0280	0.0320	0.0333	0.0012	0.0054
0.0022						
MW		95.32	105.97	108.39	23.58	58.55
32.20						
Stream Mole Ratio		1.0000	0.8707	0.8284	0.1293	0.0423
0.1716						
Heating Value [BTU/SCF]					1402.06	3267.00
1861.58						
Gas Gravity [Gas/Air]					0.81	2.02
1.11						
Bubble Pt. @ 100F [psia]		329.94	20.05	2.16		
RVP @ 100F [psia]		66.58	7.62	2.13		
Spec. Gravity @ 100F		0.665	0.681	0.684		

20141216_EQT_SMI-27_Produced Fluids Tanks.txt

20141029_EQT_SMI-27_Sand Separator Tank.txt

* Project Setup Information

*

Project File : \\tsclient\Z\Client\EQT Corporation\West Virginia\WV
Production Wells\143901.0023\SMI 27\03 Draft\2014-1027_SMI-27_G70 Draft\Attach I -
Emission Calcs\E&P Tank\20141029_EQT_SMI-27_Sand Separator Tank.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-27 Sand Separator Tank
Date : 2014.10.29

* Data Input

*

Separator Pressure : 1158.00[psig]
Separator Temperature : 60.00[F]
Ambient Pressure : 14.70[psia]
Ambient Temperature : 55.00[F]
C10+ SG : 0.7644
C10+ MW : 129.318

-- Low Pressure Oil

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.0650
4	N2	0.0000
5	C1	10.3080
6	C2	1.7950
7	C3	0.9640
8	i-C4	0.4580
9	n-C4	1.5070
10	i-C5	1.8930
11	n-C5	2.4250
12	C6	4.7170
13	C7	17.7350
14	C8	24.8040
15	C9	13.5310
16	C10+	13.6070
17	Benzene	0.1520
18	Toluene	1.3930
19	E-Benzene	0.2100
20	xylenes	0.3170
21	n-C6	4.0910
22	2,2,4-Trimethylp	0.0280

-- Sales Oil

Production Rate : 0.3[bb1/day]

20141029_EQT_SMI-27_Sand Separator Tank.txt

Days of Annual Operation : 365 [days/year]
 API Gravity : 56.11
 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
Total HC	0.474	0.108	0.009	0.002
----- E&P TANK				
VOCs, C2+	0.225	0.051	0.005	0.001
VOCs, C3+	0.158	0.036	0.003	0.001

Uncontrolled Recovery Info.

Vapor	42.1200 x1E-3	[MSCFD]
HC Vapor	41.9300 x1E-3	[MSCFD]
GOR	140.40	[SCF/bbl]

-- Emission Composition

No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
1	H2S	0.000	0.000	0.000	0.000
2	O2	0.000	0.000	0.000	0.000
3	CO2	0.004	0.001	0.004	0.001
4	N2	0.000	0.000	0.000	0.000
5	C1	0.249	0.057	0.005	0.001
6	C2	0.067	0.015	0.001	0.000
7	C3	0.033	0.008	0.001	0.000
8	i-C4	0.011	0.003	0.000	0.000
9	n-C4	0.027	0.006	0.001	0.000
10	i-C5	0.018	0.004	0.000	0.000
11	n-C5	0.017	0.004	0.000	0.000
12	C6	0.013	0.003	0.000	0.000
13	C7	0.018	0.004	0.000	0.000
14	C8	0.009	0.002	0.000	0.000
15	C9	0.002	0.000	0.000	0.000
16	C10+	0.002	0.000	0.000	0.000
17	Benzene	0.000	0.000	0.000	0.000
18	Toluene	0.001	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	0.009	0.002	0.000	0.000
22	2,2,4-Trimethylp	0.000	0.000	0.000	0.000
	Total	0.480	0.110	0.010	0.002

-- Stream Data

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

		20141029_EQT_SMI-27_Sand Separator Tank.txt					
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	0.0650	0.0079	0.0079	0.4496	0.0000
0.4496							
4	N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000							
5	C1	16.04	10.3080	0.4648	0.4648	76.5899	0.0000
76.5899							
6	C2	30.07	1.7950	0.4322	0.4322	10.9716	0.0000
10.9716							
7	C3	44.10	0.9640	0.5635	0.5635	3.6610	0.0000
3.6610							
8	i-C4	58.12	0.4580	0.3875	0.3875	0.9327	0.0000
0.9327							
9	n-C4	58.12	1.5070	1.3929	1.3929	2.2756	0.0000
2.2756							
10	i-C5	72.15	1.8930	1.9962	1.9962	1.1984	0.0000
1.1984							
11	n-C5	72.15	2.4250	2.6175	2.6175	1.1285	0.0000
1.1285							
12	C6	86.16	4.7170	5.3024	5.3024	0.7750	0.0000
0.7750							
13	C7	100.20	17.7350	20.2319	20.2319	0.9213	0.0000
0.9213							
14	C8	114.23	24.8040	28.4308	28.4308	0.3818	0.0000
0.3818							
15	C9	128.28	13.5310	15.5304	15.5304	0.0675	0.0000
0.0675							
16	C10+	129.32	13.6070	15.6179	15.6179	0.0659	0.0000
0.0659							
17	Benzene	78.11	0.1520	0.1720	0.1720	0.0174	0.0000
0.0174							
18	Toluene	92.13	1.3930	1.5936	1.5936	0.0420	0.0000
0.0420							
19	E-Benzene	106.17	0.2100	0.2409	0.2409	0.0020	0.0000
0.0020							
20	Xylenes	106.17	0.3170	0.3637	0.3637	0.0025	0.0000
0.0025							
21	n-C6	86.18	4.0910	4.6219	4.6219	0.5161	0.0000
0.5161							
22	224Trimethylp	114.24	0.0280	0.0320	0.0320	0.0012	0.0000
0.0012							
	MW		95.32	105.97	105.97	23.58	0.00
23.58	Stream Mole Ratio		1.0000	0.8707	0.8707	0.1293	0.0000
0.1293	Heating Value [BTU/SCF]					1402.06	0.00
1402.06	Gas Gravity [Gas/Air]					0.81	0.00
0.81	Bubble Pt. @ 100F [psia]		329.94	20.05	20.05		
	RVP @ 100F [psia]		66.58	7.62	7.62		
	Spec. Gravity @ 100F		0.665	0.681	0.681		

20141029_EQT_SMI-27_Sand Separator Tank.txt

20141029_EQT_SMI-27_Dehy Drip Tank.txt

* Project Setup Information

Project File : \\tsclient\z\Client\EQT Corporation\west Virginia\WV
Production Wells\143901.0023\SMI 27\03 Draft\2014-1027_SMI-27_G70 Draft\Attach I
Emission Calcs\E&P Tank\20141029_EQT_SMI-27_Dehy Drip Tank.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-27 Dehy Drip Tank
Date : 2014.10.29

* Data Input

Separator Pressure : 1000.00[psig]
Separator Temperature : 60.00[F]
Ambient Pressure : 14.70[psia]
Ambient Temperature : 55.00[F]
C10+ SG : 0.7644
C10+ MW : 129.318

-- Low Pressure Oil

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.0650
4	N2	0.0000
5	C1	10.3080
6	C2	1.7950
7	C3	0.9640
8	i-C4	0.4580
9	n-C4	1.5070
10	i-C5	1.8930
11	n-C5	2.4250
12	C6	4.7170
13	C7	17.7350
14	C8	24.8040
15	C9	13.5310
16	C10+	13.6070
17	Benzene	0.1520
18	Toluene	1.3930
19	E-Benzene	0.2100
20	Xylenes	0.3170
21	n-C6	4.0910
22	224Trimethylp	0.0280

-- Sales Oil

Production Rate : 1[bb]/day

20141029_EQT_SMI-27_Dehy Drip Tank.txt

Days of Annual Operation : 365 [days/year]
 API Gravity : 56.11
 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	0.030	0.007	0.001	0.000
Total HC	1.569	0.358	0.031	0.007
----- E&P TANK				
VOCs, C2+	0.739	0.169	0.015	0.003
VOCs, C3+	0.516	0.118	0.010	0.002

Uncontrolled Recovery Info.

