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

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

Alex Bosiljevac
Environmental Coordinator

October 12, 2015

FEDEX

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

RE: G70A Permit Modification
EQT Production Company
BIG-192 Natural Gas Production Site

Dear Mr. Durham,

Enclosed are two electronic copies and one original hard copy of a proposed modification to the G70-A General Air Permit for the BIG-192 Natural Gas Production Well Site. A legal advertisement will be published in the next few days and proof of publication will be forwarded as soon as it is received. Please contact me for payment of the application fee by credit card.

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

Sincerely,

RAB

Alex Bosiljevac
EQT Corporation

Enclosures

PROJECT REPORT

EQT Production
BIG-192 Pad

G70-A Permit Modification Application

Where energy meets innovation.

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

October 2015

Trinity Consultants

Environmental solutions delivered uncommonly well

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EQT Production Company (EQT) is submitting this modification application to the West Virginia Department of Environmental Protection (WVDEP) for an existing natural gas production well pad, BIG-192, located in Wetzel County, West Virginia. The wellpad is currently authorized under General Permit G70-A082.

1.1. FACILITY AND PROJECT DESCRIPTION

The BIG-192 Pad is a natural gas production facility that currently consists of sixteen (16) natural gas wells. Natural gas and produced water are extracted from deposits underneath the surface. Natural gas is then transported from the well to a gas line for additional processing and compression, as necessary. The liquids produced are stored in storage vessels.

The BIG-192 Pad is currently authorized for the following equipment:

- Sixteen (16) 400 bbl storage tanks for condensate/water (produced fluids) controlled by one of the two enclosed combustors, each rated at 11.66 MMBtu/hr;
- Sixteen (16) line heaters, rated at 1.54 MMBtu/hr heat input (each);
- Two (2) thermoelectric generators (TEGs), each rated at 0.03 MMBtu/hr;
- One (1) glycol dehydration unit rated at 130 MMscfd, with associated reboiler (rated at 2.31 MMbtu/hr heat input), enclosed combustor rated at 8.33 MMBtu/hr (controls dehydrator regenerator still and excess flash gas), and BTEX condenser unit

This application seeks to authorize the addition of the following equipment at the BIG-192 Pad:

- Two (2) additional wells;
- One (1) enclosed combustor, rated at 18.75 MMBtu/hr, for control of emissions from the produced fluid tanks and liquid loading;
- Four (4) 400 barrel (bbl) storage tanks for produced fluid, controlled by one of the three aforementioned combustors;
- One (1) 140 bbl sand separator storage tank for sand and produced fluids from the sand separator;
- Two (2) line heaters, each rated at 1.54 MMBtu/hr;
- Three (3) TEGs, each rated at 0.013 MMBtu/hr; and
- One (1) 100 bbl dehydrator drip tank controlled by one of the three aforementioned combustors.

Additionally, this application seeks to increase throughput limits for the existing storage tanks, and to revise the heat input rating for the dehydrator combustor to 8.33 MMBtu/hr (this combustor was previously permitted at 11.66 MMBtu/hr).

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 one 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 BIG-192 Pad for air permitting purposes if, and only if, all three elements of the "stationary source" definition above are fulfilled. The existing dehydrator at BIG-

192 processes gas from both the BIG-192 wellpad and BIG-333 wellpad. These wellpads are separated by approximately ½ mile WVDEP has previously determined that that the BIG-192 and BIG-333 wellpads should be aggregated as a single stationary source with respect to permitting programs, including Title V and Prevention of Significant Deterioration (PSD). As discussed in this application, the facility will remain a minor source of air emissions with respect to New Source Review (NSR) and Title V permitting with combined emissions from both wellpads.

1.3. G70-A APPLICATION ORGANIZATION

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

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

The characteristics of air emissions from the existing natural gas production operations, along with the methodology for calculating emissions, are briefly described in this section of the application. Detailed emission calculations are presented in Attachment I of this application.

Emissions from the proposed project will result from storage of organic liquids in storage tanks and loading of organic liquids into tank trucks. Emissions will also result from natural gas combustion in the TEGs and line heaters. Fugitive emissions will result from the component leaks from the operation of the station. The methods by which emissions from each of these source types, as well as the existing source types, are calculated are summarized below.

- **Line Heaters, Thermoelectric Generators, and Combustors:** Potential emissions of all criteria pollutants and HAPs are calculated using U.S. EPA's AP-42 factors for natural gas combustion equipment and natural gas generators.[1] These calculations assume a site-specific heat content of natural gas. Greenhouse gas (GHG) emissions are calculated according to 40 CFR 98 Subpart C.[2] Please note that potential emissions of NO_X, CO, PM, SO_2 and GHGs from the combustors are also calculated according to the afore-mentioned methodologies.

- **Fugitive Equipment Leaks:** Emissions of VOC and HAPs from leaking equipment components have been estimated using facility estimated component counts and types along with *Table 2-4: Oil & Gas Production Operations Average Emission Factors, Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995.* Emission factors used are based on average measured TOC from component types indicated in gas service at O&G Production Operations. Greenhouse gas emissions from component leaks are calculated according to the procedures in 40 CFR 98 Subpart W.[3]

- **Storage Tanks:** Working and 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. Controlled calculations assume a total control efficiency of 93% (95% capture, 98% destruction) from the combustors. The site's maximum expected produced water plus condensate throughput is 60,871,608 gallons per year. Please note that the total produced liquids value is based on the twice the maximum monthly throughput, annualized. Of that total 149,688 gallons is condensate, and 60,721,920 gallons is produced water. The E&P Tank throughput also takes into account that produced water is *conservatively assumed* to contain 5% condensate in accordance with guidance from the Texas Commission on Environmental Quality on estimating emissions from produced water (i.e., 3,036,096 gallons per year).[4], [5]

  This results in a total of 3,185,784 gallons/year of condensate for all tanks, and approximately 10.4 bbl/day per tank. This throughput is used in E&P Tank calculations. Below is an example calculation for the total throughput used as an input to E&P Tank on a bbl/day per tank basis:

[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] *ENVIRON International Corporation, "Emission Factor Determination for Produced Water Storage Tanks", August 2010, https://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/5820784005FY1024-20100830-environ-%20EmissionFactorDeterminationForProducedWaterStorageTanks.pdf.*

[5] *https://www.tceq.texas.gov/assets/public/permitting/air/NewSourceReview/oilgas/produced-water.pdf*

$$Throughput\ per\ Tank\ \left(\frac{bbl}{day}\right) = \frac{\left[C\left(\frac{bbl}{month}\right) + PW\ \left(\frac{bbl}{month}\right) * 5\%\ (Condensate\ in\ Produced\ Water)\ \right] * \frac{12\left(\frac{months}{year}\right)}{365\left(\frac{days}{year}\right)}}{Tank\ Count}$$

C = Condensate throughput, 297 bbl/month
PW = Produced Water throughput, 120,480 bbl/month
Tank Count = Number of tanks at wellpad, 20 tanks

$$10.4\left(\frac{bbl}{day}\right) = \frac{\left[297\left(\frac{bbl}{month}\right) + 120{,}480\ \left(\frac{bbl}{month}\right) * 5\%\ \right] * \frac{12\left(\frac{months}{year}\right)}{365\left(\frac{days}{year}\right)}}{20\ \text{tanks}}$$

- **Tank Truck Loading:** Emissions of VOC and HAPs from the loading of organic liquids from storage tanks to tank truck are calculated using U.S. EPA's AP-42 Chapter 5 Section 2 factors.[6]

- **Dehydration Units:** Potential emissions of HAPs, volatile organic compounds (VOC), methane and carbon dioxide from the dehydration units are calculated using GRI-GLYCalc v4.0.

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

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

- Prevention of Significant Deterioration (PSD) permitting;
- Title V of the 1990 Clean Air Act Amendments;
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants (NESHAP); and
- West Virginia State Implementation Plan (SIP) regulations.

This review is presented to supplement and/or add clarification to the information provided in the WVDEP G70-A permit application forms.

In addition to providing a summary of applicable requirements, this section of the application also provides non-applicability determinations for certain regulations, allowing the WVDEP to confirm that identified regulations are not applicable to the wellpad. Note that explanations of non-applicability are limited to those regulations for which there may be some question of applicability specific to the operations at the wellpad. Regulations that are categorically non-applicable are not discussed (e.g., NSPS Subpart J, Standards of Performance for Petroleum Refineries).

3.1. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) SOURCE CLASSIFICATION

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

3.2. TITLE V OPERATING PERMIT PROGRAM

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in West Virginia Code of State Regulations (CSR) 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP, 100,000 tpy of greenhouse gas pollutants (on a carbon dioxide equivalent [CO_2e] basis), and 100 tpy of all other regulated pollutants.[7] 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.

[7] 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 with a heat input greater than 10 MMbtu/hr, therefore the requirements of these subparts do not apply.

3.3.2. NSPS Subparts K, Ka, and Kb

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

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

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

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

There will be twenty (20) produced fluids storage vessels, one (1) dehy drip tank, and one (1) sand separator storage vessel at the wellpad. The storage vessels at the facility will each have potential VOC emissions less than 6 tpy based on the permit application materials and enforceable limits to be included in the G70-A permit. As such, per 60.5365(e), the tanks are not storage vessel affected facilities under the rule.

The pneumatic controllers were ordered and installed after August 23, 2011 and are therefore potentially subject to NSPS OOOO. Per 60.5365(d)(2), a pneumatic controller affected facility is a single continuous bleed natural gas driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh. No pneumatic controllers installed will

meet the definition of a pneumatic controller affected facility. Therefore, these units are not subject to the requirements of Subpart OOOO.

Note that EPA has recently proposed revisions to NSPS OOOO.

3.3.4. Non-Applicability of All Other NSPS

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

3.4. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

Part 63 NESHAP allowable emission limits are established on the basis of a maximum achievable control technology (MACT) determination for a particular major source. A HAP major source is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP. The wellpad is an Area (minor) source of HAP since its potential emissions of HAP are less than the 10/25 major source thresholds. NESHAP apply to sources in specifically regulated industrial source categories (Clean Air Act Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type. Besides 40 CFR 63 Subpart A (NESHAP Subpart A), which is similar to 40 CFR 60 Subpart A (NSPS Subpart A), the following NESHAP could potentially apply to the wellpad:

- 40 CFR Part 63 Subpart HH – Oil and Natural Gas Production Facilities
- 40 CFR Part 63 Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers

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

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

This standard contains requirements for both major and area sources of HAP. At area sources, the only affected source is the triethylene glycol (TEG) dehydration unit (§63.760(b)(2)). The dehydration unit will continue to emit less than 0.90 megagrams of benzene per year; therefore the exemption found in §63.764(e)(1)(ii) applies. EQT will maintain the applicable records as required in §63.774(d)(1).

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

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

3.5. WEST VIRGINIA SIP REGULATIONS

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

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

45 CSR 2 applies to fuel burning units, defined as equipment burning fuel "for the primary purpose of producing heat or power by indirect heat transfer". The proposed and existing TEGs and line heaters are fuel burning units and therefore must comply with this regulation. Per 45 CSR 2-3, opacity of emissions from this unit shall not exceed 10 percent.

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

According to 45 CSR 4-3:

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

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

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

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

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

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

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

According to 45 CSR 17-3.1:

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

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

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

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

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

45 CSR 34-1 incorporates the federal Clean Air Act (CAA) national emissions standards for hazardous air pollutants (NESHAPs) as set forth in 40 CPR Parts 61 and 63 by reference. As such, by complying with all applicable requirements of 40 CFR Parts 61 and 63 at the wellpad, EQT will be complying with 45 CSR 34.

3.5.8. Non-Applicability of Other SIP Rules

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

4. G70-A APPLICATION FORMS

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

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

APPLICATION FOR GENERAL PERMIT REGISTRATION

CONSTRUCT, MODIFY, RELOCATE OR ADMINISTRATIVELY UPDATE

A STATIONARY SOURCE OF AIR POLLUTANTS

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

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

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

SECTION I. GENERAL INFORMATION

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

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

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

4. Applicant's physical address:
Jacksonburg, Wetzel County, WV

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

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

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

SECTION II. FACILITY INFORMATION

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

8a. Standard Industrial Classification AND 8b. North American Industry

Classification (SIC) code: 1311 System (NAICS) code: 211111

9. DAQ Plant ID No. (for existing facilities only):
103-00073

10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only):
G70-A082

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site:	12A. Address of primary operating site:
BIG-192 Wellpad	Mailing: 625 Liberty Avenue, Suite 1700, Pittsburgh, PA 15222 Physical: Jacksonburg, Wetzel County, WV

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

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

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

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

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

From Jacksonburg, WV, head south on WV-20S toward Co Rd 7/6/Richwood Run Road and travel 0.3 miles. Turn left onto Co Rd 7/6/Richwood Run Road and travel 1.9 miles. Make a slight right to stay on Co Rd 7/6/Richwood Run Road and travel just over 1.4 miles. The facility road will be on your right.

15A. Nearest city or town:	16A. County:	17A. UTM Coordinates:
Jacksonburg	Wetzel	Northing (KM): 4,375.407 Easting (KM): 535.874 Zone: 17

18A. Briefly describe the proposed new operation or change(s) to the facility:	19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
EQT is proposing to drill two (2) additional wells, install four (4) storage tanks, one (1) sand separator tank, two (2) line heaters, one (1) enclosed combustor, and two (2) thermoelectric generators	Latitude: 39.52757° Longitude: -80.58259°

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

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

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

– IF **YES**, please explain: _____

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

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

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

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

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

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

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

- IF **YES**, please explain: _____
- IF **NO**, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

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

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

_____

_____

_____

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

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

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

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

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

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

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

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

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

- ☒ ATTACHMENT A : CURRENT BUSINESS CERTIFICATE
- ☒ ATTACHMENT B: PROCESS DESCRIPTION
- ☒ ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS
- ☒ ATTACHMENT D: PROCESS FLOW DIAGRAM
- ☒ ATTACHMENT E: PLOT PLAN
- ☒ ATTACHMENT F: AREA MAP
- ☒ ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM
- ☒ ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS
- ☒ ATTACHMENT I: EMISSIONS CALCULATIONS
- ☒ ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT
- ☒ ATTACHMENT K: ELECTRONIC SUBMITTAL
- ☒ 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 _____ 10/12/15
(please use blue ink) Responsible Official Date

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

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

Applicant's Name Alex Bosiljevac – Environmental Coordinator

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

Email abosiljevac@eqt.com

ATTACHMENT A

Current Business Certificate

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
EQT PRODUCTION COMPANY
625 LIBERTY AVE 1700
PITTSBURGH, PA 15222-3114

BUSINESS REGISTRATION ACCOUNT NUMBER: **1022-8081**

This certificate is issued on: 08/4/2010

This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code

The person or organization identified on this certificate is registered to conduct business in the State of West Virginia at the location above.

This certificate is not transferrable and must be displayed at the location for which issued. This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

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ATTACHMENT B

Process Description

ATTACHMENT B – PROCESS DESCRIPTION

The project involves the construction and operation of two (2) line heaters, four (4) storage vessels for produced fluids, one (1) enclosed combustor, three (3) thermoelectric generators, one (1) sand separator tank, and one (1) dehydrator drip tank at an existing natural gas production wellpad operation (BIG-192). The project also seeks to increase the liquid throughputs at the wellpad.