Vapor	140.0000	x1E-3	[MSCFD]
HC Vapor	139.3700	x1E-3	[MSCFD]
GOR	140.00		[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	0.013	0.003	0.013	0.003
4	N2	0.000	0.000	0.000	0.000
5	C1	0.830	0.189	0.017	0.004
6	C2	0.222	0.051	0.004	0.001
7	C3	0.108	0.025	0.002	0.000
8	i-C4	0.036	0.008	0.001	0.000
9	n-C4	0.088	0.020	0.002	0.000
10	i-C5	0.057	0.013	0.001	0.000
11	n-C5	0.054	0.012	0.001	0.000
12	C6	0.043	0.010	0.001	0.000
13	C7	0.059	0.013	0.001	0.000
14	C8	0.028	0.006	0.001	0.000
15	C9	0.005	0.001	0.000	0.000
16	C10+	0.006	0.001	0.000	0.000
17	Benzene	0.001	0.000	0.000	0.000
18	Toluene	0.003	0.001	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	0.029	0.007	0.001	0.000
22	2,2,4-Trimethylp	0.000	0.000	0.000	0.000
	Total	1.582	0.361	0.032	0.007

-- Stream Data

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

		20141029_EQT_SMI-27_Dehy Drip Tank.txt					
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	0.0650	0.0080	0.0080	0.4502	0.0000
0.4502							
4	N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000							
5	C1	16.04	10.3080	0.4678	0.4678	76.7752	0.0000
76.7752							
6	C2	30.07	1.7950	0.4364	0.4364	10.9717	0.0000
10.9717							
7	C3	44.10	0.9640	0.5679	0.5679	3.6395	0.0000
3.6395							
8	i-C4	58.12	0.4580	0.3893	0.3893	0.9218	0.0000
0.9218							
9	n-C4	58.12	1.5070	1.3979	1.3979	2.2437	0.0000
2.2437							
10	i-C5	72.15	1.8930	1.9992	1.9992	1.1759	0.0000
1.1759							
11	n-C5	72.15	2.4250	2.6204	2.6204	1.1054	0.0000
1.1054							
12	C6	86.16	4.7170	5.3034	5.3034	0.7563	0.0000
0.7563							
13	C7	100.20	17.7350	20.2280	20.2280	0.8955	0.0000
0.8955							
14	C8	114.23	24.8040	28.4214	28.4214	0.3696	0.0000
0.3696							
15	C9	128.28	13.5310	15.5246	15.5246	0.0651	0.0000
0.0651							
16	C10+	129.32	13.6070	15.6121	15.6121	0.0636	0.0000
0.0636							
17	Benzene	78.11	0.1520	0.1720	0.1720	0.0170	0.0000
0.0170							
18	Toluene	92.13	1.3930	1.5932	1.5932	0.0407	0.0000
0.0407							
19	E-Benzene	106.17	0.2100	0.2408	0.2408	0.0019	0.0000
0.0019							
20	Xylenes	106.17	0.3170	0.3636	0.3636	0.0025	0.0000
0.0025							
21	n-C6	86.18	4.0910	4.6222	4.6222	0.5030	0.0000
0.5030							
22	224Trimethylp	114.24	0.0280	0.0320	0.0320	0.0011	0.0000
0.0011							
	MW		95.32	105.95	105.95	23.47	0.00
23.47	Stream Mole Ratio		1.0000	0.8710	0.8710	0.1290	0.0000
0.1290	Heating Value [BTU/SCF]					1396.20	0.00
1396.20	Gas Gravity [Gas/Air]					0.81	0.00
0.81	Bubble Pt. @ 100F [psia]		329.94	20.17	20.17		
	RVP @ 100F [psia]		66.58	7.66	7.66		
	Spec. Gravity @ 100F		0.665	0.681	0.681		

20141029_EQT_SMI-27_Dehy Drip Tank.txt

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: SMI-27 Wellpad

File Name: Z:\Client\EQT Corporation\West Virginia\WV Production Wells\143901.0023\SMI
27\03 Draft\2014-1212 SMI-27 G70 Draft Add 3 Wells\Attach I - Emission
Calcs\GLYCalc\20141216 EQT SMI-27_DEHY-70_98% control.ddf

Date: December 16, 2014

DESCRIPTION:

Description: 70 MMSCFD Dehy
Max Pump Rate: 450 GPH each

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0198	0.474	0.0866
Ethane	0.0548	1.314	0.2399
Propane	0.0559	1.342	0.2448
Isobutane	0.0177	0.424	0.0774
n-Butane	0.0428	1.027	0.1873
Isopentane	0.0155	0.373	0.0681
n-Pentane	0.0168	0.404	0.0737
n-Hexane	0.0351	0.841	0.1536
Cyclohexane	0.0357	0.856	0.1562
Other Hexanes	0.0452	1.084	0.1978
Heptanes	0.1660	3.983	0.7270
2,2,4-Trimethylpentane	0.0529	1.269	0.2316
Benzene	0.0674	1.618	0.2952
Toluene	0.3720	8.927	1.6292
Ethylbenzene	0.1079	2.589	0.4726
Xylenes	1.1019	26.445	4.8261
C8+ Heavies	0.8786	21.086	3.8483
Total Emissions	3.0857	74.056	13.5152
Total Hydrocarbon Emissions	3.0857	74.056	13.5152
Total VOC Emissions	3.0111	72.267	13.1888
Total HAP Emissions	1.7370	41.689	7.6082
Total BTEX Emissions	1.6491	39.579	7.2231

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.9880	23.713	4.3277
Ethane	2.7382	65.717	11.9933
Propane	2.7949	67.077	12.2416
Isobutane	0.8835	21.205	3.8698
n-Butane	2.1386	51.327	9.3672
Isopentane	0.7773	18.656	3.4047
n-Pentane	0.8410	20.185	3.6837
n-Hexane	1.7529	42.069	7.6777
Cyclohexane	1.7831	42.794	7.8098

Other Hexanes	2.2576	54.182	
Heptanes	8.2989	199.174	36.3493
2,2,4-Trimethylpentane	2.6436	63.448	11.5792
Benzene	3.3703	80.888	14.7620
Toluene	18.5978	446.348	81.4585
Ethylbenzene	5.3945	129.468	23.6279
Xylenes	55.0928	1322.227	241.3063
C8+ Heavies	43.9299	1054.317	192.4129

Total Emissions	154.2830	3702.792	675.7596

Total Hydrocarbon Emissions	154.2830	3702.792	675.7596
Total VOC Emissions	150.5568	3613.363	659.4387
Total HAP Emissions	86.8519	2084.447	380.4115
Total BTEX Emissions	82.4554	1978.930	361.1547