The wellpad currently consists of multiple wells (total of 18), each with the same basic operation. The incoming gas stream from the underground wells passes through a sand separator, where sand, water and residual solids are displaced and transferred to the sand separator tank. The gas then flows into a three phase separator which separates water and condensate from the gas stream. The water and condensate in the separator is transferred to storage vessels. Emissions from the storage vessels will be controlled by three (3) enclosed combustors (C001-C002 and C004). 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 is controlled by a separate enclosed combustor (C003), while emissions from the dehydrator drip tank will be controlled by the three (3) enclosed combustors that control the tanks (C001-C002 and C004). 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 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 PM_{10} $PM_{2.5}$	20.95 5.34 0.53	91.78 23.39 2.34	20.95 5.34 0.53	91.78 23.39 2.34	O[A]
Loading/Unloading Operations	VOC HAP	0.96 0.02	4.20 0.10	0.30 0.01	1.32 0.03	O[B]
Equipment Leaks	VOC CO_2e HAP	Does not apply	18.86 2,309 0.39	Does not apply	18.86 2,309 0.39	O[C]
Blowdown Emissions	N/A					
Other	N/A					

[A] AP-42 Section 13.2.2

[B] AP-42 Section 5.2

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

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

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

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

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

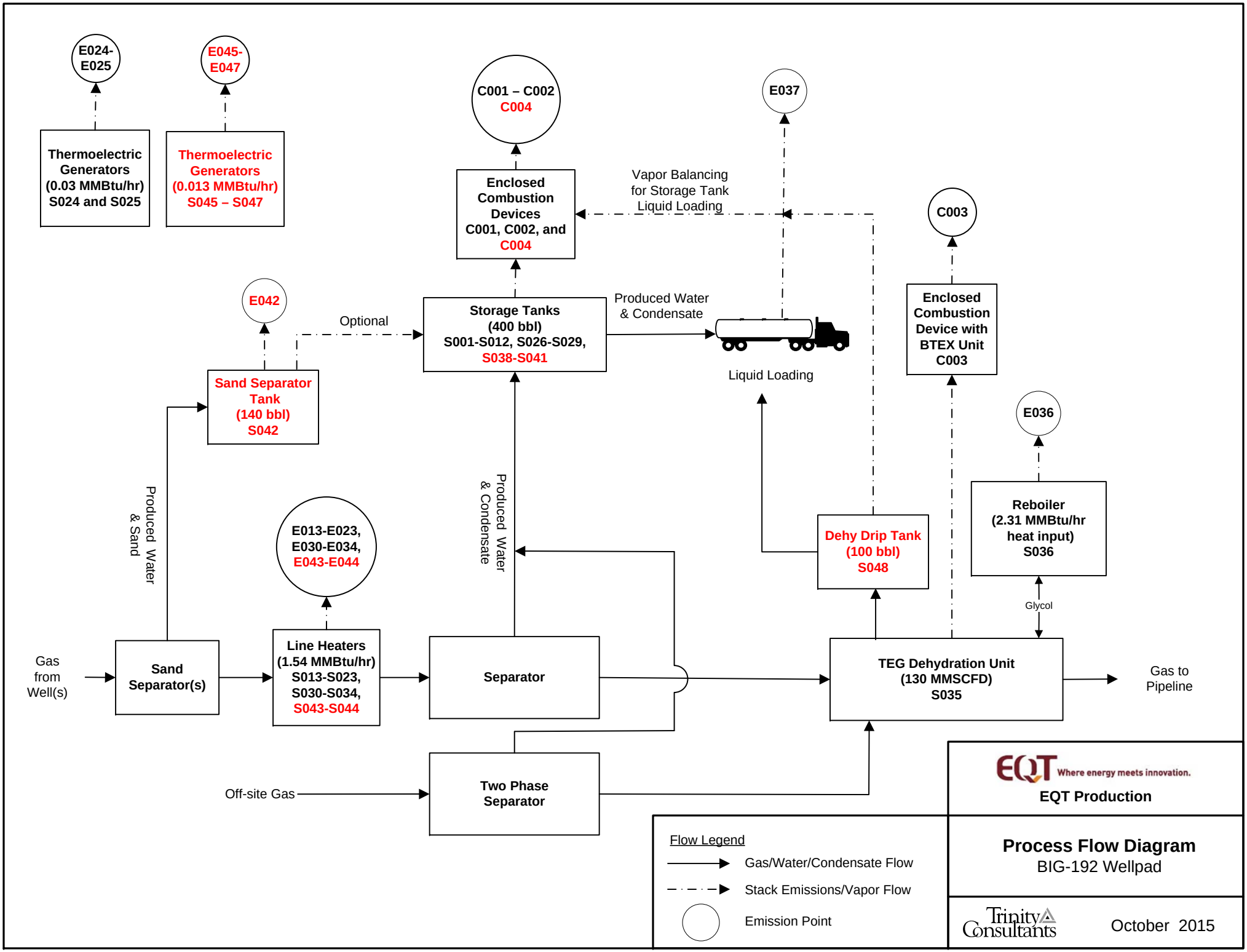
LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components	Number of Components Monitored by Frequency	Average Time to Repair (days)	Estimated Annual Emission Rate (lb/yr)[1]
Pumps	light liquid VOC	1	TBD	TBD	384
	heavy liquid VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Valves	Gas VOC	921	TBD	TBD	10,862
	Light Liquid VOC	---	TBD	TBD	---
	Heavy Liquid VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Safety Relief Valves	Gas VOC	60	TBD	TBD	12,327
	Non VOC	---	TBD	TBD	---
Open-ended Lines	VOC	47	TBD	TBD	158
	Non-VOC	---	TBD	TBD	---
Sampling Connections	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Compressors	VOC	---	TBD	TBD	---
	Non-VOC	---	TBD	TBD	---
Flanges	VOC	3,870	TBD	TBD	13,991
	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-453/R-95-017, 1995). SOCMI factors were used as it was representative of natural gas liquids extraction

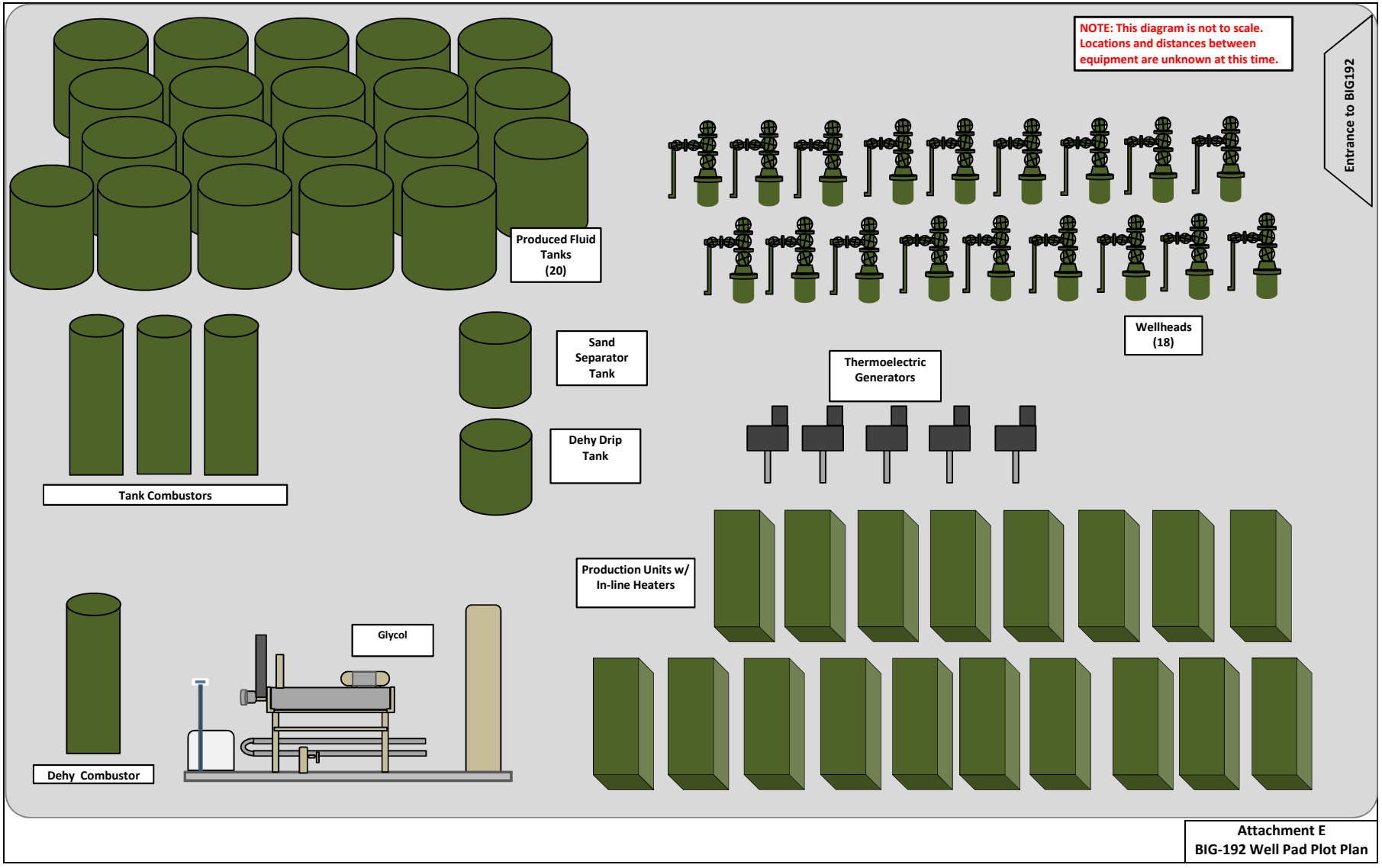
ATTACHMENT D

Process Flow Diagram


E024-E025
E045-E047
C001 – C002
C004
E037
Thermoelectric Generators (0.03 MMBtu/hr) S024 and S025
Thermoelectric Generators (0.013 MMBtu/hr) S045 – S047
Enclosed Combustion Devices C001, C002, and C004
Vapor Balancing for Storage Tank Liquid Loading
C003
E042
Optional
Storage Tanks (400 bbl) S001-S012, S026-S029, S038-S041
Produced Water & Condensate
Enclosed Combustion Device with BTEX Unit C003
Liquid Loading
Sand Separator Tank (140 bbl) S042
E036
Produced Water & Sand
E013-E023, E030-E034, E043-E044
Produced Water & Condensate
Dehy Drip Tank (100 bbl) S048
Reboiler (2.31 MMBtu/hr heat input) S036
Glycol
Gas from Well(s)
Sand Separator(s)
Line Heaters (1.54 MMBtu/hr) S013-S023, S030-S034, S043-S044
Separator
TEG Dehydration Unit (130 MMSCFD) S035
Gas to Pipeline
Off-site Gas
Two Phase Separator
Flow Legend
Gas/Water/Condensate Flow
Stack Emissions/Vapor Flow
Emission Point
EQT Where energy meets innovation.
EQT Production
Process Flow Diagram
BIG-192 Wellpad
Trinity Consultants
October 2015

ATTACHMENT E

Plot Plan



Attachment E
BIG-192 Well Pad Plot Plan

ATTACHMENT F

Area Map

ATTACHMENT F – AREA MAP

Figure 1 - Map of BIG-192 Location

UTM Northing (KM): 4,375.407
UTM Easting (KM): 535.874
Elevation (ft): ~1,475

ATTACHMENT G

Emission Unit Data Sheets and G70-A Section Applicability Form

General Permit G70-A Registration
Section Applicability Form

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

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

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

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

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

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

Emission Units Table

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

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
S001	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S002	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S003	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S004	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S005	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S006	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S007	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S008	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S009	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S010	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S011	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S012	C001 & C002, C004	Produced Fluid Storage Tank	2013	400 bbl	Existing - Increase throughput	C001 & C002, C004
S013	E013	Line Heater	2013	1.54 MMbtu/hr	No Change	None

S014	E014	Line Heater	2013	1.54 MMbtu/hr	No Change	None
S015	E015	Line Heater	2013	1.54 MMbtu/hr	No Change	None
S016	E016	Line Heater	2013	1.54 MMbtu/hr	No Change	None
S017	E017	Line Heater	2013	1.54 MMbtu/hr	No Change	None
S018	E018	Line Heater	2013	1.54 MMbtu/hr	No Change	None
S019	E019	Line Heater	2013	1.54 MMbtu/hr	No Change	None
S020	E020	Line Heater	2013	1.54 MMbtu/hr	No Change	None
S021	E021	Line Heater	2013	1.54 MMbtu/hr	No Change	None
S022	E022	Line Heater	2013	1.54 MMbtu/hr	No Change	None
S023	E023	Line Heater	2013	1.54 MMbtu/hr	No Change	None
S024	E024	Thermoelectric Generator	2013	0.03 MMbtu/hr	No Change	None
S025	E025	Thermoelectric Generator	2013	0.03 MMbtu/hr	No Change	None
S026	C001 & C002, C004	Produced Fluid Storage Tank	2014	400 bbl	Existing - Increase throughput	C001 & C002, C004
S027	C001 & C002, C004	Produced Fluid Storage Tank	2014	400 bbl	Existing - Increase throughput	C001 & C002, C004
S028	C001 & C002, C004	Produced Fluid Storage Tank	2014	400 bbl	Existing - Increase throughput	C001 & C002, C004
S029	C001 & C002, C004	Produced Fluid Storage Tank	2014	400 bbl	Existing - Increase throughput	C001 & C002, C004
S030	E030	Line Heater	2014	1.54 MMbtu/hr	No Change	None
S031	E031	Line Heater	2014	1.54 MMbtu/hr	No Change	None
S032	E032	Line Heater	2014	1.54 MMbtu/hr	No Change	None
S033	E033	Line Heater	2014	1.54 MMbtu/hr	No Change	None
S034	E034	Line Heater	2014	1.54 MMbtu/hr	No Change	None
S035	E035	Glycol Dehydrator	2014	130 MMscfd	No Change	C003
S036	E036	Reboiler	2014	2.31 MMbtu/hr	No Change	None
S037	E037	Tank Truck Loading	2013	60,871,608 gal/yr	Existing - Increase throughput	C001 & C002, C004
S038	C001 & C002, C004	Produced Fluid Storage Tank	TBD	400 bbl	New	C001 & C002, C004
S039	C001 & C002,	Produced Fluid Storage Tank	TBD	400 bbl	New	C001 & C002, C004

S040	C001 & C002, C004	Produced Fluid Storage Tank	TBD	400 bbl	New	C001 & C002, C004
S041	C001 & C002, C004	Produced Fluid Storage Tank	TBD	400 bbl	New	C001 & C002, C004
S042	E042	Sand Separator Tank	TBD	140 bbl	New	None
S043	E043	Line Heater	TBD	1.54 MMBtu/hr	New	None
S044	E044	Line Heater	TBD	1.54 MMBtu/hr	New	None
S045	E045	Thermoelectric Generator	TBD	0.013 MMBtu/hr	New	None
S046	E046	Thermoelectric Generator	TBD	0.013 MMBtu/hr	New	None
S047	E047	Thermoelectric Generator	TBD	0.013 MMBtu/hr	New	None
S048	C001 & C002, C004	Dehydrator Drip Tank	TBD	100 bbl	New	C001 & C002, C004
C001	C001	Enclosed Combustor	2013	11.66 MMbtu/hr	No Change	N/A
C002	C002	Enclosed Combustor	2014	11.66 MMbtu/hr	No Change	N/A
C003	C003	Enclosed Combustor	2014	8.33 MMbtu/hr	Modified	N/A
C004	C004	Enclosed Combustor	TBD	18.75 MMbtu/hr	New	N/A

[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:	
047-103-02819	047-103-02828
047-103-02825	047-103-02855
047-103-02826	047-103-02900
047-103-02824	047-103-03040
047-103-02820	047-103-03041
047-103-02823	047-103-03042
047-103-02822	047-103-03043
047-103-02821	TBD
047-103-02827	TBD

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

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

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

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

STORAGE VESSEL EMISSION UNIT DATA SHEET

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

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name BIG-192 Pad	2. Tank Name Produced Fluid Storage Tanks
3. Emission Unit ID number S001-S012, S026-S029 (Existing) S038 – S041 (New)	4. Emission Point ID number C001-C002 (Existing), C004 (New)
5. Date Installed or Modified *(for existing tanks)* 2013 (S001-S012), 2014 (S026-S029)	6. Type of change: ☒ New construction ☐ New stored material ☒ Other
7A. Description of Tank Modification *(if applicable)* Increase produced fluid throughput for existing tanks and installation of four (4) new tanks.	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.) NA	

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 400 bbl (each)	
9A. Tank Internal Diameter (ft.) 12	9B. Tank Internal Height (ft.) 20
10A. Maximum Liquid Height (ft.) 20	10B. Average Liquid Height (ft.) 10
11A. Maximum Vapor Space Height (ft.)	11B. Average Vapor Space Height (ft.)
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working" volume. 400 bbl	
13A. Maximum annual throughput (gal/yr) ~60,871,608 (All tanks: S001-S012, S026-S029, S038-S041, S048)	13B. Maximum daily throughput (gal/day) ~166,772 (All tanks: S001-S012, S026-S029, S038-S041, S048)
14. Number of tank turnovers per year ~3,624 (All tanks: S001-S012, S026-S029, S038-S041, S048)	15. Maximum tank fill rate (gal/min) TBD
16. Tank fill method ☐ Submerged ☒ Splash ☐ Bottom Loading	
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): ☒ Fixed Roof _X_ vertical ___ horizontal __ flat roof _X__ cone roof ___ dome roof ___ other (describe) ☐ External Floating Roof ___ pontoon roof ___ double deck roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof ___ vertical column support ___ self-supporting ☐ Variable Vapor Space ___ lifter roof ___ diaphragm ☐ Pressurized ___ spherical ___ cylindrical ☐ Underground ☐ Other (describe)	

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

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

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

☐ Refer to enclosed TANKS Summary Sheets

☒ Refer to the responses to items 27 – 33 in section VII

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

☐ Refer to enclosed TANKS Summary Sheets

☒ Refer to the responses to items 34 – 39 in section VII

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

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

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

[1] Complete appropriate Air Pollution Control Device Sheet

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

Material Name and CAS No.	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method[1]
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
See Attached Emission Calculations									

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

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

TANK CONSTRUCTION AND OPERATION INFORMATION

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

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

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

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

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

24. Is the tank a **Vertical Fixed Roof Tank**? ☒ Yes ☐ No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft): 0.06

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

25A. Year Internal Floaters Installed:

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

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

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

25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No			
25F. Describe deck fittings:			
26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply			
26A. Deck Type: ☐ Bolted ☐ Welded		26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction: ☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: Elkins, WV			
28. Daily Avg. Ambient Temperature (°F): 49.06		29. Annual Avg. Maximum Temperature (°F): 61.15	
30. Annual Avg. Minimum Temperature (°F): 39.97		31. Avg. Wind Speed (mph): 6.17	
32. Annual Avg. Solar Insulation Factor (BTU/ft^2-day): 1,193.87		33. Atmospheric Pressure (psia): 13.73	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.30	34A. Minimum (°F):	34B. Maximum (°F):	
35. Avg. operating pressure range of tank (psig): 0.2217	35A. Minimum (psig): 0.1658	35B. Maximum (psig): 0.2935	
36A. Minimum liquid surface temperature (°F): 46.54		36B. Corresponding vapor pressure (psia): 0.1658	
37A. Avg. liquid surface temperature (°F): 55.41		37B. Corresponding vapor pressure (psia): 0.2217	
38A. Maximum liquid surface temperature (°F): 64.27		38B. Corresponding vapor pressure (psia): 0.2935	
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	Produced Fluid		
39B. CAS number:	NA		
39C. Liquid density (lb/gal):	TBD		
39D. Liquid molecular weight (lb/lb-mole):	TBD		
39E. Vapor molecular weight (lb/lb-mole):	19.28		
39F. Maximum true vapor pressure (psia):	TBD		
39G. Maxim Reid vapor pressure (psia):	TBD		
39H. Months Storage per year. From: To:	12 (All year)		

STORAGE VESSEL EMISSION UNIT DATA SHEET

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

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name BIG-192 Pad	2. Tank Name Sand Separator Tank
3. Emission Unit ID number S042	4. Emission Point ID number E042
5. Date Installed or Modified *(for existing tanks)* TBD	6. Type of change: ☒ New construction ☐ New stored material ☐ Other
7A. Description of Tank Modification *(if applicable)NA*	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.) NA	

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 (each)	15. Maximum tank fill rate (gal/min) TBD
16. Tank fill method ☐ Submerged ☒ Splash ☐ Bottom Loading	
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): ☒ Fixed Roof __ vertical _X_ horizontal __ flat roof ___ cone roof ___ dome roof ___ other (describe) ☐ External Floating Roof ___ pontoon roof ___ double deck roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof ___ vertical column support ___ self-supporting ☐ Variable Vapor Space ___ lifter roof ___ diaphragm ☐ Pressurized ___ spherical ___ cylindrical ☐ Underground ☐ Other (describe)	

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

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

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

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

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

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

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

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

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

[1] Complete appropriate Air Pollution Control Device Sheet

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

Material Name and CAS No.	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method[1]
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
See Attached Emission Calculations									

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

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

TANK CONSTRUCTION AND OPERATION INFORMATION

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

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

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

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

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

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

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

25A. Year Internal Floaters Installed:

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

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

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

25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No

25F. Describe deck fittings:

26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply

26A. Deck Type: ☐ Bolted ☐ Welded	26B. For bolted decks, provide deck construction:

26C. Deck seam. Continuous sheet construction:
☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)

26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: Elkins, WV			
28. Daily Avg. Ambient Temperature (°F): 49.06		29. Annual Avg. Maximum Temperature (°F): 61.15	
30. Annual Avg. Minimum Temperature (°F): 39.97		31. Avg. Wind Speed (mph): 6.17	
32. Annual Avg. Solar Insulation Factor (BTU/ft^2-day): 1,193.87		33. Atmospheric Pressure (psia): 13.73	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.30	34A. Minimum (°F):	34B. Maximum (°F):	
35. Avg. operating pressure range of tank (psig): 0.2217	35A. Minimum (psig): 0.1658	35B. Maximum (psig): 0.2935	
36A. Minimum liquid surface temperature (°F): 46.54		36B. Corresponding vapor pressure (psia): 0.1658	
37A. Avg. liquid surface temperature (°F): 55.41		37B. Corresponding vapor pressure (psia): 0.2217	
38A. Maximum liquid surface temperature (°F): 64.27		38B. Corresponding vapor pressure (psia): 0.2935	
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:	Produced Fluid		
39B. CAS number:	NA		
39C. Liquid density (lb/gal):	TBD		
39D. Liquid molecular weight (lb/lb-mole):	TBD		
39E. Vapor molecular weight (lb/lb-mole):	19.28		
39F. Maximum true vapor pressure (psia):	TBD		
39G. Maxim Reid vapor pressure (psia):	TBD		
39H. Months Storage per year. From: To:	12 (All year)		

STORAGE VESSEL EMISSION UNIT DATA SHEET

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

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name BIG-192 Pad	2. Tank Name Dehydrator Drip Tank
3. Emission Unit ID number S048	4. Emission Point ID number C001-C002 (Existing), C004(New)
5. Date Installed or Modified *(for existing tanks)* TBD	6. Type of change: ☒ New construction ☐ New stored material ☐ Other
7A. Description of Tank Modification *(if applicable)* NA	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.) NA	

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) ~60,871,608 (All tanks: S001-S012, S026-S029, S038-S041, S048)	13B. Maximum daily throughput (gal/day) ~166,772 (All tanks: S001-S012, S026-S029, S038-S041, S048)
14. Number of tank turnovers per year 3,623 (All tanks: S001-S012, S026-S029, S038-S041, S048)	15. Maximum tank fill rate (gal/min) TBD
16. Tank fill method ☐ Submerged ☒ Splash ☐ Bottom Loading	
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): ☒ Fixed Roof _X_ vertical __ horizontal _X_ flat roof ___ cone roof ___ dome roof ___ other (describe) ☐ External Floating Roof ___ pontoon roof ___ double deck roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof ___ vertical column support ___ self-supporting ☐ Variable Vapor Space ___ lifter roof ___ diaphragm ☐ Pressurized ___ spherical ___ cylindrical ☐ Underground ☐ Other (describe)	

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

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

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

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

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

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

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

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

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

[1] Complete appropriate Air Pollution Control Device Sheet

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

Material Name and CAS No.	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method[1]
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
See Attached Emission Calculations									

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

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

TANK CONSTRUCTION AND OPERATION INFORMATION

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

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

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

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

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

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

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

25A. Year Internal Floaters Installed:

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

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

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

25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No

25F. Describe deck fittings:			
26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply			
26A. Deck Type: ☐ Bolted ☐ Welded		26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction: ☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:

SITE INFORMATION:			
27. Provide the city and state on which the data in this section are based: Elkins, WV			
28. Daily Avg. Ambient Temperature (°F): 49.06		29. Annual Avg. Maximum Temperature (°F): 61.15	
30. Annual Avg. Minimum Temperature (°F): 39.97		31. Avg. Wind Speed (mph): 6.17	
32. Annual Avg. Solar Insulation Factor (BTU/ft^2-day): 1,193.87		33. Atmospheric Pressure (psia): 13.73	
LIQUID INFORMATION:			
34. Avg. daily temperature range of bulk liquid (°F): 51.30	34A. Minimum (°F):	34B. Maximum (°F):	
35. Avg. operating pressure range of tank (psig): 0.2217	35A. Minimum (psig): 0.1658	35B. Maximum (psig): 0.2935	
36A. Minimum liquid surface temperature (°F): 46.54		36B. Corresponding vapor pressure (psia): 0.1658	
37A. Avg. liquid surface temperature (°F): 55.41		37B. Corresponding vapor pressure (psia): 0.2217	
38A. Maximum liquid surface temperature (°F): 64.27		38B. Corresponding vapor pressure (psia): 0.2935	
39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			

39A. Material name and composition:	Produced Fluid		
39B. CAS number:	NA		
39C. Liquid density (lb/gal):	TBD		
39D. Liquid molecular weight (lb/lb-mole):	TBD		
39E. Vapor molecular weight (lb/lb-mole):	19.28		
39F. Maximum true vapor pressure (psia):	TBD		
39G. Maxim Reid vapor pressure (psia):	TBD		
39H. Months Storage per year. From: To:	12 (All year)		

NATURAL GAS FIRED FUEL BURNING UNITS
EMISSION DATA SHEET

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

Emission Unit ID #[1]	Emission Point ID#[2]	Emission Unit Description (Manufacturer / Model #)	Year Installed/ Modified	Type[3] and Date of Change	Control Device[4]	Design Heat Input (mmBtu/hr)[5]	Fuel Heating Value (Btu/scf)[6]
S013-S023	E013-E023	Line Heaters	2013	---	N/A	1.54 (each)	1,163
S024-S025	E024-E025	Thermoelectric Generators	2013	---	N/A	0.03 (each)	1,163
S030-S034	E030-E034	Line Heaters	2014	---	N/A	1.54 (each)	1,163
S036	E036	Reboiler	2014	---	N/A	2.31	1,163
S043-S044	E043-E044	Line Heaters	TBD	New	N/A	1.54 (each)	1,163
S045-S047	E045-E047	Thermoelectric Generators	TBD	New	N/A	0.013 (each)	1,163

[1] Enter the appropriate Emission Unit (or Sources) identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For sources, use 1S, 2S, 3S…or other appropriate designation. Enter glycol dehydration unit Reboiler Vent data on the *Glycol Dehydration Unit Data Sheet*.

[2] Enter the appropriate Emission Point identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For emission points, use 1E, 2E, 3E…or other appropriate designation.

[3] New, modification, removal

[4] Complete appropriate air pollution control device sheet for any control device.

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

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

TANK TRUCK LOADING
EMISSION UNIT DATA SHEET

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

1. Emission Unit ID: S037	2. Emission Point ID: C001-C002, C004	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? ☐ Yes ☒ No If YES, describe:		

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

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

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

Liquid Name	Produced Fluids		
Max. daily throughput (1000 gal/day)	Variable		
Max. annual throughput (1000 gal/yr)	~60,871		
Loading Method [1]	Vapor Balanced		
Max. Fill Rate (gal/min)	TBD		
Average Fill Time (min/loading)			
Max. Bulk Liquid Temperature (ºF)	51.30		
True Vapor Pressure [2]	0.2935		
Cargo Vessel Condition[3]	Unknown		
Control Equipment or Method [4]	VB, ECD		
Minimum collection efficiency (%)	70		
Minimum control efficiency (%)	98		

* *Continued on next page*

Maximum Emission Rate	Loading (lb/hr)	VOC: 0.30 HAP: 0.01		
	Annual (ton/yr)	VOC: 1.32 HAP: 0.03		
Estimation Method [5]		EPA		

Notes:

[1] BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill

[2] At maximum bulk liquid temperature

[3] B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

[4] List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets as Attachment "H"*):
CA = Carbon Adsorption
VB = Dedicated Vapor Balance (closed system)
ECD = Enclosed Combustion Device
F = Flare
TO = Thermal Oxidation or Incineration

[5] EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance
TM = Test Measurement based upon test data submittal
O = other (describe)

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

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

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

GLYCOL DEHYDRATION EMISSION UNIT DATA SHEET

General Glycol Dehydration Unit Data		Manufacturer and Model		TBD	
		Max Dry Gas Flow Rate (mmscf/day)		130	
		Design Heat Input (mmBtu/hr)		2.31	
		Design Type (DEG or TEG)		TEG	
		Source Status[2]		ES	
		Date Installed/Modified/Removed[3]		Installed 2014	
		Regenerator Still Vent APCD[4]		FL	
		Control Device ID[4]		C003	
		Fuel HV (Btu/scf)		1,163	
		H_2S Content (gr/100 scf)		neg.	
		Operation (hrs/yr)		8,760	
Emission Unit ID/ Emission Point ID[1]	Vent	Reference[5]	Potential Emissions[6]	lbs/hr	tons/yr
S036/E036	Reboiler Vent	AP	NO_X	0.20	0.87
		AP	CO	0.17	0.73
		AP	VOC	0.01	0.05
		AP	SO_2	<0.01	0.01
		AP	PM_{10}	0.02	0.07
S035/C003	Glycol Regenerator Still Vent- Includes combined flash tank emissions	GR	VOC	3.48	15.25
		GR	Benzene	0.11	0.47
		GR	Ethylbenzene	0.27	1.20
		GR	Toluene	0.37	1.61
		GR	Xylenes	0.39	1.72
		GR	n-Hexane	0.01	0.05

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.

ATTACHMENT H

Air Pollution Control Device Data Sheets

AIR POLLUTION CONTROL DEVICE
Vapor Combustion Control Device Sheet

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

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.

General Information

1. Control Device ID#: C004	2. Installation Date: TBD ☒ New	
3. Maximum Rated Total Flow Capacity: ~208 scf/min ~300,000 scfd (each)	4. Maximum Design Heat Input: 18.75 MMBtu/hr	5. Design Heat Content: ~1,500 BTU/scf

Control Device Information

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

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

7. Manufacturer: LEED Fabrication Model No.: Leed 60" Enclosed Combustor	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#: C004)

10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
S001-S012, S026-S029, S038-S041	Twenty (20) Produced Fluid Storage Tanks		
S048	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?
☐ Steam - ☐ Air - ☐ Pressure - ☒ Non -	30 ft	5 ft	☐Yes ☐No NA

Waste Gas Information

15. Maximum waste gas flow rate (scfm):	16. Heat value of waste gas stream (BTU/ft3)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (ft/s)
208	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 (each)	~50	75,000	☐ Yes ☒ No

25. If automatic re-ignition will be used, describe the method:
N/A

26. Describe the method of controlling flame:

3 flame cells to stop the main flame front; One 2" flame arrestor on piping from drip pot to burner assembly.

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

29. Pollutant(s) Controlled	30. % Capture Efficiency	31. Manufacturer's Guaranteed Control Efficiency (%)
HC	95	≥98
VOC	95	≥98
HAP	95	≥98

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

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

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

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

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

AIR POLLUTION CONTROL DEVICE
Vapor Combustion Control Device Sheet

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

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.

General Information

1. Control Device ID#: C001 - C002	2. Installation Date: C001–2013; C002 – 2014 ☐ New	
3. Maximum Rated Total Flow Capacity: 131 scf/min 188,380 scfd (each)	4. Maximum Design Heat Input: 11.66 MMBtu/hr	5. Design Heat Content: ~1,500 BTU/scf

Control Device Information

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

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

7. Manufacturer: LEED Fabrication Model No.: Leed 48" Enclosed Combustor	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#: C001-C002)

10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
S001-S012, S026-S029, S038-S041	Twenty (20) Produced Fluid Storage Tanks		
S048	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?
☐ Steam - ☐ Air - ☐ Pressure - ☒ Non -	25 ft	4 ft	☐Yes ☐No NA

Waste Gas Information

15. Maximum waste gas flow rate (scfm):	16. Heat value of waste gas stream (BTU/ft3)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (ft/s)
~131	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	~50	75,000	☐ Yes ☒ No

25. If automatic re-ignition will be used, describe the method:
N/A

26. Describe the method of controlling flame:

Each combustor: 3 flame cells to stop the main flame front; One 2" flame arrestor on piping from drip pot to burner assembly.

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

29. Pollutant(s) Controlled	30. % Capture Efficiency	31. Manufacturer's Guaranteed Control Efficiency (%)
HC	95	≥98
VOC	95	≥98
HAP	95	≥98

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

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

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

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

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

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 ☐ New	
3. Maximum Rated Total Flow Capacity: 93 scf/min ~134,558 scfd	4. Maximum Design Heat Input: 8.33 MMBtu/hr	5. Design Heat Content: ~1,500 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.: Leed 36" Enclosed Combustor	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#: C003)

10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
S035	Glycol Dehydrator		

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

11. Assist Type	12. Flare Height	13. Tip Diameter	14. Was the design per §60.18?
☐ Steam - ☐ Air - ☐ Pressure - ☒ Non -	25 ft	3 ft	☐Yes ☐No NA

Waste Gas Information

15. Maximum waste gas flow rate (scfm):	16. Heat value of waste gas stream (BTU/ft3)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (ft/s)
93	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	64	75,000	☐ Yes ☒ No

25. If automatic re-ignition will be used, describe the method:
N/A

26. Describe the method of controlling flame:

Each combustor: 2 flame cells to stop the main flame front; one 2" flame arrestor on piping from drip pot to burner assembly.