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	6.2220	149.328	27.2523
Ethane	4.6801	112.321	20.4986
Propane	2.2554	54.130	9.8787
Isobutane	0.4631	11.115	2.0286
n-Butane	0.8520	20.447	3.7316
Isopentane	0.2623	6.295	1.1488
n-Pentane	0.2275	5.461	0.9966
n-Hexane	0.2552	6.124	1.1177
Cyclohexane	0.0635	1.525	0.2782
Other Hexanes	0.4349	10.437	1.9048
Heptanes	0.5738	13.772	2.5134
2,2,4-Trimethylpentane	0.3579	8.590	1.5677
Benzene	0.0180	0.431	0.0787
Toluene	0.0618	1.484	0.2709
Ethylbenzene	0.0100	0.241	0.0439
Xylenes	0.0713	1.712	0.3124
C8+ Heavies	0.2438	5.851	1.0678

Total Emissions	17.0527	409.265	74.6908

Total Hydrocarbon Emissions	17.0527	409.265	74.6908
Total VOC Emissions	6.1506	147.616	26.9398
Total HAP Emissions	0.7743	18.582	3.3912
Total BTEX Emissions	0.1611	3.868	0.7058

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	24.8880	597.312	109.0094
Ethane	18.7202	449.285	81.9946
Propane	9.0216	216.519	39.5148
Isobutane	1.8526	44.462	8.1143
n-Butane	3.4079	81.789	14.9265
Isopentane	1.0491	25.179	4.5952
n-Pentane	0.9102	21.844	3.9865
n-Hexane	1.0207	24.498	4.4709
Cyclohexane	0.2541	6.099	1.1130
Other Hexanes	1.7396	41.749	7.6193

Heptanes	2.2953	55.088	10.0536
2,2,4-Trimethylpentane	1.4317	34.360	6.2708
Benzene	0.0719	1.725	0.3149
Toluene	0.2474	5.937	1.0834
Ethylbenzene	0.0401	0.962	0.1756
Xylenes	0.2853	6.846	1.2494
C8+ Heavies	0.9752	23.405	4.2713

Total Emissions	68.2108	1637.059	298.7633

Total Hydrocarbon Emissions	68.2108	1637.059	298.7633
Total VOC Emissions	24.6026	590.462	107.7593
Total HAP Emissions	3.0970	74.329	13.5650
Total BTEX Emissions	0.6446	15.470	2.8233

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	6.2418	149.802	27.3389
Ethane	4.7348	113.636	20.7385
Propane	2.3113	55.471	10.1235
Isobutane	0.4808	11.540	2.1060
n-Butane	0.8947	21.474	3.9190
Isopentane	0.2778	6.668	1.2169
n-Pentane	0.2444	5.865	1.0703
n-Hexane	0.2902	6.966	1.2713
Cyclohexane	0.0992	2.381	0.4344
Other Hexanes	0.4800	11.521	2.1026
Heptanes	0.7398	17.756	3.2404
2,2,4-Trimethylpentane	0.4108	9.859	1.7993
Benzene	0.0854	2.049	0.3740
Toluene	0.4338	10.411	1.9000
Ethylbenzene	0.1179	2.830	0.5165
Xylenes	1.1732	28.156	5.1385
C8+ Heavies	1.1224	26.937	4.9161

Total Emissions	20.1384	483.321	88.2060

Total Hydrocarbon Emissions	20.1384	483.321	88.2060
Total VOC Emissions	9.1618	219.883	40.1286
Total HAP Emissions	2.5113	60.271	10.9995
Total BTEX Emissions	1.8103	43.446	7.9289

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction
Methane	113.3370	27.3389	75.88
Ethane	93.9879	20.7385	77.93
Propane	51.7563	10.1235	80.44
Isobutane	11.9841	2.1060	82.43
n-Butane	24.2937	3.9190	83.87
Isopentane	7.9999	1.2169	84.79
n-Pentane	7.6702	1.0703	86.05
n-Hexane	12.1485	1.2713	89.54
Cyclohexane	8.9228	0.4344	95.13
Other Hexanes	17.5074	2.1026	87.99

Heptanes	46.4029	3.2404	93.02
2,2,4-Trimethylpentane	17.8500	1.7993	89.92
Benzene	15.0768	0.3740	97.52
Toluene	82.5419	1.9000	97.70
Ethylbenzene	23.8035	0.5165	97.83
Xylenes	242.5557	5.1385	97.88
C8+ Heavies	196.6842	4.9161	97.50

Total Emissions	974.5229	88.2060	90.95

Total Hydrocarbon Emissions	974.5229	88.2060	90.95
Total VOC Emissions	767.1980	40.1286	94.77
Total HAP Emissions	393.9765	10.9995	97.21
Total BTEX Emissions	363.9780	7.9289	97.82

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 70.00 deg. F
 Excess Oxygen: 5.00 %
 Combustion Efficiency: 98.00 %
 Supplemental Fuel Requirement: 6.34e-001 MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	2.00%	98.00%
Isobutane	2.00%	98.00%
n-Butane	2.00%	98.00%
Isopentane	2.00%	98.00%
n-Pentane	2.00%	98.00%
n-Hexane	2.00%	98.00%
Cyclohexane	2.00%	98.00%
Other Hexanes	2.00%	98.00%
Heptanes	2.00%	98.00%
2,2,4-Trimethylpentane	2.00%	98.00%
Benzene	2.00%	98.00%
Toluene	2.00%	98.00%
Ethylbenzene	2.00%	98.00%
Xylenes	2.00%	98.00%
C8+ Heavies	2.00%	98.00%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
 Calculated Dry Gas Dew Point: 1.30 lbs. H2O/MMSCF
 Temperature: 80.0 deg. F

Pressure: 1000.0 psig
 Dry Gas Flow Rate: 70.0000 MMSCF/day
 Glycol Losses with Dry Gas: 0.9113 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 32.39 lbs. H2O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 9.90 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	4.02%	95.98%
Carbon Dioxide	99.65%	0.35%
Nitrogen	99.97%	0.03%
Methane	99.97%	0.03%
Ethane	99.93%	0.07%
Propane	99.89%	0.11%
Isobutane	99.86%	0.14%
n-Butane	99.82%	0.18%
Isopentane	99.83%	0.17%
n-Pentane	99.78%	0.22%
n-Hexane	99.67%	0.33%
Cyclohexane	98.43%	1.57%
Other Hexanes	99.74%	0.26%
Heptanes	99.43%	0.57%
2,2,4-Trimethylpentane	99.77%	0.23%
Benzene	85.68%	14.32%
Toluene	81.00%	19.00%
Ethylbenzene	77.81%	22.19%
Xylenes	70.51%	29.49%
C8+ Heavies	99.20%	0.80%