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

29. Pollutant(s) Controlled	30. % Capture Efficiency	31. Manufacturer's Guaranteed Control Efficiency (%)
HC	100	≥98
VOC	100	≥98
HAP	100	≥98

32. Has the control device been tested by the manufacturer and certified?
Test results are currently under review by U.S. EPA

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

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

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

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

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		Project:		Date:	27 February 2014		
	Enviromental Control Equipment Data Sheet			By:	JS		
		P.O. No.:	-	Checked:	SG		
		RFQ No.:	-	Approved:	MS		
	Client:	Ref. P&ID:	-				
	Site:			Supplier:	LEED FABRICATION		
	Unit/Lease:	Remarks:	-	Model No.:	L30-0018-00		

GENERAL

1	Design Code:		NDE:	LEED Fabrication Standards
2	Service:		Customer Specs:	☐ Yes
3	Description:	Standard Single Stage 36 High Efficiency Combustor		☑ No

PROCESS DATA

	Gas Composition:	mol %	Process Conditions: Variable	Value	Units
4	Methane		Flow Rate	Up to 99	Mscfd
5	Ethane		Pressure	Up to 12	oz/in2
6	Propane		Temperature		°F
7	I-Butane		Molecular Weight		
8	n-Butane		Process/Waste Stream	☑ Gas	☐ Liquid
9	I-Pentane		Detailed Process Description / Process Notes:		
10	n-Pentane		1. Turndown 10:1. Based on an expected normal operating rate indicated above.		
11	n-Hexane		2. DRE: 98 % operating at design conditions		
12	CO2		3. Burner Pressure Drop: Min. 0.10 oz/in2		
13	N2				
14	Helium				
15	H_2O				
16	C7				
17	C8				
18	C9				
19	C10				
20	C11+				
21	TOTAL				

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

DESIGN DATA

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

EQUIPMENT SPECIFICATION

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

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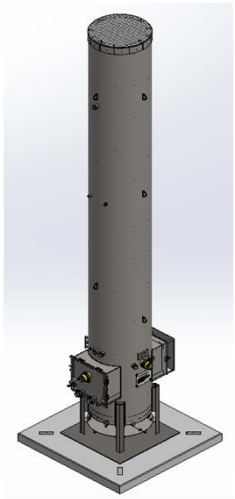
	Site:			Supplier:	LEED FABRICATION		
	Unit/Lease:	Remarks:	-	Model No.:	L30-0018-00		

EQUIPMENT SPECIFICATION

56	**Flame Detection:**	☐ Thermocouple ☑ Ionization Rod	**Auxiliary Equipment**		
57		☐ 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**	☐ Skid Mounted ☑ Concrete Pad	**Equipment Info**	
77		☐ Other	**Component**	**Weight / Dimensions**
78			**Burner**	
79	**Inspection**	☑ Vendor Standard	Burner Assembly	
80		☐ Other. Specify:	**Stack**	
81	**Material Certification**	☑ Vendor Standard	Stack Assembly	36 " OD x 25 ' H
82		☐ MTR	Pilot Tip	
83		☐ Certificate of Compliance	Pilot Line(s)	
84		☐ Other (Specify):	Stack Assembly	
85	**NDE**	☑ Vendor Standard	**Auxiliary Equipment**	
86		☐ Radiography. Specify:	Blowers	
87		☐ Ultrasonic. Specify:	Inlet KO / Liquid Seal	
88		☐ Liquid Penetrant.	Flame / Detonation Arrestor	
89		☐ Magnetic Particles.	Skid	
90		☐ PMI. Specify:	**Instrumentation & Controls**	
91		☐ Other. Specify:	BMS	
92	**Surface Preparation**	☑ Vendor Standard	Control Panel	
93		☐ Other. Specify:		
94	**Paint System**	☑ Vendor Standard		
95		☐ Other. Specify:		
96	**Finished Color**	☑ Vendor Standard		
97		☐ Other. Specify:		
98				
99				

Additional Notes:

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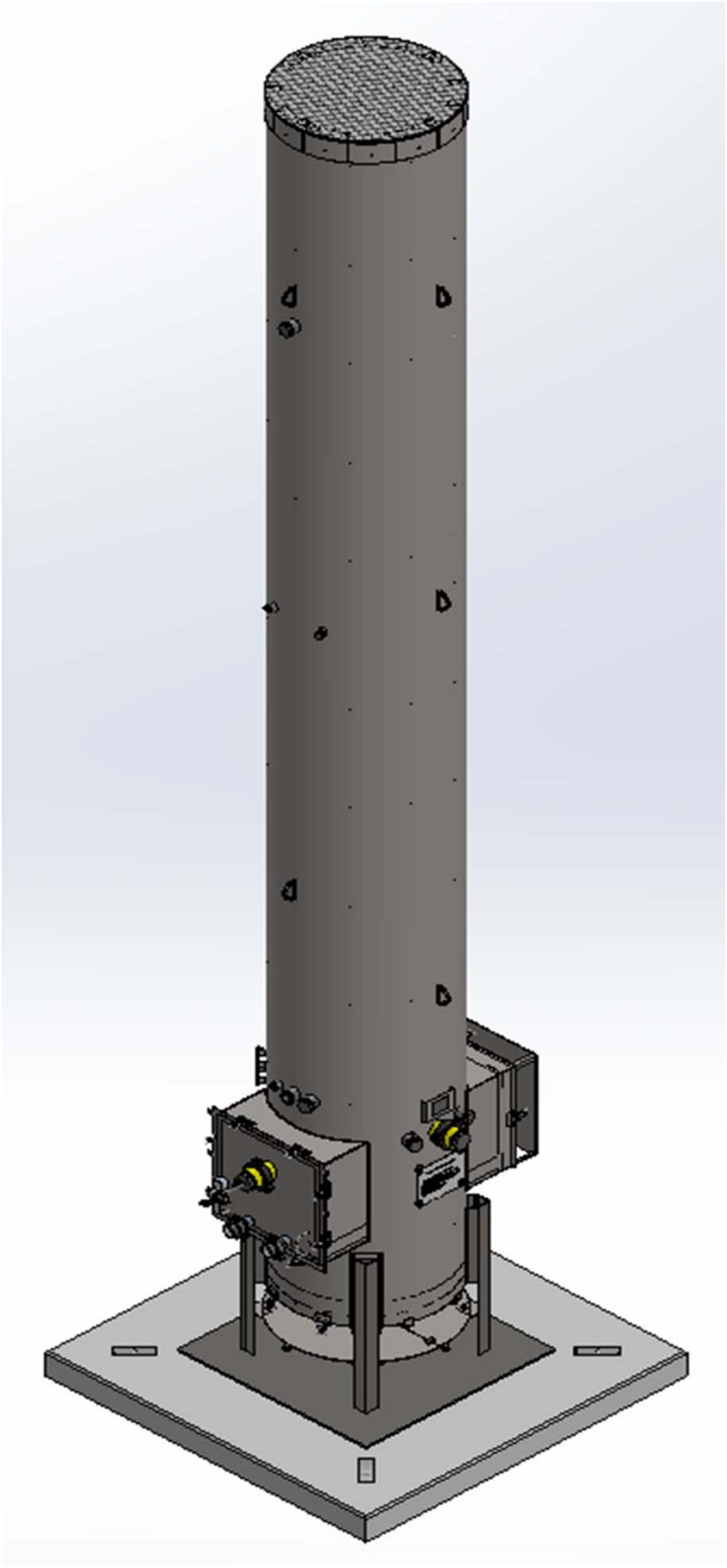
Client:		Ref. P&ID:	-				
Site:				Supplier:	LEED FABRICATION		
Unit/Lease:		Remarks:	-	Model No.:	L30-0018-00		

GENERAL ARRANGEMENT



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	Site:			Supplier:	LEED FABRICATION		
	Unit/Lease:	Remarks:	-	Model No.:	L30-0028-00		

GENERAL

1	Design Code:		NDE:	LEED Fabrication Standards
2	Service:		Customer Specs:	☐ Yes
3	Description:	Standard Dual Stage 60 High Efficiency Combustor		☑ No

PROCESS DATA

	Gas Composition:	mol %	Process Conditions: Variable	Value	Units
4	Methane		Flow Rate	Up to 300	Mscfd
5	Ethane		Pressure	Up to 12	oz/in2
6	Propane		Temperature		°F
7	I-Butane		Molecular Weight		
8	n-Butane		Process/Waste Stream	☑ Gas	☐ Liquid
9	I-Pentane		Detailed Process Description / Process Notes:		
10	n-Pentane		1. Turndown 10:1. Based on an expected normal operating rate indicated above.		
11	n-Hexane		2. DRE: 98 % operating at design conditions		
12	CO2		3. Burner Pressure Drop: Min. 0.12 oz/in2		
13	N2		4. Gas mixture heating value estimated to be 1500 BTU/SCF unless specified by customer		
14	Helium				
15	H_2O				
16	C7				
17	C8				
18	C9				
19	C10				
20	C11+				
21	TOTAL				

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

DESIGN DATA

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

EQUIPMENT SPECIFICATION

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

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	Site:			Supplier:	LEED FABRICATION		
	Unit/Lease:	Remarks:	-	Model No.:	L30-0028-00		

EQUIPMENT SPECIFICATION

56	**Flame Detection:**	☐ Thermocouple ☑ Ionization Rod	**Auxiliary Equipment**		
57		☐ 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	Check with Sales for available config.	
65			Calorimeter	NA	
66			Pressure Switches/Transmitters	Check with Sales for available config.	
67			Thermocouples	Check with Sales for available config.	
68			Temperature Switches/Transmitters	Check with Sales for available config.	
69			BMS	Check with Sales for available config.	
70			CEMS	NA	
71			Other	NA	
72					
73					
74					
75					

FABRICATION AND INSPECTION

76	**Special requirements**	☐ Skid Mounted ☑ Concrete Pad	**Equipment Info**	
77		☐ Other	**Component**	**Weight / Dimensions**
78			**Burner**	
79	**Inspection**	☑ Vendor Standard	Burner Assembly	
80		☐ Other. Specify:	**Stack**	
81	**Material Certification**	☑ Vendor Standard	Stack Assembly	60 " OD x 30 ' H. 7,000 Lbs
82		☐ MTR	Pilot Tip	
83		☐ Certificate of Compliance	Pilot Line(s)	
84		☐ Other (Specify):	Concrete Pad	12'x12' 12". 21,600 Lbs
85	**NDE**	☑ Vendor Standard	**Auxiliary Equipment**	
86		☐ Radiography. Specify:	Blowers	
87		☐ Ultrasonic. Specify:	Inlet KO / Liquid Seal	
88		☐ Liquid Penetrant.	Flame / Detonation Arrestor	
89		☐ Magnetic Particles.	Skid	
90		☐ PMI. Specify:	**Instrumentation & Controls**	
91		☐ Other. Specify:	BMS	
92	**Surface Preparation**	☑ Vendor Standard	Control Panel	
93		☐ Other. Specify:		
94	**Paint System**	☑ Vendor Standard		
95		☐ Other. Specify:		
96	**Finished Color**	☑ Vendor Standard		
97		☐ Other. Specify:		
98				
99				

Additional Notes:

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				By:	JS		
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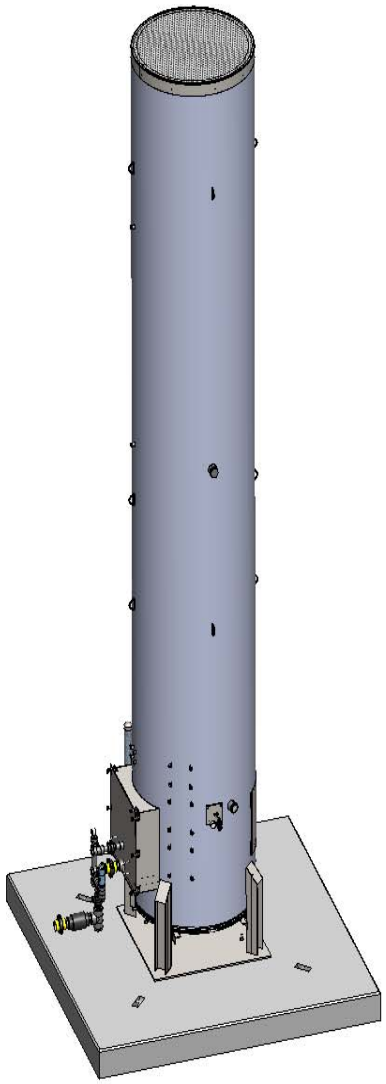
Site:				Supplier:	LEED FABRICATION		
Unit/Lease:		Remarks:	-	Model No.:	L30-0028-00		

GENERAL ARRANGEMENT



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	Enviromental Control Equipment Data Sheet			By:	JS		
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	Client:	Ref. P&ID:	-				
	Site:			Supplier:	LEED FABRICATION		
	Unit/Lease:	Remarks:	-	Model No.:	L30-0011-00		

GENERAL

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

PROCESS DATA

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

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

DESIGN DATA

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

EQUIPMENT SPECIFICATION

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

Environmental Control Equipment
Data Sheet

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

EQUIPMENT SPECIFICATION

Flame Detection: ☐ Thermocouple ☑ Ionization Rod ☐ UV Scanner

General Configuration:

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

FABRICATION AND INSPECTION

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

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

Additional Notes:

		Item/Tag No.:		Page	3	of	3
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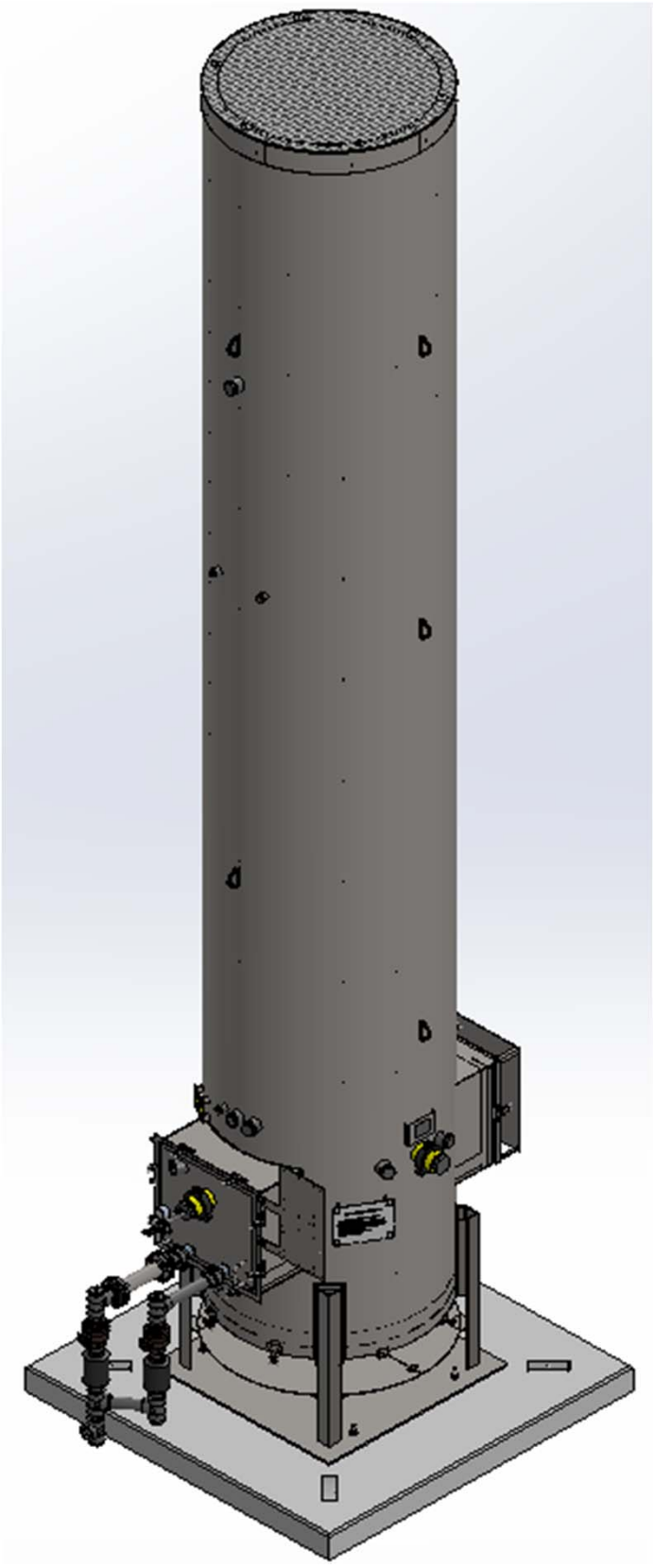
		Project:		Date:	27 February 2014		
				By:	JS		
Environmental Control Equipment Data Sheet		P.O. No.:	-	Checked:	SG		
		RFQ No.:	-	Approved:	MS		
Client:		Ref. P&ID:	-				
Site:				Supplier:	LEED FABRICATION		
Unit/Lease:		Remarks:	-	Model No.:	L30-0011-00		

GENERAL ARRANGEMENT



ATTACHMENT I

Emission Calculations

Company Name: EQT Production, LLC
Facility Name: BIG-192 Wellpad
Project Description: G-70A Permit Application

Site Wide Summary

Emission Source	Value	Units	Emission Unit ID(s)	Emission Point ID(s)	Control Device
Well(s)	18	per pad	---	---	---
Storage Tank(s)	20	per pad	S001 - S012, S026 - S029, S038 - S041	C001 - C002, C004	C001 - C002, C004
Sand Separator Tank	1	per pad	S042	E042	None
Line Heater(s)	18	per pad	S013 - S023, S030 - S034, S043 - S044	E013 - E023, E030 - E034, E043 - E044	None
Thermoelectric Generator(s) - 0.03 MMBtu/hr	2	per pad	S024 - S025	E024 - E025	None
Thermoelectric Generator(s) - 0.013 MMBtu/hr	3	per pad	S045 - S047	E045 - E047	None
Dehydrator(s)	1	per pad	S035	C003	C003
Reboiler(s)	1	per pad	S036	E036	None
Dehy Drip Tank	1	per pad	S048	C001 - C002, C004	C001 - C002, C004
Tank Combustor(s) 18.75 MMBtu/hr	1	per pad	C004	C004	---
Tank Combustor(s) 11.66 MMBtu/hr	2	per pad	C001 - C002	C001 - C002	---
Dehy Combustor(s)	1	per pad	C003	C003	---
Length of lease road	7,400	feet	---	---	---

Constituent	C001 [1] Produced Fluid Storage Tanks, Dehy Drip Tank, & Liquid Loading (includes Combustor) (tpy)	C002 [1] Produced Fluid Storage Tanks, Dehy Drip Tank, & Liquid Loading (includes Combustor) (tpy)	C004 [1] Produced Fluid Storage Tanks, Dehy Drip Tank, & Liquid Loading (includes Combustor) (tpy)	E042 Sand Separator Tank (tpy)	E013 - E023, E030 - E034, E043 - E044 Line Heaters (tpy)	E024 - E025, E045 - E047 TEGs (tpy)	C003 Dehydrator (includes Combustor) (tpy)	E036 Reboiler (tpy)	Fugitive Components (tpy)	E027 Liquid Loading (Uncontrolled, Uncaptured) (tpy)	Haul Roads (tpy)	BIG-192 Wellpad Emissions (tpy)	BIG-333 Wellpad Emissions (tpy)
Criteria Pollutants													
NO_X	4.42	4.42	7.09	---	10.427	3.66E-02	3.16	0.869	---	---	---	**30.42**	15.22
CO	3.71	3.71	5.95	---	8.759	3.07E-02	2.66	0.730	---	---	---	**25.56**	12.79
PM Total	0.34	0.34	0.54	---	0.792	2.78E-03	0.24	0.066	---	---	91.78	**94.09**	57.94
PM_{10} Total	0.34	0.34	0.54	---	0.792	2.78E-03	0.24	0.066	---	---	23.39	**25.70**	15.63
$PM_{2.5}$ Total	0.34	0.34	0.54	---	0.792	2.78E-03	0.24	0.066	---	---	2.34	**4.65**	2.60
SO_2	0.03	0.03	0.04	---	0.063	2.20E-04	0.02	0.005	---	---	---	**0.18**	0.09
VOC	13.04	13.04	25.99	0.53	0.574	2.01E-03	15.25	0.048	18.86	1.26	---	**62.93**	16.14
Greenhouse Gases													
CO_2	6,014	6,014	9,647	---	14,191	50	4,570	1,183	0.44	---	---	**41,667**	19,876
CH_4	0.43	0.43	0.50	<0.01	0.27	9.4E-04	2.46	0.02	92.36	---	---	**95.84**	64.45
N_2O	0.01	0.01	0.02	---	0.03	9.4E-05	0.01	0.00		---	---	**0.08**	0.04
CO_2e	6,028	6,028	9,665	0.18	14,206	50	4,634	1,184	2,309	---	---	**44,087**	21,499
Hazardous Air Pollutants													
Methylnaphthalene (2-)	---	---	---	---	2.5E-06	5.9E-09	---	2.1E-07	---	---	---	2.7E-06	1.5E-06
Methylchloranthrene (3-)	---	---	---	---	1.9E-07	4.4E-10	---	1.6E-08	---	---	---	2.0E-07	1.2E-07
Dimethybenz(a)anthracene (7,12-)	---	---	---	---	1.7E-06	3.9E-09	---	1.4E-07	---	---	---	1.8E-06	1.0E-06
Acenaphthene	---	---	---	---	1.9E-07	4.4E-10	---	1.6E-08	---	---	---	2.0E-07	1.2E-07
Acenaphthylene	---	---	---	---	1.9E-07	4.4E-10	---	1.6E-08	---	---	---	2.0E-07	1.2E-07
Anthracene	---	---	---	---	2.5E-07	5.9E-10	---	2.1E-08	---	---	---	2.7E-07	1.5E-07
Benz(a)anthracene	---	---	---	---	1.9E-07	4.4E-10	---	1.6E-08	---	---	---	2.0E-07	1.2E-07
Benzene	3.0E-02	3.0E-02	6.0E-02	1.0E-03	2.2E-04	5.1E-07	0.47	1.8E-05	2.9E-02	6.3E-04	---	5.6E-01	3.0E-02
Benzo(a)pyrene	---	---	---	---	1.3E-07	2.9E-10	---	1.0E-08	---	---	---	1.4E-07	7.7E-08
Benzo(b)fluoranthene	---	---	---	---	1.9E-07	4.4E-10	---	1.6E-08	---	---	---	2.0E-07	1.2E-07
Benzo(g,h,i)perylene	---	---	---	---	1.3E-07	2.9E-10	---	1.0E-08	---	---	---	1.4E-07	7.7E-08
Benzo(k)fluoranthene	---	---	---	---	1.9E-07	4.4E-10	---	1.6E-08	---	---	---	2.0E-07	1.2E-07
Chrysene	---	---	---	---	1.9E-07	4.4E-10	---	1.6E-08	---	---	---	2.0E-07	1.2E-07
Dibenzo(a,h)anthracene	---	---	---	---	1.3E-07	2.9E-10	---	1.0E-08	---	---	---	1.4E-07	7.7E-08
Dichlorobenzene	---	---	---	---	1.3E-04	2.9E-07	---	1.0E-05	---	---	---	1.4E-04	7.7E-05
Fluoranthene	---	---	---	---	3.1E-07	7.3E-10	---	2.6E-08	---	---	---	3.4E-07	1.9E-07
Fluorene	---	---	---	---	2.9E-07	6.8E-10	---	2.4E-08	---	---	---	3.2E-07	1.8E-07
Formaldehyde	---	---	---	---	7.8E-03	1.8E-05	---	6.5E-04	---	---	---	8.5E-03	4.8E-03
Hexane, n-	0.94	0.94	1.88	3.9E-02	1.9E-01	4.4E-04	0.05	1.6E-02	1.3E-01	2.6E-02	---	2.32	3.5E-01
Indeno(1,2,3-cd)pyrene	---	---	---	---	1.9E-07	4.4E-10	---	1.6E-08	---	---	---	2.0E-07	1.2E-07
Naphthalene	---	---	---	---	6.4E-05	1.5E-07	---	5.3E-06	---	---	---	6.9E-05	3.9E-05
Phenanthrene	---	---	---	---	1.8E-06	4.1E-09	---	1.5E-07	---	---	---	1.9E-06	1.1E-06
Pyrene	---	---	---	---	5.2E-07	1.2E-09	---	4.3E-08	---	---	---	5.7E-07	3.2E-07
Toluene	1.7E-01	1.7E-01	3.4E-01	7.0E-03	3.5E-04	8.3E-07	1.61	3.0E-05	6.8E-02	1.2E-03	---	2.0E+00	1.6E-02
Arsenic	---	---	---	---	2.1E-05	4.9E-08	---	1.7E-06	---	---	---	2.3E-05	1.3E-05
Beryllium	---	---	---	---	1.3E-06	2.9E-09	---	1.0E-07	---	---	---	1.4E-06	7.7E-07
Cadmium	---	---	---	---	1.1E-04	2.7E-07	---	9.6E-06	---	---	---	1.2E-04	7.1E-05
Chromium	---	---	---	---	1.5E-04	3.4E-07	---	1.2E-05	---	---	---	1.6E-04	9.0E-05
Cobalt	---	---	---	---	8.8E-06	2.0E-08	---	7.3E-07	---	---	---	9.5E-06	5.4E-06
Manganese	---	---	---	---	4.0E-05	9.3E-08	---	3.3E-06	---	---	---	4.3E-05	2.4E-05
Mercury	---	---	---	---	2.7E-05	6.3E-08	---	2.3E-06	---	---	---	2.9E-05	1.7E-05
Nickel	---	---	---	---	2.2E-04	5.1E-07	---	1.8E-05	---	---	---	2.4E-04	1.4E-04
Selenium	---	---	---	---	2.5E-06	5.9E-09	---	2.1E-07	---	---	---	2.7E-06	1.5E-06
Ethylbenzene	1.0E-02	1.0E-02	2.0E-02	1.0E-03	---	---	1.20	---	3.9E-02	6.7E-05	---	1.26	1.5E-03
Trimethylpentane (2,2,4-)	1.3E-06	1.3E-06	2.6E-06	<0.001	---	---	0.02	---	8.4E-02	5.6E-05	---	0.11	1.8E-01
Xylene	2.7E-01	2.7E-01	5.4E-01	1.1E-02	---	---	1.72	---	3.9E-02	9.0E-04	---	2.31	2.8E-02
Total HAP	1.42	1.42	2.84	0.06	0.20	4.6E-04	5.06	1.6E-02	0.39	0.03	---	**8.63**	0.61

1 The combustor emission points include potential controlled emissions from all storage tanks and controlled liquid loading since all tanks have the potential to be routed to either one combustor or the other at a given time. Facility-wide totals include the pilot from each combustor firing 8,760 hr/yr.

Company Name: EQT Production, LLC
Facility Name: BIG-192 Wellpad
Project Description: G-70A Permit Application

Produced Fluid Storage Tank and Dehy Drip Tank

Throughput Parameter	Value	Units
Operational Hours	8,760	hrs/yr
Total Produced Fluid Throughput for E&P [1]	10.4	bbl/day (per tank)
Total Condensate Throughput	297	bbl/month
Total Produced Water Throughput	120,480	bbl/month

Description	Potential Throughput [2, 3] (gal/yr)
Produced Water and Condensate	60,871,608

[1] For the purposes of establishing PTE, produced water is conservatively assumed to contain 5% condensate. E&P Tank throughput is on a per-tank basis.

[2] Based on maximum historical produced water and condensate throughput for the existing wells at the BIG-192 wellpad. See Section 2 - Sample Emission Source Calculations for more information.

[3] Throughput for the dehy drip tank is included in total wellpad throughput. Therefore, the emissions calculated for the produced fluid storage tanks conservatively account for emissions from the dehy drip tank.

Total Produced Fluid Throughput for E&P Tank is calculated according to the following:

$$Throughput\ per\ Tank\ \left(\frac{bbl}{day}\right) = \frac{\left(Condensate\ Throughput\ \left(\frac{bbl}{month}\right) + \left(Produced\ Water\ Throughput\ \left(\frac{bbl}{month}\right) * 5\%\ (Condensate\ in\ Produced\ Water)\right) * \frac{12\left(\frac{months}{year}\right)}{365\left(\frac{days}{year}\right)}\right)}{Number\ of\ tanks\ at\ wellpad}$$

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

Constituent	Total Emissions [4, 5] lb/hr	tpy
Methane	0.053	0.234
Ethane	0.077	0.339
Propane	0.164	0.720
Isobutane	0.124	0.541
n-Butane	0.298	1.305
Isopentane	0.345	1.509
n-Pentane	0.295	1.293
n-Hexane	0.307	1.346
Cyclohexane	<0.001	<0.001
Other Hexanes	0.522	2.287
Heptanes	1.095	4.796
Benzene	0.011	0.047
Toluene	0.054	0.237
Ethylbenzene	0.005	0.020
Xylenes	0.089	0.391
2,2,4-Trimethylpentane	0.001	0.005
C8+ Heavies	0.856	3.747
Total HC Emissions:	4.296	18.815
Total VOC Emissions:	4.165	18.243
Total HAP Emissions:	0.468	2.050

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

[5] E&P TANK v2.0 emission calculations are based on a 9/12/2014 condensate sample from BIG-192 wellpad.

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

Company Name: EQT Production, LLC
Facility Name: BIG-192 Wellpad
Project Description: G-70A Permit Application

Produced Fluid Storage Tank and Dehy Drip Tank

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

Constituent	Total Emissions lb/hr	Total Emissions tpy
Methane	0.004	0.016
Ethane	0.005	0.024
Propane	0.012	0.050
Isobutane	0.009	0.038
n-Butane	0.021	0.091
Isopentane	0.024	0.106
n-Pentane	0.021	0.091
n-Hexane	0.022	0.094
Cyclohexane	<0.001	<0.001
Other Hexanes	0.037	0.160
Heptanes	0.077	0.336
Benzene	0.001	0.003
Toluene	0.004	0.017
Ethylbenzene	<0.001	0.001
Xylenes	0.006	0.027
2,2,4-Trimethylpentane	<0.001	<0.001
C8+ Heavies	0.059	0.262
Total HC Emissions:	0.301	1.317
Total VOC Emissions:	0.292	1.277
Total HAP Emissions:	0.033	0.144

Enclosed Combustor Emissions C001 & C002 - (Per combustor) [6]

Pollutant [7]	Emission Factor (lb/MMBtu)	Combustor Potential Emissions (lb/hr)	Combustor Potential Emissions (tpy)	Pilot Potential Emissions (lb/hr)	Pilot Potential Emissions (tpy)
NO_x	0.086	1.002	4.391	6.45E-03	2.82E-02
CO	0.072	0.842	3.688	5.42E-03	2.37E-02
PM/PM_{10}	0.007	0.076	0.334	4.9E-04	2.15E-03
SO_2	5.2E-04	0.006	0.026	3.9E-05	1.69E-04
VOC	4.7E-03	0.055	0.241	3.5E-04	1.55E-03
CO_2 (Natural Gas Firing)	116.997	1364.189	5975.146	8.775	38.434
CH_4 (Natural Gas Firing)	0.002	0.026	0.113	1.7E-04	7.24E-04
N_2O (Natural Gas Firing)	2.2E-04	0.003	0.011	1.7E-05	7.24E-05

Enclosed Combustor Emissions C004 - (Per combustor) [6]

Pollutant [7]	Emission Factor (lb/MMBtu)	Combustor Potential Emissions (lb/hr)	Combustor Potential Emissions (tpy)	Pilot Potential Emissions (lb/hr)	Pilot Potential Emissions (tpy)
NO_x	0.086	1.612	7.060	6.45E-03	2.82E-02
CO	0.072	1.354	5.931	5.42E-03	2.37E-02
PM/PM_{10}	0.007	0.123	0.537	4.9E-04	2.15E-03
SO_2	5.2E-04	0.010	0.042	3.9E-05	1.69E-04
VOC	4.7E-03	0.089	0.388	3.5E-04	1.55E-03
CO_2 (Natural Gas Firing)	116.997	2193.699	9608.403	8.775	38.434
CH_4 (Natural Gas Firing)	0.002	0.041	0.181	1.7E-04	7.24E-04
N_2O (Natural Gas Firing)	2.2E-04	0.004	0.018	1.7E-05	7.24E-05

[6] 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.

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

Company Name: **EQT Production, LLC**
Facility Name: **BIG-192 Wellpad**
Project Description: **G-70A Permit Application**

Sand Separator Tank

Throughput Parameter	Value	Units
Tank Capacity	5,880	gallons
Operational Hours	8,760	hrs/yr
Total Produced Water and Sand Throughput [1]	280	bbl/month
Percent Produced Water	50%	
Total Produced Water Throughput	140	bbl/month
Total Throughput for E&P [2]	0.3	bbl/day

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

[1] Conservatively assumes 2 turnovers/month of sand and produced water. Engineering estimates assumes mixture is 50% sand and 50% Produced Fluids.
2 Throughput for E&P Tank is based on the conservative assumption that produced water contains 5% condensate.