FLASH TANK

Flash Control: Combustion device
 Flash Control Efficiency: 75.00 %
 Flash Temperature: 125.0 deg. F
 Flash Pressure: 35.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.95%	0.05%
Carbon Dioxide	31.73%	68.27%
Nitrogen	3.73%	96.27%
Methane	3.82%	96.18%
Ethane	12.76%	87.24%
Propane	23.65%	76.35%
Isobutane	32.29%	67.71%
n-Butane	38.56%	61.44%
Isopentane	42.85%	57.15%
n-Pentane	48.29%	51.71%
n-Hexane	63.38%	36.62%
Cyclohexane	87.93%	12.07%
Other Hexanes	56.91%	43.09%
Heptanes	78.44%	21.56%
2,2,4-Trimethylpentane	65.40%	34.60%
Benzene	98.02%	1.98%
Toluene	98.79%	1.21%
Ethylbenzene	99.34%	0.66%
Xylenes	99.55%	0.45%
C8+ Heavies	98.09%	1.91%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	58.22%	41.78%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	1.17%	98.83%
n-Pentane	1.03%	98.97%
n-Hexane	0.79%	99.21%
Cyclohexane	3.64%	96.36%
Other Hexanes	1.76%	98.24%
Heptanes	0.64%	99.36%
2,2,4-Trimethylpentane	2.29%	97.71%
Benzene	5.10%	94.90%
Toluene	8.00%	92.00%
Ethylbenzene	10.47%	89.53%
Xylenes	12.97%	87.03%
C8+ Heavies	12.22%	87.78%

STREAM REPORTS:

WET GAS STREAM

Temperature: 80.00 deg. F
 Pressure: 1014.70 psia
 Flow Rate: 2.92e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.83e-002	9.46e+001
Carbon Dioxide	1.98e-001	6.70e+002
Nitrogen	3.74e-001	8.06e+002
Methane	8.08e+001	9.98e+004
Ethane	1.25e+001	2.89e+004
Propane	3.28e+000	1.11e+004
Isobutane	4.42e-001	1.98e+003
n-Butane	6.84e-001	3.06e+003
Isopentane	1.94e-001	1.08e+003
n-Pentane	1.44e-001	7.99e+002
n-Hexane	1.26e-001	8.35e+002
Cyclohexane	2.00e-002	1.29e+002
Other Hexanes	2.35e-001	1.56e+003
Heptanes	2.43e-001	1.87e+003
2,2,4-Trimethylpentane	2.03e-001	1.78e+003

Benzene	4.00e-003	2.40e+001
Toluene	1.40e-002	9.92e+001
Ethylbenzene	3.00e-003	2.45e+001
Xylenes	2.30e-002	1.88e+002
C8+ Heavies	4.31e-001	5.65e+003

Total Components	100.00	1.60e+005
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DRY GAS STREAM

Temperature: 80.00 deg. F
 Pressure: 1014.70 psia
 Flow Rate: 2.92e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.75e-003	3.80e+000
Carbon Dioxide	1.97e-001	6.68e+002
Nitrogen	3.74e-001	8.05e+002
Methane	8.09e+001	9.98e+004
Ethane	1.25e+001	2.89e+004
Propane	3.28e+000	1.11e+004
Isobutane	4.42e-001	1.97e+003
n-Butane	6.83e-001	3.05e+003
Isopentane	1.94e-001	1.07e+003
n-Pentane	1.44e-001	7.97e+002
n-Hexane	1.26e-001	8.32e+002
Cyclohexane	1.97e-002	1.27e+002
Other Hexanes	2.35e-001	1.55e+003
Heptanes	2.42e-001	1.86e+003
2,2,4-Trimethylpentane	2.03e-001	1.78e+003
Benzene	3.43e-003	2.06e+001
Toluene	1.13e-002	8.04e+001
Ethylbenzene	2.34e-003	1.91e+001
Xylenes	1.62e-002	1.32e+002
C8+ Heavies	4.28e-001	5.60e+003
Total Components	100.00	1.60e+005

LEAN GLYCOL STREAM

Temperature: 80.00 deg. F
 Flow Rate: 1.50e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.83e+001	8.28e+003
Water	1.50e+000	1.26e+002
Carbon Dioxide	2.81e-012	2.36e-010
Nitrogen	2.97e-013	2.50e-011
Methane	1.03e-017	8.69e-016
Ethane	1.20e-007	1.01e-005
Propane	5.71e-009	4.81e-007
Isobutane	9.74e-010	8.20e-008
n-Butane	1.63e-009	1.37e-007
Isopentane	1.09e-004	9.17e-003
n-Pentane	1.04e-004	8.79e-003
n-Hexane	1.65e-004	1.39e-002
Cyclohexane	7.99e-004	6.73e-002

Other Hexanes	4.79e-004	4.03e-002
Heptanes	6.32e-004	5.32e-002
2,2,4-Trimethylpentane	7.36e-004	6.20e-002
Benzene	2.15e-003	1.81e-001
Toluene	1.92e-002	1.62e+000
Ethylbenzene	7.50e-003	6.31e-001
Xylenes	9.75e-002	8.21e+000
C8+ Heavies	7.27e-002	6.12e+000

Total Components	100.00	8.42e+003

RICH GLYCOL STREAM

Temperature: 80.00 deg. F
 Pressure: 1014.70 psia
 Flow Rate: 1.56e+001 gpm
 NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)

TEG	9.47e+001	8.28e+003
Water	2.49e+000	2.17e+002
Carbon Dioxide	2.71e-002	2.37e+000
Nitrogen	2.88e-003	2.52e-001
Methane	2.96e-001	2.59e+001
Ethane	2.46e-001	2.15e+001
Propane	1.35e-001	1.18e+001
Isobutane	3.13e-002	2.74e+000
n-Butane	6.35e-002	5.55e+000
Isopentane	2.10e-002	1.84e+000
n-Pentane	2.01e-002	1.76e+000
n-Hexane	3.19e-002	2.79e+000
Cyclohexane	2.41e-002	2.10e+000
Other Hexanes	4.62e-002	4.04e+000
Heptanes	1.22e-001	1.06e+001
2,2,4-Trimethylpentane	4.74e-002	4.14e+000
Benzene	4.15e-002	3.62e+000
Toluene	2.34e-001	2.05e+001
Ethylbenzene	6.94e-002	6.07e+000
Xylenes	7.28e-001	6.36e+001
C8+ Heavies	5.84e-001	5.10e+001

Total Components	100.00	8.74e+003

FLASH TANK OFF GAS STREAM

Temperature: 125.00 deg. F
 Pressure: 49.70 psia
 Flow Rate: 9.98e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)

Water	2.37e-001	1.12e-001
Carbon Dioxide	1.39e+000	1.61e+000
Nitrogen	3.29e-001	2.42e-001
Methane	5.90e+001	2.49e+001
Ethane	2.37e+001	1.87e+001

Propane	7.78e+000	9.02e+000
Isobutane	1.21e+000	1.85e+000
n-Butane	2.23e+000	3.41e+000
Isopentane	5.53e-001	1.05e+000
n-Pentane	4.79e-001	9.10e-001
n-Hexane	4.50e-001	1.02e+000
Cyclohexane	1.15e-001	2.54e-001
Other Hexanes	7.67e-001	1.74e+000
Heptanes	8.71e-001	2.30e+000
2,2,4-Trimethylpentane	4.76e-001	1.43e+000
Benzene	3.50e-002	7.19e-002
Toluene	1.02e-001	2.47e-001
Ethylbenzene	1.44e-002	4.01e-002
Xylenes	1.02e-001	2.85e-001
C8+ Heavies	2.18e-001	9.75e-001

Total Components	100.00	7.02e+001

FLASH TANK GLYCOL STREAM

 Temperature: 125.00 deg. F
 Flow Rate: 1.55e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)