Total Produced Fluid Throughput for E&P Tank is calculated according to the following:

$$\begin{aligned} Throughput\ \left(\frac{bbl}{day}\right) &= \left(Sand\ and\ Produced\ Water\ Throughput\ \left(\frac{bbl}{month}\right) * 50\%\ (Produced\ Fluid\ in\ Mixture)\right) \\ &* \left(Produced\ Water\ Throughput\ \left(\frac{bbl}{month}\right) * 5\%\ (Condensate\ in\ Produced\ Water)\right) \end{aligned}$$

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

Constituent	Total Emissions [1] lb/hr	tpy
Methane	0.002	0.007
Ethane	0.002	0.010
Propane	0.005	0.021
Isobutane	0.004	0.016
n-Butane	0.009	0.038
Isopentane	0.010	0.044
n-Pentane	0.008	0.037
n-Hexane	0.009	0.039
Cyclohexane	<0.001	<0.001
Other Hexanes	0.015	0.066
Heptanes	0.032	0.138
Benzene	<0.001	0.001
Toluene	0.002	0.007
Ethylbenzene	<0.001	0.001
Xylenes	0.003	0.011
2,2,4-Trimethylpentane	<0.001	<0.001
C8+ Heavies	0.025	0.108
Total HC Emissions:	0.124	0.543
Total VOC Emissions:	0.120	0.526
Total HAP Emissions:	0.014	0.060

[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 9/12/2014 condensate sample from BIG-192 wellpad.

Company Name: **EQT Production, LLC**
Facility Name: **BIG-192 Wellpad**
Project Description: **G-70A Permit Application**

Triethylene Glycol Dehydrator Unit

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY

Controlled Regenerator Emissions

Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon Dioxide	0.353	8.472	1.546
Methane	0.0335	0.805	0.1469
Ethane	0.0727	1.744	0.3183
Propane	0.0685	1.645	0.3001
Isobutane	0.0207	0.497	0.0907
n-Butane	0.0395	0.947	0.1729
Isopentane	0.0168	0.403	0.0735
n-Pentane	0.0106	0.255	0.0465
n-Hexane*	0.0079	0.189	0.0345
Cyclohexane	0.0213	0.510	0.0932
Other Hexanes	0.0194	0.465	0.0848
Heptanes	0.0287	0.690	0.1259
2,2,4-Trimethylpentane*	0.0040	0.095	0.0173
Benzene*	0.1050	2.520	0.4599
Toluene*	0.3658	8.780	1.6024
Ethylbenzene*	0.2727	6.546	1.1946
Xylenes*	0.3906	9.375	1.7109
C8 + Heavier Hydrocarbons	1.8498	44.395	8.1021
Total Emissions	3.3275	79.861	14.5746
Total Hydrocarbon Emissions	3.3275	79.861	14.5746
Total VOC Emissions	3.2213	77.312	14.1094
Total HAP Emissions	1.1460	27.504	5.0196

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY

Flash Gas Emissions

Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon Dioxide	59.6	1430.4	261.048
Methane	0.5093	12.223	2.2307
Ethane	0.3177	7.625	1.3916
Propane	0.1256	3.015	0.5503
Isobutane	0.0250	0.601	0.1096
n-Butane	0.0360	0.865	0.1578
Isopentane	0.0132	0.316	0.0577
n-Pentane	0.0067	0.160	0.0292
n-Hexane*	0.0027	0.065	0.0119
Cyclohexane	0.0019	0.047	0.0085
Other Hexanes	0.0088	0.212	0.0387
Heptanes	0.0048	0.116	0.0212
2,2,4-Trimethylpentane*	0.0013	0.032	0.0058
Benzene*	0.0012	0.030	0.0054
Toluene*	0.0027	0.066	0.0120
Ethylbenzene*	0.0012	0.028	0.0051
Xylenes*	0.0011	0.027	0.0049
C8 + Heavier Hydrocarbons	0.0274	0.657	0.1199
Total Emissions	1.0868	26.083	4.7602
Total Hydrocarbon Emissions	1.0868	26.083	4.7602
Total VOC Emissions	0.2598	6.235	1.1379
Total HAP Emissions	0.0103	0.247	0.0450

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY[1]

Controlled Total Emission Rates

Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Carbon Dioxide	59.95	1438.87	262.59
Methane	0.5428	13.028	2.3776
Ethane	0.3904	9.369	1.7099
Propane	0.1941	4.660	0.8504
Isobutane	0.0457	1.098	0.2003
n-Butane	0.0755	1.812	0.3307
Isopentane	0.0300	0.719	0.1312
n-Pentane	0.0173	0.415	0.0757
n-Hexane*	0.0106	0.254	0.0464
Cyclohexane	0.0232	0.557	0.1017
Other Hexanes	0.0282	0.677	0.1235
Heptanes	0.0335	0.806	0.1471
2,2,4-Trimethylpentane*	0.0053	0.127	0.0231
Benzene*	0.1062	2.550	0.4653
Toluene*	0.3685	8.846	1.6144
Ethylbenzene*	0.2739	6.574	1.1997
Xylenes*	0.3917	9.402	1.7158
C8 + Heavier Hydrocarbons	1.8772	45.052	8.2220
Total Emissions	4.4141	105.938	19.3338
Total Hydrocarbon Emissions	4.4141	105.938	19.3338
Total VOC Emissions	3.4809	83.542	15.2463
Total HAP Emissions	1.1562	27.749	5.0642

Combustor Rating	8.33 MMbtu/hr
Pilot Rating	0.08 MMbtu/hr

Enclosed Combustor Emissions- C003

Pollutant	Emission Factors (lb/MMBtu)	Combustor Potential Emissions (lb/hr)	Combustor Potential Emissions (tpy)	Pilot Potential Emissions (lb/hr)	Pilot Potential Emissions (tpy)
NO_x	0.086	0.72	3.14	0.01	0.03
CO	0.072	0.60	2.63	0.01	0.02
PM/PM_{10}	0.007	0.05	0.24	0.00	0.00
SO_2	0.001	0.00	0.02	0.00	0.00
CO_2 (Natural Gas Firing)[2]	116.997	974.59	4268.69	8.77	38.43
CH_4 (Natural Gas Firing)[2]	0.002	0.02	0.08	0.00	0.00
N_2O (Natural Gas Firing)[2]	0.000	0.00	0.01	0.00	0.00

* HAPs

[1] Based on GRI GlyCalc 4.0 run at dry gas flowrate of 130 MMscf/day and T and P of 80 °F and 850 psig, respectively. Emissions from the regenerator are controlled by an enclosed combustor at 95% 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 does not include the control by the BTEX condenser unit.

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

Company Name: **EQT Production, LLC**
Facility Name: **BIG-192 Wellpad**
Project Description: **G-70A Permit Application**

Reboiler

Parameter	Value	Units
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,163	BTU/scf
Heat Input	2.31	MMBtu/hr
Fuel Consumption	1.98E-03	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]	Potential Emissions (tons/yr)[3]
NO_x	100	2.0E-01	8.7E-01
CO	84	1.7E-01	7.3E-01
SO_2	0.6	1.2E-03	5.2E-03
PM Total	7.6	1.5E-02	6.6E-02
PM Condensable	5.7	1.1E-02	5.0E-02
PM_{10} (Filterable)	1.9	3.8E-03	1.7E-02
$PM_{2.5}$ (Filterable)	1.9	3.8E-03	1.7E-02
VOC	5.5	1.1E-02	4.8E-02
Lead	5.00E-04	9.9E-07	4.3E-06
CO_2 (Natural Gas Firing)[4]	136,092	270	1183
CH_4 (Natural Gas Firing)[4]	2.6	5.1E-03	2.2E-02
N_2O (Natural Gas Firing)[4]	0.26	5.1E-04	2.2E-03

Company Name: EQT Production, LLC
Facility Name: BIG-192 Wellpad
Project Description: G-70A Permit Application

Reboiler

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
HAPs:			
Methylnaphthalene (2-)	2.4E-05	4.8E-08	2.1E-07
3-Methylchloranthrene	1.8E-06	3.6E-09	1.6E-08
7,12-Dimethylbenz(a)anthracene	1.6E-05	3.2E-08	1.4E-07
Acenaphthene	1.8E-06	3.6E-09	1.6E-08
Acenaphthylene	1.8E-06	3.6E-09	1.6E-08
Anthracene	2.4E-06	4.8E-09	2.1E-08
Benz(a)anthracene	1.8E-06	3.6E-09	1.6E-08
Benzene	2.1E-03	4.2E-06	1.8E-05
Benzo(a)pyrene	1.2E-06	2.4E-09	1.0E-08
Benzo(b)fluoranthene	1.8E-06	3.6E-09	1.6E-08
Benzo(g,h,i)perylene	1.2E-06	2.4E-09	1.0E-08
Benzo(k)fluoranthene	1.8E-06	3.6E-09	1.6E-08
Chrysene	1.8E-06	3.6E-09	1.6E-08
Dibenzo(a,h) anthracene	1.2E-06	2.4E-09	1.0E-08
Dichlorobenzene	1.2E-03	2.4E-06	1.0E-05
Fluoranthene	3.0E-06	6.0E-09	2.6E-08
Fluorene	2.8E-06	5.6E-09	2.4E-08
Formaldehyde	7.5E-02	1.5E-04	6.5E-04
Hexane	1.8E+00	3.6E-03	1.6E-02
Indo(1,2,3-cd)pyrene	1.8E-06	3.6E-09	1.6E-08
Naphthalene	6.1E-04	1.2E-06	5.3E-06
Phenanthrene	1.7E-05	3.4E-08	1.5E-07
Pyrene	5.0E-06	9.9E-09	4.3E-08
Toluene	3.4E-03	6.7E-06	3.0E-05
Arsenic	2.0E-04	4.0E-07	1.7E-06
Beryllium	1.2E-05	2.4E-08	1.0E-07
Cadmium	1.1E-03	2.2E-06	9.6E-06
Chromium	1.4E-03	2.8E-06	1.2E-05
Cobalt	8.4E-05	1.7E-07	7.3E-07
Manganese	3.8E-04	7.5E-07	3.3E-06
Mercury	2.6E-04	5.2E-07	2.3E-06
Nickel	2.1E-03	4.2E-06	1.8E-05
Selenium	2.4E-05	4.8E-08	2.1E-07
Total HAP		**3.7E-03**	**1.6E-02**

[1] Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, 1.4-3, & 1.4-4.
[2] Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).
[3] Annual Emissions $(tons/yr)_{Potential}$ = $(lb/hr)_{Emissions}$ × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).
[4] GHG Emission factors from Tables C-1 and C-2, 40 CFR 98, Subpart C.

Company Name: **EQT Production, LLC**
Facility Name: **BIG-192 Wellpad**
Project Description: **G-70A Permit Application**

Line Heaters

Parameter	Value	Units
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,163	BTU/scf
Heat Input	1.54	MMBtu/hr (each)
Fuel Consumption	1.32E-03	MMscf/hr (each)
Potential Annual Hours of Operation	8,760	hr/yr

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
NO_x	100	1.3E-01	5.8E-01
CO	84	1.1E-01	4.9E-01
SO_2	0.6	7.9E-04	3.5E-03
PM Total	7.6	1.0E-02	4.4E-02
PM Condensable	5.7	7.5E-03	3.3E-02
PM_{10} (Filterable)	1.9	2.5E-03	1.1E-02
$PM_{2.5}$ (Filterable)	1.9	2.5E-03	1.1E-02
VOC	5.5	7.3E-03	3.2E-02
Lead	5.00E-04	6.6E-07	2.9E-06
CO_2 (Natural Gas Firing)[4]	136,092	180	788
CH_4 (Natural Gas Firing)[4]	2.6	3.4E-03	1.5E-02
N_2O (Natural Gas Firing)[4]	0.26	3.4E-04	1.5E-03

Company Name: **EQT Production, LLC**
Facility Name: **BIG-192 Wellpad**
Project Description: **G-70A Permit Application**

Line Heaters

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
HAPs:			
Methylnaphthalene (2-)	2.4E-05	3.2E-08	1.4E-07
3-Methylchloranthrene	1.8E-06	2.4E-09	1.0E-08
7,12-Dimethylbenz(a)anthracene	1.6E-05	2.1E-08	9.3E-08
Acenaphthene	1.8E-06	2.4E-09	1.0E-08
Acenaphthylene	1.8E-06	2.4E-09	1.0E-08
Anthracene	2.4E-06	3.2E-09	1.4E-08
Benz(a)anthracene	1.8E-06	2.4E-09	1.0E-08
Benzene	2.1E-03	2.8E-06	1.2E-05
Benzo(a)pyrene	1.2E-06	1.6E-09	7.0E-09
Benzo(b)fluoranthene	1.8E-06	2.4E-09	1.0E-08
Benzo(g,h,i)perylene	1.2E-06	1.6E-09	7.0E-09
Benzo(k)fluoranthene	1.8E-06	2.4E-09	1.0E-08
Chrysene	1.8E-06	2.4E-09	1.0E-08
Dibenzo(a,h) anthracene	1.2E-06	1.6E-09	7.0E-09
Dichlorobenzene	1.2E-03	1.6E-06	7.0E-06
Fluoranthene	3.0E-06	4.0E-09	1.7E-08
Fluorene	2.8E-06	3.7E-09	1.6E-08
Formaldehyde	7.5E-02	9.9E-05	4.3E-04
Hexane	1.8E+00	2.4E-03	1.0E-02
Indo(1,2,3-cd)pyrene	1.8E-06	2.4E-09	1.0E-08
Naphthalene	6.1E-04	8.1E-07	3.5E-06
Phenanthrene	1.7E-05	2.2E-08	9.8E-08
Pyrene	5.0E-06	6.6E-09	2.9E-08
Toluene	3.4E-03	4.5E-06	2.0E-05
Arsenic	2.0E-04	2.6E-07	1.2E-06
Beryllium	1.2E-05	1.6E-08	7.0E-08
Cadmium	1.1E-03	1.5E-06	6.4E-06
Chromium	1.4E-03	1.9E-06	8.1E-06
Cobalt	8.4E-05	1.1E-07	4.9E-07
Manganese	3.8E-04	5.0E-07	2.2E-06
Mercury	2.6E-04	3.4E-07	1.5E-06
Nickel	2.1E-03	2.8E-06	1.2E-05
Selenium	2.4E-05	3.2E-08	1.4E-07
Total HAP		**2.5E-03**	**1.1E-02**

[1] Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, 1.4-3, & 1.4-4.
[2] Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf)
[3] Annual Emissions $(tons/yr)_{Potential}$ = $(lb/hr)_{Emissions}$ × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).
[4] GHG Emission factors from Tables C-1 and C-2, 40 CFR 98, Subpart C.

Company Name: **EQT Production, LLC**
Facility Name: **BIG-192 Wellpad**
Project Description: **G-70A Permit Application**

Thermoelectric Generators (TEGs)

Parameter	Value	Units
Manufacturer	Global Thermoelectric	
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,163	BTU/scf
Heat Input	0.03	MMBtu/hr (each)
Fuel Consumption [1]	2.51E-05	MMscf/hr (each)
Potential Annual Hours of Operation	8,760	hr/yr

[1] Global Themoelectric specification sheet states 700 f^3/day at 1000 BTU/ft^3.

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
NO_x	100	2.5E-03	1.1E-02
CO	84	2.1E-03	9.2E-03
SO_2	0.6	1.5E-05	6.6E-05
PM Total	7.6	1.9E-04	8.3E-04
PM Condensable	5.7	1.4E-04	6.3E-04
PM_{10} (Filterable)	1.9	4.8E-05	2.1E-04
$PM_{2.5}$ (Filterable)	1.9	4.8E-05	2.1E-04
VOC	5.5	1.4E-04	6.0E-04
Lead	5.00E-04	1.3E-08	5.5E-08
CO_2 (Natural Gas Firing)[4]	136,092	3	15
CH_4 (Natural Gas Firing)[4]	2.6	6.4E-05	2.8E-04
N_2O (Natural Gas Firing)[4]	0.26	6.4E-06	2.8E-05

Company Name: **EQT Production, LLC**
Facility Name: **BIG-192 Wellpad**
Project Description: **G-70A Permit Application**

Thermoelectric Generators (TEGs)

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
HAPs:			
Methylnaphthalene (2-)	2.4E-05	6.0E-10	2.6E-09
3-Methylchloranthrene	1.8E-06	4.5E-11	2.0E-10
7,12-Dimethylbenz(a)anthracene	1.6E-05	4.0E-10	1.8E-09
Acenaphthene	1.8E-06	4.5E-11	2.0E-10
Acenaphthylene	1.8E-06	4.5E-11	2.0E-10
Anthracene	2.4E-06	6.0E-11	2.6E-10
Benz(a)anthracene	1.8E-06	4.5E-11	2.0E-10
Benzene	2.1E-03	5.3E-08	2.3E-07
Benzo(a)pyrene	1.2E-06	3.0E-11	1.3E-10
Benzo(b)fluoranthene	1.8E-06	4.5E-11	2.0E-10
Benzo(g,h,i)perylene	1.2E-06	3.0E-11	1.3E-10
Benzo(k)fluoranthene	1.8E-06	4.5E-11	2.0E-10
Chrysene	1.8E-06	4.5E-11	2.0E-10
Dibenzo(a,h) anthracene	1.2E-06	3.0E-11	1.3E-10
Dichlorobenzene	1.2E-03	3.0E-08	1.3E-07
Fluoranthene	3.0E-06	7.5E-11	3.3E-10
Fluorene	2.8E-06	7.0E-11	3.1E-10
Formaldehyde	7.5E-02	1.9E-06	8.2E-06
Hexane	1.8E+00	4.5E-05	2.0E-04
Indo(1,2,3-cd)pyrene	1.8E-06	4.5E-11	2.0E-10
Naphthalene	6.1E-04	1.5E-08	6.7E-08
Phenanthrene	1.7E-05	4.3E-10	1.9E-09
Pyrene	5.0E-06	1.3E-10	5.5E-10
Toluene	3.4E-03	8.5E-08	3.7E-07
Arsenic	2.0E-04	5.0E-09	2.2E-08
Beryllium	1.2E-05	3.0E-10	1.3E-09
Cadmium	1.1E-03	2.8E-08	1.2E-07
Chromium	1.4E-03	3.5E-08	1.5E-07
Cobalt	8.4E-05	2.1E-09	9.2E-09
Manganese	3.8E-04	9.5E-09	4.2E-08
Mercury	2.6E-04	6.5E-09	2.9E-08
Nickel	2.1E-03	5.3E-08	2.3E-07
Selenium	2.4E-05	6.0E-10	2.6E-09
Total HAP		**4.7E-05**	**2.1E-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 $(tons/yr)_{Potential} = (lb/hr)_{Emissions} \times$ (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

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

Company Name: **EQT Production, LLC**
Facility Name: **BIG-192 Wellpad**
Project Description: **G-70A Permit Application**

Thermoelectric Generators (TEGs)

Parameter	Value	Units
Manufacturer	Global Thermoelectric	
Fuel Used	Natural Gas	
Higher Heating Value (HHV)	1,163	BTU/scf
Heat Input	0.013	MMBtu/hr (each)
Fuel Consumption [1]	1.11E-05	MMscf/hr (each)
Potential Annual Hours of Operation	8,760	hr/yr

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

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
NO_x	100	1.1E-03	4.9E-03
CO	84	9.4E-04	4.1E-03
SO_2	0.6	6.7E-06	2.9E-05
PM Total	7.6	8.5E-05	3.7E-04
PM Condensable	5.7	6.3E-05	2.8E-04
PM_{10} (Filterable)	1.9	2.1E-05	9.3E-05
$PM_{2.5}$ (Filterable)	1.9	2.1E-05	9.3E-05
VOC	5.5	6.1E-05	2.7E-04
Lead	5.00E-04	5.6E-09	2.4E-08
CO_2 (Natural Gas Firing)[4]	136,092	2	7
CH_4 (Natural Gas Firing)[4]	2.6	2.9E-05	1.3E-04
N_2O (Natural Gas Firing)[4]	0.26	2.9E-06	1.3E-05

Company Name: **EQT Production, LLC**
Facility Name: **BIG-192 Wellpad**
Project Description: **G-70A Permit Application**

Thermoelectric Generators (TEGs)

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
HAPs:			
Methylnaphthalene (2-)	2.4E-05	2.7E-10	1.2E-09
3-Methylchloranthrene	1.8E-06	2.0E-11	8.8E-11
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.8E-10	7.8E-10
Acenaphthene	1.8E-06	2.0E-11	8.8E-11
Acenaphthylene	1.8E-06	2.0E-11	8.8E-11
Anthracene	2.4E-06	2.7E-11	1.2E-10
Benz(a)anthracene	1.8E-06	2.0E-11	8.8E-11
Benzene	2.1E-03	2.3E-08	1.0E-07
Benzo(a)pyrene	1.2E-06	1.3E-11	5.9E-11
Benzo(b)fluoranthene	1.8E-06	2.0E-11	8.8E-11
Benzo(g,h,i)perylene	1.2E-06	1.3E-11	5.9E-11
Benzo(k)fluoranthene	1.8E-06	2.0E-11	8.8E-11
Chrysene	1.8E-06	2.0E-11	8.8E-11
Dibenzo(a,h) anthracene	1.2E-06	1.3E-11	5.9E-11
Dichlorobenzene	1.2E-03	1.3E-08	5.9E-08
Fluoranthene	3.0E-06	3.3E-11	1.5E-10
Fluorene	2.8E-06	3.1E-11	1.4E-10
Formaldehyde	7.5E-02	8.4E-07	3.7E-06
Hexane	1.8E+00	2.0E-05	8.8E-05
Indo(1,2,3-cd)pyrene	1.8E-06	2.0E-11	8.8E-11
Naphthalene	6.1E-04	6.8E-09	3.0E-08
Phenanthrene	1.7E-05	1.9E-10	8.3E-10
Pyrene	5.0E-06	5.6E-11	2.4E-10
Toluene	3.4E-03	3.8E-08	1.7E-07
Arsenic	2.0E-04	2.2E-09	9.8E-09
Beryllium	1.2E-05	1.3E-10	5.9E-10
Cadmium	1.1E-03	1.2E-08	5.4E-08
Chromium	1.4E-03	1.6E-08	6.8E-08
Cobalt	8.4E-05	9.4E-10	4.1E-09
Manganese	3.8E-04	4.2E-09	1.9E-08
Mercury	2.6E-04	2.9E-09	1.3E-08
Nickel	2.1E-03	2.3E-08	1.0E-07
Selenium	2.4E-05	2.7E-10	1.2E-09
Total HAP		**2.1E-05**	**9.2E-05**

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

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

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

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

Company Name: EQT Production, LLC
Facility Name: BIG-192 Wellpad
Project Description: G-70A Permit Application

Fugitive Components

Component Counts

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

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

Fugitive Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Total Fugitive Emissions (lb/hr)	TOC Annual Fugitive Emissions (tpy)
Valves	Gas	5.97E-03	921	12.12	53.09
Pump Seals	Light Liquid	1.99E-02	1	0.04	0.19
Pressure Relief Valves	Gas	1.04E-01	60	13.76	60.25
Connectors	All	1.83E-03	3,870	15.61	68.39
Open-Ended Lines	All	1.70E-03	47	0.18	0.77
			Emission Totals:	**41.71**	**182.70**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-1. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). SOCMI factors were used as it was representative of natural gas liquids extraction.
[2] Assumes one pump for liquid loading, no compressors or dehydrators, and one meter per wellhead. Pressure relief valves count includes an Enardo valve and Emergency Pressure Relief valve for each storage tank.

VOC and HAP Weight Fractions [1]

Service	Weight Fraction VOC	Weight Fraction Hexane	Weight Fraction Benzene	Weight Fraction Toluene	Weight Fraction Ethylbenzene	Weight Fraction 2,2,4-trimethylpentane	Weight Fraction Xylene
Gas	0.102	7.0E-04	1.6E-04	3.7E-04	2.1E-04	4.6E-04	2.1E-04
Light Liquid	1.000	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
All	0.102	7.0E-04	1.6E-04	3.7E-04	2.1E-04	4.6E-04	2.1E-04

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

Company Name: EQT Production, LLC
Facility Name: BIG-192 Wellpad
Project Description: G-70A Permit Application

Fugitive Components

VOC and HAP Fugitive Emissions

Pollutant	Hourly Fugitive Emissions (lb/hr)	Annual Fugitive Emissions (tpy)
VOC	4.306	18.86
Hexane	2.9E-02	1.3E-01
Benzene	6.6E-03	2.9E-02
Toluene	1.5E-02	6.8E-02
Ethylbenzene	8.9E-03	3.9E-02
2,2,4-trimethylpentane	1.9E-02	8.4E-02
Xylene	8.9E-03	3.9E-02
Total HAP	8.8E-02	3.9E-01

GHG Fugitive Emissions from Component Leaks

Component	Component Count[1]	GHG Emission Factor[2] (scf/hr/component)	CH_4 Emissions[3,4] (tpy)	CO_2 Emissions[3,4] (tpy)	CO_2e Emissions[5] (tpy)
Connectors	3,870	3.0E-03	1.8E+00	8.8E-03	4.6E+01
Open-Ended Lines	47	6.1E-02	4.6E-01	2.2E-03	1.1E+01
Pressure Relief Devices	60	4.0E-02	3.8E-01	1.8E-03	9.5E+00
Pneumatic Devices	90	6.0E+00	8.6E+01	4.1E-01	2.1E+03
Valves	921	2.7E-02	3.9E+00	1.9E-02	9.9E+01
Total			**92.4**	**0.442**	**2309**

[1] The component count for pneumatics assumes 5 pneumatics per well

[2] Population emission factors for gas service in the Eastern U.S. from *Table W-1A of Subpart W - Default Whole Gas Emission Factors for Onshore Production* , 40 CFR 98, Subpart W, except for pneumatics, which are set at NSPS OOOO limits.

[3] Calculated in accordance with Equations W-32a, W-35 and W-36 in Subpart W of 40 CFR 98.

[4] Mole fractions of CH_4 and CO_2 based on gas analysis:

CH_4: 85.63% CO_2: 0.15%

[5] Carbon equivalent emissions (CO_2e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:

Carbon Dioxide (CO_2): 1 Methane (CH_4): 25

Company Name: **EQT Production, LLC**
Facility Name: **BIG-192 Wellpad**
Project Description: **G-70A Permit Application**

Liquid Loading

Liquid Loading Losses:

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

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

Parameter	Value	Description
S	1.00	saturation factor for vapor balancing (AP-42 Table 5.2-1)
Collection Efficiency	70%	collection efficiency for non-NSPS/MACT annual leak tested trucks
Control Efficiency	98%	destruction efficiency of combustor
P	0.29	max true vapor pressure of liquid loaded (psia) - EPA TANKS Data
M	19.29	molecular weight of vapors (lb/lb-mol) - EPA TANKS Data
T	511.0	temperature of liquids loaded (deg R) - EPA TANKS Data

Description	Loading Losses (lb/10^3 gal)	Maximum Throughput[1] (gal)	VOC Emissions Total Uncontrolled (tpy)	VOC Emissions Uncontrolled Uncaptured (tpy)	VOC Emissions Controlled[2] Captured (tpy)
Liquids Hauling	0.1	60,871,608	4.20	1.26	0.06

[1] Sum of the annual throughput from each well at the pad including the sand separator 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	Controlled Speciated Liquid Loading Emissions (tpy)[3]
Methane	0.095	---	---	---	---	---	---	---
Ethane	0.602	---	---	---	---	---	---	---
Propane	1.646	127.310	2.1E+00	3.2E-01	4.4E+01	1.4E+01	2.0E-01	1.2E-02
Isobutane	0.867	46.110	4.0E-01	6.1E-02	5.8E+01	3.6E+00	4.9E-02	2.9E-03
n-Butane	2.986	32.045	9.6E-01	1.5E-01	5.8E+01	8.5E+00	1.2E-01	6.9E-03
Isopentane	3.103	12.530	3.9E-01	5.9E-02	7.2E+01	4.3E+00	5.9E-02	3.5E-03
n-Pentane	3.943	8.433	3.3E-01	5.1E-02	7.2E+01	3.7E+00	5.1E-02	3.0E-03
n-Hexane	4.692	2.436	1.1E-01	1.7E-02	8.6E+01	1.5E+00	2.1E-02	1.2E-03
Other Hexanes	4.939	2.436	1.2E-01	1.8E-02	8.6E+01	1.6E+00	2.2E-02	1.3E-03
Heptanes	14.686	0.735	1.1E-01	1.7E-02	9.8E+01	1.6E+00	2.2E-02	1.3E-03
Benzene	0.200	1.508	3.0E-03	4.6E-04	7.8E+01	3.6E-02	5.0E-04	2.9E-05
Toluene	1.138	0.425	4.8E-03	7.4E-04	9.2E+01	6.8E-02	9.4E-04	5.6E-05
Ethylbenzene	0.155	0.151	2.3E-04	3.6E-05	1.1E+02	3.8E-03	5.3E-05	3.1E-06
Xylenes	1.763	0.180	3.2E-03	4.8E-04	1.1E+02	5.1E-02	7.1E-04	4.2E-05
2,2,4-Trimethylpentane	0.031	0.596	1.8E-04	2.8E-05	1.1E+02	3.2E-03	4.5E-05	2.6E-06
C8+ Heavies	59.154	3.400	2.0E+00	3.1E-01	1.1E+02	3.3E+01	4.6E-01	2.7E-02
	100.0		6.54			72.15	1.00	
Total Emissions:								0.06
Total HAP Emissions:								1.4E-03

[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: **BIG-192 Wellpad**
Project Description: **G-70A Permit Application**

Haul Roads

Estimated Potential Road Fugitive Emissions

Unpaved Road Emissions

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

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

Description	Weight of Empty Truck (tons)	Weight of Truck w/ Max Load (tons)	Mean Vehicle Weight (tons)	Length of Unpaved Road Traveled (mile/trip)	Trips Per Year	Mileage Per Year	Control (%)	Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
Liquids Hauling	20	40	30	2.80	15,218	42,656	0	91.36	23.28	2.328
Employee Vehicles	3	3	3	2.80	200	561	0	0.43	0.11	0.011
Total Potential Emissions								**91.78**	**23.39**	**2.34**

Company Name:	**EQT Production, LLC**	
Facility Name:	**BIG-192 Wellpad**	**BIG-192 Wellpad**
Project Description:	**G-70A Permit Application**	**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	0.040	0.001	0.001	44.01	0.04
Nitrogen	<0.001	<0.001	<0.001	28.00	<0.001
Methane	1.060	0.066	0.059	16.04	0.94
Ethane	1.540	0.051	0.046	30.07	1.37
Propane	3.280	0.074	0.066	44.10	2.92
Isobutane	2.480	0.043	0.038	58.12	2.21
n-Butane	5.960	0.103	0.091	58.12	5.31
Isopentane	6.900	0.096	0.085	72.15	6.14
n-Pentane	5.900	0.082	0.073	72.15	5.25
n-Hexane	6.140	0.072	0.064	85.67	5.47
Cyclohexane	<0.001	<0.001	<0.001	84.16	<0.001
Other Hexanes	10.440	0.121	0.108	86.18	9.30
Heptanes	21.900	0.224	0.199	97.88	19.50
2,2,4-Trimethylpentane	0.020	0.000	0.000	114.23	0.02
Benzene	0.220	2.8E-03	2.5E-03	78.11	0.20
Toluene	1.080	0.012	1.0E-02	92.14	0.96
Ethylbenzene	0.100	0.001	0.001	106.17	0.09
Xylenes	1.780	1.7E-02	1.5E-02	106.17	1.58
C8 + Heavies	17.120	0.159	0.142	107.73	15.243
Total	85.96	1.12		76.54	lb/lbmole

1. Representative gas stream from the produced water storage tanks 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	0.08	MMBtu/hr	Max. pilot fuel usage for Leed Enclosed Combustor
Pilot Rating	75,000	btu/hr	
Pilot Fuel Usage	50	scf/hr	
Combustor Flow Capacity	188.38	MSCFD	Max. flowrate from LEED Combustor Operations Manual
	7,849	scf/hr	
	131	scf/min	

Enclosed Combustor Mass Flow Rate (C001 & C002)

$$\frac{7{,}849\ \text{scf}}{\text{hr}} * \frac{1\ \text{lbmole}}{379\ \text{scf}} * \frac{76.54\ \text{lb}}{\text{lbmole}} = \mathbf{1585}\ \frac{\text{lb}}{\text{hr}}$$

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

C004

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

Enclosed Combustor Mass Flow Rate (C004)

$$\frac{12{,}500\ \text{scf}}{\text{hr}} * \frac{1\ \text{lbmole}}{379\ \text{scf}} * \frac{76.54\ \text{lb}}{\text{lbmole}} = \mathbf{2524}\ \frac{\text{lb}}{\text{hr}}$$

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

Company Name:	**EQT Production, LLC**	
Facility Name:	**BIG-192 Wellpad**	**BIG-192 Wellpad**
Project Description:	**G-70A Permit Application**	**G-70A Permit Application**

Combustor Flow Rate Calculations

REGENERATOR AND FLASH GAS STREAM (FROM GRI GLYCALC)

Component	lb/hr	lb-mol/hr	mol%	MW lb/lb-mol	MW in Mixture
Carbon Dioxide	0.780	0.018	0.016	44.01	0.69
Nitrogen	0.082	0.003	0.003	28.00	0.07
Methane	10.871	0.678	0.603	16.04	9.68
Ethane	7.800	0.259	0.231	30.07	6.94
Propane	1.621	0.037	0.033	44.10	1.44
Isobutane	0.914	0.016	0.014	58.12	0.81
n-Butane	1.511	0.026	0.023	58.12	1.35
Isopentane	0.599	0.008	0.007	72.15	0.53
n-Pentane	0.345	0.005	0.004	72.15	0.31
n-Hexane	0.212	0.002	0.002	85.67	0.19
Cyclohexane	0.464	0.006	0.005	84.16	0.41
Other Hexanes	0.564	0.007	0.006	86.18	0.50
Heptanes	0.672	0.007	0.006	97.88	0.60
2,2,4-Trimethylpentane	0.106	0.001	0.001	114.23	0.09
Benzene	2.125	2.7E-02	2.4E-02	78.11	1.89
Toluene	7.375	0.080	7.1E-02	92.14	6.57
Ethylbenzene	5.473	0.052	0.046	106.17	4.87
Xylenes	7.832	7.4E-02	6.6E-02	106.17	6.97
C8 + Heavies	4.248	0.039	0.035	107.73	3.782
Total	53.59	1.34		47.72	lb/lbmole