TEG	9.55e+001	8.28e+003
Water	2.50e+000	2.17e+002
Carbon Dioxide	8.66e-003	7.50e-001
Nitrogen	1.08e-004	9.38e-003
Methane	1.14e-002	9.88e-001
Ethane	3.16e-002	2.74e+000
Propane	3.23e-002	2.79e+000
Isobutane	1.02e-002	8.84e-001
n-Butane	2.47e-002	2.14e+000
Isopentane	9.08e-003	7.86e-001
n-Pentane	9.81e-003	8.50e-001
n-Hexane	2.04e-002	1.77e+000
Cyclohexane	2.14e-002	1.85e+000
Other Hexanes	2.65e-002	2.30e+000
Heptanes	9.64e-002	8.35e+000
2,2,4-Trimethylpentane	3.12e-002	2.71e+000
Benzene	4.10e-002	3.55e+000
Toluene	2.33e-001	2.02e+001
Ethylbenzene	6.95e-002	6.03e+000
Xylenes	7.31e-001	6.33e+001
C8+ Heavies	5.78e-001	5.00e+001

Total Components	100.00	8.67e+003

FLASH GAS EMISSIONS

 Flow Rate: 3.55e+003 scfh
 Control Method: Combustion Device
 Control Efficiency: 75.00

Component	Conc. (vol%)	Loading (lb/hr)

Water	5.66e+001	9.53e+001

Carbon Dioxide	3.64e+001	1.50e+002
Nitrogen	9.25e-002	2.42e-001
Methane	4.15e+000	6.22e+000
Ethane	1.66e+000	4.68e+000
Propane	5.47e-001	2.26e+000
Isobutane	8.52e-002	4.63e-001
n-Butane	1.57e-001	8.52e-001
Isopentane	3.89e-002	2.62e-001
n-Pentane	3.37e-002	2.28e-001
n-Hexane	3.17e-002	2.55e-001
Cyclohexane	8.07e-003	6.35e-002
Other Hexanes	5.39e-002	4.35e-001
Heptanes	6.12e-002	5.74e-001
2,2,4-Trimethylpentane	3.35e-002	3.58e-001
Benzene	2.46e-003	1.80e-002
Toluene	7.18e-003	6.18e-002
Ethylbenzene	1.01e-003	1.00e-002
Xylenes	7.18e-003	7.13e-002
C8+ Heavies	1.53e-002	2.44e-001

Total Components	100.00	2.63e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 2.50e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)

Water	7.64e+001	9.07e+001
Carbon Dioxide	2.59e-001	7.50e-001
Nitrogen	5.08e-003	9.38e-003
Methane	9.35e-001	9.88e-001
Ethane	1.38e+000	2.74e+000
Propane	9.62e-001	2.79e+000
Isobutane	2.31e-001	8.84e-001
n-Butane	5.58e-001	2.14e+000
Isopentane	1.63e-001	7.77e-001
n-Pentane	1.77e-001	8.41e-001
n-Hexane	3.09e-001	1.75e+000
Cyclohexane	3.22e-001	1.78e+000
Other Hexanes	3.98e-001	2.26e+000
Heptanes	1.26e+000	8.30e+000
2,2,4-Trimethylpentane	3.51e-001	2.64e+000
Benzene	6.55e-001	3.37e+000
Toluene	3.06e+000	1.86e+001
Ethylbenzene	7.71e-001	5.39e+000
Xylenes	7.87e+000	5.51e+001
C8+ Heavies	3.91e+000	4.39e+001

Total Components	100.00	2.46e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 1.17e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Methane	4.01e+000	1.98e-002
Ethane	5.93e+000	5.48e-002
Propane	4.12e+000	5.59e-002
Isobutane	9.89e-001	1.77e-002
n-Butane	2.39e+000	4.28e-002
Isopentane	7.01e-001	1.55e-002
n-Pentane	7.59e-001	1.68e-002
n-Hexane	1.32e+000	3.51e-002
Cyclohexane	1.38e+000	3.57e-002
Other Hexanes	1.70e+000	4.52e-002
Heptanes	5.39e+000	1.66e-001
2,2,4-Trimethylpentane	1.51e+000	5.29e-002
Benzene	2.81e+000	6.74e-002
Toluene	1.31e+001	3.72e-001
Ethylbenzene	3.31e+000	1.08e-001
Xylenes	3.38e+001	1.10e+000
C8+ Heavies	1.68e+001	8.79e-001
-----	-----	-----
Total Components	100.00	3.09e+000



Certificate of Analysis
 Number: 2030-14120043-004A

Carencro Laboratory
 4790 NE Evangeline Thruway
 Carencro, LA 70520

Gary Vermillion
 Gas Analytical Services
 PO Box 1028
 Bridgeport, WV 26330

Dec. 08, 2014

Field: EQT
 Station Name: SMI 27 West Side Dehy Inlet
 Sample Point:
 Cylinder No: 0186
 Analyzed: 12/03/2014 07:20:14 by GR

Sampled By: SL-GAS
 Sample Of: Gas Spot
 Sample Date: 11/13/2014 10:10
 Sample Conditions: 1155 psig
 Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia	
Nitrogen	0.374	0.506		
Carbon Dioxide	0.198	0.421		
Methane	80.889	62.701		
Ethane	12.491	18.148	3.352	
Propane	3.282	6.993	0.907	
Iso-Butane	0.442	1.241	0.145	
n-Butane	0.684	1.921	0.216	
Iso-Pentane	0.194	0.676	0.071	
n-Pentane	0.144	0.502	0.052	
Hexanes	0.361	1.470	0.146	
Heptanes Plus	0.941	5.421	0.476	
	100.000	100.000	5.365	
				GPM TOTAL C2+ 5.365
				GPM TOTAL C3+ 2.013
				GPM TOTAL IC5+ 0.745

Physical Properties	Total	C7+
Relative Density Real Gas	0.7184	4.0407
Calculated Molecular Weight	20.70	117.03
Compressibility Factor	0.9964	

GPA 2172-09 Calculation:
Calculated Gross BTU per ft³ @ 14.73 psia & 60°F
 Real Gas Dry BTU 1254 6297
 Water Sat. Gas Base BTU 1233 6187

Comments: H2O Mol% : 1.740 ; Wt% : 1.520

Hydrocarbon Laboratory Manager

Quality Assurance:

The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



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Dec. 08, 2014

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 Station Name: SMI 27 West Side Dehy Inlet
 Sample Point:
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Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia	
Nitrogen	0.374	0.506		
Carbon Dioxide	0.198	0.421		
Methane	80.889	62.701		
Ethane	12.491	18.148	3.352	
Propane	3.282	6.993	0.907	
Iso-butane	0.442	1.241	0.145	
n-Butane	0.684	1.921	0.216	
Iso-pentane	0.194	0.676	0.071	
n-Pentane	0.144	0.502	0.052	
Hexanes Plus	1.302	6.891	0.622	
	100.000	100.000	5.365	
				GPM TOTAL C2+ 5.365
				GPM TOTAL C3+ 2.013
				GPM TOTAL IC5+ 0.745

Physical Properties	Total	C6+
Relative Density Real Gas	0.7164	3.7424
Calculated Molecular Weight	20.70	108.39
Compressibility Factor	0.9964	
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.73 psia & 60°F		
Real Gas Dry BTU	1254	5865
Water Sat. Gas Base BTU	1233	5762

Comments: H2O Mol% : 1.740 ; Wt% : 1.519

Hydrocarbon Laboratory Manager

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Carencro, LA 70520

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Bridgeport, WV 26330

Dec. 08, 2014

Field: EQT
Station Name: SMI 27 West Side Dehy Inlet
Sample Point:
Cylinder No: 0186
Analyzed: 12/03/2014 07:20:14 by GR

Sampled By: SL-GAS
Sample Of: Gas Spot
Sample Date: 11/13/2014 10:10
Sample Conditions: 1155 psig
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia	
Nitrogen	0.374	0.506		
Methane	80.889	62.701		
Carbon Dioxide	0.198	0.421		
Ethane	12.491	18.148	3.352	
Propane	3.282	6.993	0.907	
Iso-Butane	0.442	1.241	0.145	
n-Butane	0.684	1.921	0.216	
Iso-Pentane	0.194	0.676	0.071	
n-Pentane	0.144	0.502	0.052	
i-Hexanes	0.235	0.946	0.094	
n-Hexane	0.126	0.524	0.052	
Benzene	0.004	0.018	0.001	
Cyclohexane	0.020	0.079	0.007	
i-Heptanes	0.172	0.827	0.077	
n-Heptane	0.071	0.344	0.033	
Toluene	0.014	0.065	0.005	
i-Octanes	0.203	1.076	0.094	
n-Octane	0.051	0.280	0.026	
Ethylbenzene	0.003	0.011	0.001	
Xylenes	0.023	0.122	0.009	
i-Nonanes	0.109	0.676	0.057	
n-Nonane	0.038	0.241	0.022	
i-Decanes	0.148	1.041	0.088	
n-Decane	0.021	0.151	0.013	
Undecanes	0.054	0.411	0.036	
Dodecanes	0.010	0.079	0.007	
Tridecanes	NIL	NIL	NIL	
Tetradecanes Plus	NIL	NIL	NIL	
	100.000	100.000	5.365	GPM TOTAL C2+ 5.365

Physical Properties	Total
Calculated Molecular Weight	20.696
GPA 2172-09 Calculation:	
Calculated Gross BTU per ft ³ @ 14.73 psia & 60°F	
Real Gas Dry BTU	1254.4
Water Sat. Gas Base BTU	1232.5
Relative Density Real Gas	0.7164
Compressibility Factor	0.9964

Hydrocarbon Laboratory Manager

Quality Assurance:

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Dec. 08, 2014

Field: EQT
 Station Name: SMI 27 West Side Dehy Inlet
 Sample Point:
 Cylinder No: 0186
 Analyzed: 12/03/2014 07:20:14 by GR

Sampled By: SL-GAS
 Sample Of: Gas Spot
 Sample Date: 11/13/2014 10:10
 Sample Conditions: 1155 psig
 Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %
Carbon Dioxide	0.198	0.422
Hydrogen Sulfide	N/R	N/R
Nitrogen	0.374	0.507
Methane	80.889	62.812
Ethane	12.491	18.180
Propane	3.282	7.005
Iso-Butane	0.442	1.243
n-Butane	0.684	1.924
Iso-Pentane	0.194	0.678
n-Pentane	0.144	0.503
Cyclopentane	0.017	0.054
n-Hexane	0.133	0.551
Cyclohexane	0.021	0.083
Other Hexanes	0.224	0.939
n-Heptane	0.075	0.361
Other Heptanes	0.179	0.864
Methylcyclohexane	0.059	0.276
2,2,4-Trimethylpentane	NIL	0.002
Benzene	0.006	0.019
Toluene	0.015	0.068
Ethylbenzene	0.003	0.012
Xylenes	0.025	0.129
C8 + Heavies	0.545	3.368
	<u>100.000</u>	<u>100.000</u>

Rita L. Petro

Hydrocarbon Laboratory Manager

Quality Assurance:

The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Date: 11/24/2014



Gas Analytical Services, Inc.
 P.O. Box 1028, Bridgeport, WV 26330
 205 Water Street, Stonewood, WV 26301
 Phone: (304) 623-0020 Fax: (304) 624-8076

14120043

Testing Requested

SCF Base Conditions: P₁ 14.73psia / T₁ 60 F

Referred to: Southern Petroleum Laboratories
 4790 NE Evangeline Thruway
 Carencro, LA 70520
 Attn: Patti Petro

G.P.A. 2286 C8+
 with BTEX for Gly Cales

Client	Location	Date of Collection	Time of Collection	Cylinder Number	Sulfur Speciation (GPA-2199)	Total Sulfur (GPA-2199)	Extended Hydrocarbon C ₁ ...C ₉ (GPA-2286)	Extended Hydrocarbon C ₁ ...C ₁₀₊ (GPA-2286)	Extended Hydrocarbon C ₁ ...C ₁₄₊ (GPA-2286)	Hydrocarbon Dewpoint	Gas Temperature (F)
EQT	Big 57 Dehy Inlet	11/20/2014	10:30	0421			X				
EQT	Big Run Dehy Inlet	11/20/2014	12:30	0343			X				
EQT	CPT 11 Dehy Inlet Side	11/13/2014	12:00	0196			X				
EQT	SMI 27 Wet Side Dehy Inlet	11/13/2014	10:10	0186			X				

Please email results to:
 lab@gasana.com
 gvermillion@gasana.com

Submitted by:
 Christopher Swann
 Stonewood, WV Laboratory

Received by:
 [Signature]
 12/1/14



Certificate of Analysis
 Number: 2030-14100118-002A

Carencro Laboratory
 4790 NE Evangeline Thruway
 Carencro, LA 70520

Gary Vermillion
 Gas Analytical Services
 PO Box 1028
 Bridgeport, WV 26330

Oct. 21, 2014

Field: EQT
 Station Name: Jordan
 Station Number: 514317 **CPT-11**
 Sample Point:
 Analyzed: 10/17/2014 07:44:46 by GR

Sampled By: Ronnie Moore - GAS
 Sample Of: **Condensate** Spot
 Sample Date: 09/29/2014
 Sample Conditions:
 Method: GPA-2186M/GPA-2103
 Cylinder No: GAS

Analytical Data

Components	Mol. %	MW	Wt. %	Sp. Gravity	L.V. %
Nitrogen	NIL	28.013	NIL	0.807	NIL
Methane	10.308	16.043	1.732	0.300	4.054
Carbon Dioxide	0.065	44.010	0.030	0.817	0.026
Ethane	1.795	30.069	0.565	0.356	1.113
Propane	0.964	44.096	0.445	0.507	0.616
Iso-Butane	0.458	58.122	0.279	0.563	0.348
n-Butane	1.507	58.122	0.917	0.584	1.102
Iso-Pentane	1.893	72.149	1.430	0.625	1.606
n-Pentane	2.425	72.149	1.832	0.631	2.040
i-Hexanes	4.717	85.266	4.211	0.667	4.436
n-Hexane	4.091	86.175	3.691	0.664	3.903
2,2,4-Trimethylpentane	0.028	114.231	0.034	0.697	0.034
Benzene	0.152	78.114	0.124	0.885	0.098
Heptanes	17.735	98.344	18.260	0.701	18.301
Toluene	1.393	92.141	1.344	0.872	1.082
Octanes	24.804	109.534	26.447	0.735	27.194
Ethylbenzene	0.210	106.167	0.233	0.872	0.188
Xylenes	0.317	106.167	0.351	0.885	0.278
Nonanes	13.531	124.586	17.653	0.745	16.653
Decanes Plus	13.607	129.318	18.422	0.764	16.928
	100.000		100.000		100.000

Physical Properties	Total	C10+
Specific Gravity at 60°F	0.7023	0.7644
API Gravity at 60°F	69.994	53.613
Molecular Weight	95.507	129.318
Pounds per Gallon (in Vacuum)	5.855	6.373
Pounds per Gallon (in Air)	5.848	6.366
Cu. Ft. Vapor per Gallon @ 14.73 psia	23.209	18.658

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



Certificate of Analysis
 Number: 2030-14100118-002A

Carencro Laboratory
 4790 NE Evangeline Thruway
 Carencro, LA 70520

Oct. 21, 2014

Gary Vermillion
 Gas Analytical Services
 PO Box 1028
 Bridgeport, WV 26330

Field: EQT
 Station Name: Jordan
 Station Number: 514317
 Sample Point:
 Analyzed: 10/17/2014 07:44:46 by GR

Sampled By: Ronnie Moore - GAS
 Sample Of: Condensate Spot
 Sample Date: 09/29/2014
 Sample Conditions:
 Method: GPA-2186M/GPA-2103
 Cylinder No: GAS

Analytical Data

Components	Mol. %	MW	Wt. %	Sp. Gravity	L.V. %
Nitrogen	NIL	28.013	NIL	0.807	NIL
Carbon Dioxide	0.065	44.010	0.030	0.817	0.026
Methane	10.308	16.043	1.732	0.300	4.054
Ethane	1.795	30.069	0.565	0.356	1.113
Propane	0.964	44.096	0.445	0.507	0.616
iso-butane	0.458	58.122	0.279	0.563	0.348
n-Butane	1.507	58.122	0.917	0.584	1.102
iso-pentane	1.893	72.149	1.430	0.625	1.606
n-Pentane	2.425	72.149	1.832	0.631	2.040
Hexanes	8.808	85.888	7.902	0.666	8.339
Heptanes Plus	71.777	112.930	84.868	0.738	80.756
	100.000		100.000		100.000

Physical Properties	Total	C7+
Specific Gravity at 60°F	0.7023	0.7383
API Gravity at 60°F	69.994	60.164
Molecular Weight	95.507	112.930
Pounds per Gallon (in Vacuum)	5.855	6.155
Pounds per Gallon (in Air)	5.848	6.148
Cu. Ft. Vapor per Gallon @ 14.73 psia	23.209	20.635

Patricia L. Perrino

Hydrocarbon Laboratory Manager

Quality Assurance:

The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



Certificate of Analysis
 Number: 2030-14100118-002A

Carencro Laboratory
 4790 NE Evangeline Thruway
 Carencro, LA 70520

Gary Vermillion
 Gas Analytical Services
 PO Box 1028
 Bridgeport, WV 26330

Oct. 21, 2014

Field: EQT
 Station Name: Jordan
 Station Number: 514317
 Sample Point:

Sampled By: Ronnie Moore - GAS
 Sample Of: Condensate Spot
 Sample Date: 09/29/2014
 Sample Conditions:
 Cylinder No: GAS

Analytical Data

Test	Method	Result	Units	Detection Limit	Lab Tech.	Analysis Date
Color Visual	Proprietary	Water White			TC	10/15/2014
API Gravity @ 60° F	ASTM D-5002	64.78	°		CM	10/15/2014
Specific Gravity @ 60/60° F	ASTM D-5002	0.7209			CM	10/15/2014
Density @ 60° F	ASTM D-5002	0.7202	g/ml		CM	10/15/2014
Shrinkage Factor	Proprietary	0.9462			TC	10/15/2014
Flash Factor	Proprietary	119.5015	Cu. Ft./S.T. Bbl		TC	10/15/2014

Hydrocarbon Laboratory Manager

Quality Assurance:

The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

14100118



Gas Analytical Services, Inc.
P.O. Box 1028, Bridgeport, WV 26330
205 Water Street, Stonewood, WV 26301
Phone: (304) 623-0020 Fax: (304) 624-8076

Date:
10/7/2014

Referred to: **Southern Petroleum Laboratories**
4790 NE Evangeline Thruway
Carencro, LA 70520
Attn: Patti Petro

Testing Requested
SCF Base Conditions: P₁ 14.7 psia / T₁ 60 F

Client	Location	Date of Collection	Time of Collection	Cylinder Number	Sulfur Speciation (GPA-2199)	Total Sulfur (GPA-2199)	Extended Hydrocarbon C ₁ ...C ₆ (GPA-2186)	Extended Hydrocarbon C ₁ ...C ₁₀ (GPA-2186)	Extended Hydrocarbon C ₁ ...C ₁₄ (GPA-2186)	Hydrocarbon Dewpoint	Gas Temperature (°F)
EQT	514142	9/29									
EQT	514317	9/29					X	X			

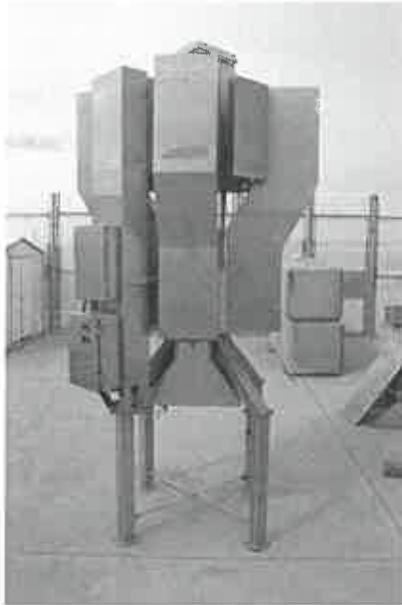
Carbon 102

Please email results to:
lab@gasana.com
overmillion@gasana.com

Submitted by: *[Signature]*
Gary Vermillion, Lab Manager
South Charleston, WV Laboratory

Received by: *[Signature]*
Patti Petro 10-14-14

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.

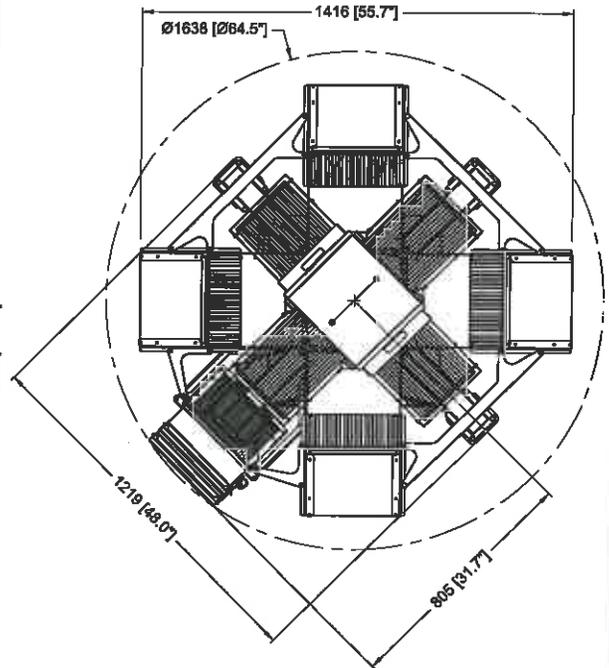
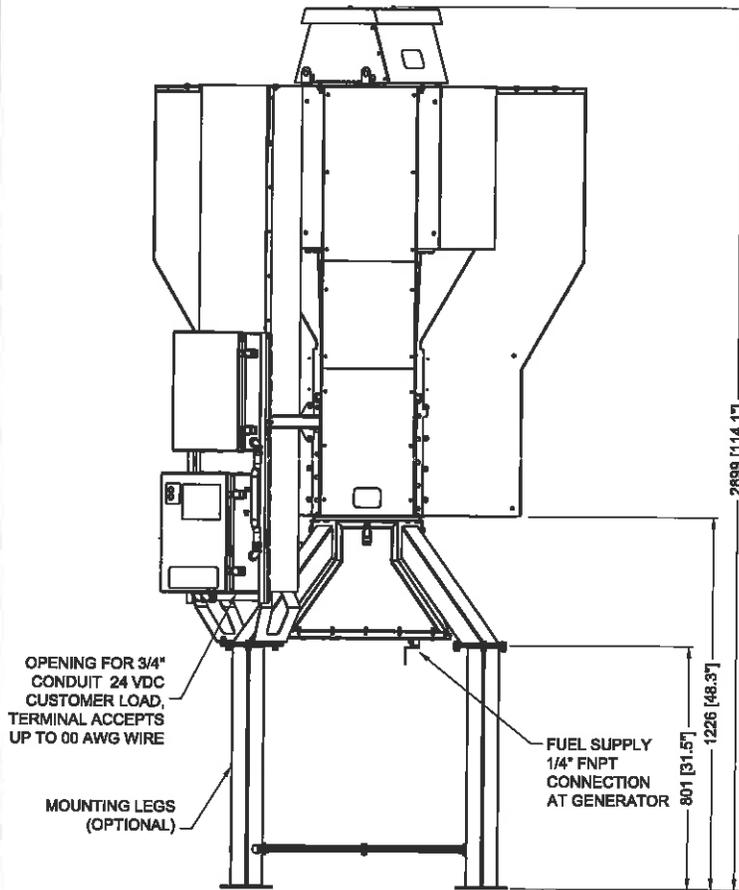


Rev 04-12



Typical Installation

Rev 04-12



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

42362 rev1



Power where you need it.®

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 Houston, TX 77238
 Phone: (281) 445-1515
 Fax: (281) 445-6060
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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 modification to General Permit G70-A No. G70-A027A for a natural gas production wellpad operation (SMI-27) located in Doddridge County, West Virginia about 4 miles southeast of Shirley, WV off Big Flint Road. The latitude and longitude coordinates are: 39.367439°N, -80.697198°W.

The applicant estimates that the potential increase to discharge the following Regulated Air Pollutants as a result of the change will be:

Pollutant	Emissions (tons per year)
NO _x	<0.01
CO	<0.01
VOC	3.38
SO ₂	<0.01
PM	43.16
Total HAPs	6.75
Carbon Dioxide Equivalents (CO ₂ e)	349

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

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

Dated this the XX day of December, 2014.

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
Emissions Summary Sheet

G70-A EMISSIONS SUMMARY SHEET

Emission Point ID No.	Emission Point Type ¹	Emission Unit Vented Through This Point		Air Pollution Control Device		All Regulated Pollutants - Chemical Name/CAS ² (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ³		Maximum Potential Controlled Emissions ⁴		Emission Form or Phase <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, E025 - E026, E031 (Total - All produced fluids tanks, Dehy Drip Tank)	Rain Cap	S001-S010, S025 - S026, S031	Produced Fluids Tanks	C001 & C002, C003	Enclosed Combustor	VOC HAPs	152.62	668.45	7.63	33.42	Gas/Vapor	O ^A O ^A
							7.94	34.80	0.40	1.74		
E011 - E019, E027 - E029 (Total - All heaters)	Upward Vertical Stack	S011-S019, S027 - S029	Line Heaters	N/A	N/A	NOx CO PM/PM ₁₀ /PM _{2.5} SO ₂ VOC CO _{2e}	1.47	6.45	1.47	6.45	Gas/Vapor	O ^B O ^B O ^B O ^B O ^B O ^C
							1.24	5.41	1.24	5.41		
E020 - E021 (Total - All MMBtu/hr TEG's)	Upward Vertical Stack	S020-S021	Thermoelectric Generator	N/A	N/A	NOx CO PM/PM ₁₀ /PM _{2.5} SO ₂ VOC CO _{2e}	<0.01	0.02	<0.01	0.02	Gas/Vapor	O ^A O ^B O ^B O ^B O ^B O ^B O ^C
							<0.01	0.02	<0.01	0.02		
E022 (Excluding combustor)	Upward Vertical Stack	S022	Dehydrator	C003	Enclosed Combustor	VOC HAP	175.16 89.95	767.20 393.98	9.16 2.51	40.13 11.00	Gas/Vapor	O ^D O ^D
E023	Upward Vertical Stack	S023	Reboiler	N/A	N/A	NOx CO PM/PM ₁₀ /PM _{2.5} SO ₂ VOC CO _{2e}	0.09	0.40	0.09	0.40	Gas/Vapor	O ^B O ^B O ^B O ^B O ^B O ^C
							0.08	0.34	0.08	0.34		
							<0.01	0.03	<0.01	0.03		
							<0.01	<0.01	<0.01	<0.01		
							<0.01	0.02	<0.01	0.02		
							135	592	135	592		

E024	Upward Vertical Stack	S024	Liquid Loading	C001 & C002	Enclosed Combustor	VOC HAP	1.07 0.02	4.67 0.11	0.36 0.01	1.56 0.04	Gas/Vapor	O ^B O ^B
E030	Upward Vertical Stack	S030	Sand Separator Tank	C001 & C002 optional	Enclosed Combustor	VOC HAPs	0.04 <0.01	0.16 0.01	0.04 <0.01	0.16 0.01	Gas/Vapor	O ^A O ^A
E032 (0.07 MMBtu/hr)	Upward Vertical Stack	S032	Thermoelectric Generator	N/A	N/A	NOx CO PM/PM ₁₀ /PM _{2.5} SO ₂ VOC CO _{2e}	0.01 <0.01 <0.01 <0.01 <0.01 17	0.05 0.04 <0.01 <0.01 <0.01 72	0.01 <0.01 <0.01 <0.01 <0.01 17	0.05 0.04 <0.01 <0.01 <0.01 72	Gas/Vapor	O ^B O ^B O ^B O ^B O ^B O ^C
C001 - C002 (Total)	Upward Vertical Stack	C001 - C002	Combustors	N/A	N/A	NOx CO PM/PM ₁₀ /PM _{2.5} SO ₂ CO _{2e}	1.86 1.57 0.14 0.01 2,833	8.16 6.86 0.62 0.05 12,408	1.86 1.57 0.14 0.01 2,833	8.16 6.86 0.62 0.05 12,408	Gas/Vapor	O ^B O ^B O ^B O ^B O ^C
C003	Upward Vertical Stack	C003	Combustor	N/A	N/A	NOx CO PM/PM ₁₀ /PM _{2.5} SO ₂ CO _{2e}	0.27 0.23 0.02 <0.01 394	1.17 0.99 0.09 0.01 1,724	0.27 0.23 0.02 <0.01 394	1.17 0.99 0.09 0.01 1,724	Gas/Vapor	O ^B O ^B O ^B O ^B O ^C

- A - E&P Tanks
- B - Emissions calculated using AP-42 Section 1.4
- C - Emissions calculated according to 40 CFR 98 Subpart C
- D - GRI GlyCalc