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

C003

Combustor Rating	8.33	MMBtu/hr	Max. input from Leed Enclosed Combustor Operations Manual
Pilot Rating	0.08	MMBtu/hr	Max. pilot fuel usage for Leed Enclosed Combustor
Pilot Rating	75,000	btu/hr	
Pilot Fuel Usage	50	scf/hr	
Combustor Flow Capacity	134.56	MSCFD	Max. flowrate from LEED Combustor Operations Manual
	5,607	scf/hr	
	93	scf/min	

Enclosed Combustor Mass Flow Rate (C003)

$$\frac{5{,}607\ \textbf{scf}}{\textbf{hr}} * \frac{1\ \textbf{lbmole}}{379\ \textbf{scf}} * \frac{47.72\ \textbf{lb}}{\textbf{lbmole}} = \mathbf{706}\ \frac{\textbf{lb}}{\textbf{hr}}$$

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

Company Name:	**EQT Production, LLC**	
Facility Name:	**BIG-192 Wellpad**	**BIG-192 Wellpad**
Project Description:	**G-70A Permit Application**	**G-70A Permit Applicati**

Gas Analysis

Sample Location: BIG-176
Sample Date: 6/25/2014
HHV (Btu/scf): 1,163

Constituent	Natural Gas Stream Speciation (Mole %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.150	44.01	0.066	0.003	0.346
Nitrogen	0.329	28.01	0.092	0.005	0.486
Methane	85.632	16.04	13.735	0.723	72.321
Ethane	10.496	30.07	3.156	0.166	16.618
Propane	2.129	44.10	0.939	0.049	4.943
Isobutane	0.275	58.12	0.160	0.008	0.841
n-Butane	0.341	58.12	0.198	0.010	1.043
Isopentane	0.110	72.15	0.079	0.004	0.417
n-Pentane	0.049	72.15	0.035	0.002	0.185
n-Hexane	0.015	86.18	0.013	0.001	0.070
Cyclohexane	0.008	84.16	0.006	3.4E-04	0.034
Other Hexanes	0.054	86.18	0.046	0.002	0.243
Heptanes	0.023	100.21	0.023	0.001	0.121
Methylcyclohexane	<0.001	98.19	<0.001	<0.001	<0.001
2,2,4-Trimethylpentane	0.008	114.23	0.009	4.6E-04	0.046
Benzene*	0.004	78.11	0.003	1.6E-04	0.016
Toluene*	0.008	92.14	0.007	3.7E-04	0.037
Ethylbenzene*	0.004	106.17	0.004	2.1E-04	0.021
Xylenes*	0.004	106.16	0.004	2.1E-04	0.021
C8 + Heavies	0.364	114.23	0.416	0.022	2.190
Totals	100		18.99	1.00	100

TOC (Total)	99.52	99.17
VOC (Total)	3.39	10.23
HAP (Total)	0.04	0.21

```
*******************************************************************************
******
*     Project Setup Information
    *
*******************************************************************************
******
Project File              : Z:\Client\EQT Corporation\West Virginia\WV Production
Wells\153901.0056 WV Wellpads 2015\BIG 192\02 Draft\Attach I - Emission Calcs\E&P
Tank\2015-0827_EQT_BIG-192_Produced Fluid Tanks.ept
Flowsheet Selection       : Oil Tank with Separator
Calculation Method        : RVP Distillation
Control Efficiency        : 93.0%
Known Separator Stream    : Low Pressure Oil
Entering Air Composition  : No

Filed Name                : BIG-192 Wellpad - Produced Fluid Tanks
Well Name                 : Condensate Analysis from 9/12/2014
Date                      : 2015.08.27


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

Separator Pressure        : 80.00[psig]
Separator Temperature     : 60.00[F]
Ambient Pressure          : 14.70[psia]
Ambient Temperature       : 70.00[F]
C10+ SG                   : 0.7861
C10+ MW                   : 168.15

-- Low Pressure Oil
--------------------------------------------------------------------------
   No.    Component             mol %
   1      H2S                    0.0000
   2      O2                     0.0000
   3      CO2                    0.0060
   4      N2                     0.0000
   5      C1                     0.4330
   6      C2                     0.3350
   7      C3                     0.4850
   8      i-C4                   0.2770
   9      n-C4                   0.6680
   10     i-C5                   0.6310
   11     n-C5                   0.5480
   12     C6                     1.1670
   13     C7                     7.7640
   14     C8                    17.5600
   15     C9                    14.4830
   16     C10+                  47.7340
   17     Benzene                0.0370
   18     Toluene                0.9610
   19     E-Benzene              0.2690
   20     Xylenes                5.8420
   21     n-C6                   0.7890
   22     224Trimethylp          0.0110

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

Production Rate : 10.4[bbl/day]
Days of Annual Operation : 365 [days/year]
API Gravity : 53.99
Reid Vapor Pressure : 0.35[psia]

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

-- Emission Summary

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
Total HAPs	2.050	0.468	0.144	0.033

Total HC	18.815	4.296	1.317	0.301
VOCs, C2+	18.582	4.242	1.301	0.297
VOCs, C3+	18.243	4.165	1.277	0.292

Uncontrolled Recovery Info.

Vapor	507.1300 x1E-3	[MSCFD]
HC Vapor	506.7100 x1E-3	[MSCFD]
GOR	48.76	[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	0.009	0.002	0.009	0.002
4	N2	0.000	0.000	0.000	0.000
5	C1	0.234	0.053	0.016	0.004
6	C2	0.339	0.077	0.024	0.005
7	C3	0.720	0.164	0.050	0.012
8	i-C4	0.541	0.124	0.038	0.009
9	n-C4	1.305	0.298	0.091	0.021
10	i-C5	1.509	0.345	0.106	0.024
11	n-C5	1.293	0.295	0.091	0.021
12	C6	2.287	0.522	0.160	0.037
13	C7	4.796	1.095	0.336	0.077
14	C8	2.534	0.579	0.177	0.040
15	C9	0.839	0.192	0.059	0.013
16	C10+	0.374	0.085	0.026	0.006
17	Benzene	0.047	0.011	0.003	0.001
18	Toluene	0.237	0.054	0.017	0.004
19	E-Benzene	0.020	0.005	0.001	0.000
20	Xylenes	0.391	0.089	0.027	0.006
21	n-C6	1.346	0.307	0.094	0.022
22	224Trimethylp	0.005	0.001	0.000	0.000
	Total	18.826	4.298	1.318	0.301

-- Stream Data

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

mol %							
1	H2S	34.80	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000							
2	O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000							
3	CO2	44.01	0.0060	0.0058	0.0000	0.3855	0.0806
0.0827							
4	N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000							
5	C1	16.04	0.4330	0.3950	0.0000	77.8276	5.4768
5.9657							
6	C2	30.07	0.3350	0.3295	0.0000	11.4612	4.5689
4.6155							
7	C3	44.10	0.4850	0.4829	0.0000	4.8059	6.6945
6.6817							
8	i-C4	58.12	0.2770	0.2766	0.0002	1.0606	3.8329
3.8141							
9	n-C4	58.12	0.6680	0.6675	0.0009	1.7768	9.2415
9.1911							
10	i-C5	72.15	0.6310	0.6310	0.0102	0.6344	8.6161
8.5621							
11	n-C5	72.15	0.5480	0.5481	0.0164	0.4049	7.3878
7.3406							
12	C6	86.16	1.1670	1.1674	0.3858	0.2620	11.2214
11.1474							
13	C7	100.20	7.7640	7.7675	6.7869	0.5770	20.3812
20.2474							
14	C8	114.23	17.5600	17.5684	18.2026	0.4101	9.4102
9.3493							
15	C9	128.28	14.4830	14.4901	15.3980	0.1163	2.8100
2.7918							
16	C10+	168.15	47.7340	47.7574	51.3987	0.0182	0.9183
0.9122							
17	Benzene	78.11	0.0370	0.0370	0.0206	0.0057	0.2477
0.2461							
18	Toluene	92.13	0.9610	0.9615	0.9539	0.0409	1.0590
1.0521							
19	E-Benzene	106.17	0.2690	0.2691	0.2840	0.0037	0.0783
0.0778							
20	Xylenes	106.17	5.8420	5.8448	6.1813	0.0707	1.5166
1.5068							
21	n-C6	86.18	0.7890	0.7893	0.3500	0.1377	6.4402
6.3976							
22	224Trimethylp	114.24	0.0110	0.0110	0.0105	0.0007	0.0180
0.0179							
	MW		135.89	135.95	140.49	22.27	77.46
77.09							
	Stream Mole Ratio		1.0000	0.9995	0.9274	0.0005	0.0721
0.0726							
	Heating Value	[BTU/SCF]				1334.20	4248.75
4229.05							
	Gas Gravity	[Gas/Air]				0.77	2.67
2.66							
	Bubble Pt. @ 100F	[psia]	18.49	17.22	0.43		
	RVP @ 100F	[psia]	5.07	4.81	0.43		

Spec. Gravity @ 100F	0.726	0.726	0.730	

```
*****************************************************************************
******
*     Project Setup Information
    *
*****************************************************************************
******
Project File              : \\tsclient\Z\Client\EQT Corporation\West Virginia\WV
Production Wells\153901.0056 WV Wellpads 2015\BIG 192\02 Draft\Attach I - Emission
Calcs\E&P Tank\2015-0902_EQT_BIG192_Sand Separator Tank_v1.1.ept
Flowsheet Selection       : Oil Tank with Separator
Calculation Method        : RVP Distillation
Control Efficiency        : 100.0%
Known Separator Stream    : Low Pressure Oil
Entering Air Composition  : No

Filed Name                : BIG-192 Wellpad - Sand Separator Tank
Well Name                 : Condensate Analysis from 9/12/2014
Date                      : 2015.09.02


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

Separator Pressure        : 80.00[psig]
Separator Temperature     : 60.00[F]
Ambient Pressure          : 14.70[psia]
Ambient Temperature       : 70.00[F]
C10+ SG                   : 0.7861
C10+ MW                   : 168.15

-- Low Pressure Oil
-------------------------------------------------------------------------
   No.    Component             mol %
   1      H2S                    0.0000
   2      O2                     0.0000
   3      CO2                    0.0060
   4      N2                     0.0000
   5      C1                     0.4330
   6      C2                     0.3350
   7      C3                     0.4850
   8      i-C4                   0.2770
   9      n-C4                   0.6680
   10     i-C5                   0.6310
   11     n-C5                   0.5480
   12     C6                     1.1670
   13     C7                     7.7640
   14     C8                    17.5600
   15     C9                    14.4830
   16     C10+                  47.7340
   17     Benzene                0.0370
   18     Toluene                0.9610
   19     E-Benzene              0.2690
   20     Xylenes                5.8420
   21     n-C6                   0.7890
   22     224Trimethylp          0.0110

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

Production Rate : 0.3[bbl/day]
Days of Annual Operation : 365 [days/year]
API Gravity : 53.99
Reid Vapor Pressure : 0.35[psia]

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

-- Emission Summary

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
Total HAPs	0.060	0.014

---------- E&P TANK

Total HC	0.543	0.124
VOCs, C2+	0.536	0.122
VOCs, C3+	0.526	0.120

Uncontrolled Recovery Info.

Vapor	14.6300 x1E-3	[MSCFD]
HC Vapor	14.6200 x1E-3	[MSCFD]
GOR	48.77	[SCF/bbl]

-- Emission Composition

No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
1	H2S	0.000	0.000
2	O2	0.000	0.000
3	CO2	0.000	0.000
4	N2	0.000	0.000
5	C1	0.007	0.002
6	C2	0.010	0.002
7	C3	0.021	0.005
8	i-C4	0.016	0.004
9	n-C4	0.038	0.009
10	i-C5	0.044	0.010
11	n-C5	0.037	0.008
12	C6	0.066	0.015
13	C7	0.138	0.032
14	C8	0.073	0.017
15	C9	0.024	0.005
16	C10+	0.011	0.003
17	Benzene	0.001	0.000
18	Toluene	0.007	0.002
19	E-Benzene	0.001	0.000
20	Xylenes	0.011	0.003
21	n-C6	0.039	0.009
22	224Trimethylp	0.000	0.000
	Total	0.544	0.124

-- Stream Data

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

mol %							
1	H2S	34.80	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000							
2	O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000							
3	CO2	44.01	0.0060	0.0058	0.0000	0.3855	0.0806
0.0827							
4	N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000							
5	C1	16.04	0.4330	0.3950	0.0000	77.8276	5.4768
5.9657							
6	C2	30.07	0.3350	0.3295	0.0000	11.4612	4.5689
4.6155							
7	C3	44.10	0.4850	0.4829	0.0000	4.8059	6.6945
6.6817							
8	i-C4	58.12	0.2770	0.2766	0.0002	1.0606	3.8329
3.8141							
9	n-C4	58.12	0.6680	0.6675	0.0009	1.7768	9.2415
9.1911							
10	i-C5	72.15	0.6310	0.6310	0.0102	0.6344	8.6161
8.5621							
11	n-C5	72.15	0.5480	0.5481	0.0164	0.4049	7.3878
7.3406							
12	C6	86.16	1.1670	1.1674	0.3858	0.2620	11.2214
11.1474							
13	C7	100.20	7.7640	7.7675	6.7869	0.5770	20.3812
20.2474							
14	C8	114.23	17.5600	17.5684	18.2026	0.4101	9.4102
9.3493							
15	C9	128.28	14.4830	14.4901	15.3980	0.1163	2.8100
2.7918							
16	C10+	168.15	47.7340	47.7574	51.3987	0.0182	0.9183
0.9122							
17	Benzene	78.11	0.0370	0.0370	0.0206	0.0057	0.2477
0.2461							
18	Toluene	92.13	0.9610	0.9615	0.9539	0.0409	1.0590
1.0521							
19	E-Benzene	106.17	0.2690	0.2691	0.2840	0.0037	0.0783
0.0778							
20	Xylenes	106.17	5.8420	5.8448	6.1813	0.0707	1.5166
1.5068							
21	n-C6	86.18	0.7890	0.7893	0.3500	0.1377	6.4402
6.3976							
22	224Trimethylp	114.24	0.0110	0.0110	0.0105	0.0007	0.0180
0.0179							
	MW		135.89	135.95	140.49	22.27	77.46
77.09							
	Stream Mole Ratio		1.0000	0.9995	0.9274	0.0005	0.0721
0.0726							
	Heating Value	[BTU/SCF]				1334.20	4248.75
4229.05							
	Gas Gravity	[Gas/Air]				0.77	2.67
2.66							
	Bubble Pt. @ 100F	[psia]	18.49	17.22	0.43		
	RVP @ 100F	[psia]	5.07	4.81	0.43		

	Spec. Gravity @ 100F	0.726	0.726	0.730

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: EQT - BIG192 Wellpad Dehydrator
File Name: Z:\Client\EQT Corporation\West Virginia\WV Production Wells\153901.0056 WV Wellpads 2015\BIG 192\02 Draft\Attach I - Emission Calcs\2014-0715_EQT_BIG192_Dehydrator v1.0.ddf
Date: September 02, 2015

DESCRIPTION:

Description: BIG192 G70 Application

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0335	0.805	0.1469
Ethane	0.0727	1.744	0.3183
Propane	0.0685	1.645	0.3001
Isobutane	0.0207	0.497	0.0907
n-Butane	0.0395	0.947	0.1729
Isopentane	0.0168	0.403	0.0735
n-Pentane	0.0106	0.255	0.0465
n-Hexane	0.0079	0.189	0.0345
Cyclohexane	0.0213	0.510	0.0932
Other Hexanes	0.0194	0.465	0.0848
Heptanes	0.0287	0.690	0.1259
2,2,4-Trimethylpentane	0.0040	0.095	0.0173
Benzene	0.1050	2.520	0.4599
Toluene	0.3658	8.780	1.6024
Ethylbenzene	0.2727	6.546	1.1946
Xylenes	0.3906	9.375	1.7109
C8+ Heavies	1.8498	44.395	8.1021
Total Emissions	3.3275	79.861	14.5746
Total Hydrocarbon Emissions	3.3275	79.861	14.5746
Total VOC Emissions	3.2213	77.312	14.1094
Total HAP Emissions	1.1460	27.504	5.0196
Total BTEX Emissions	1.1342	27.220	4.9677

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.6706	16.094	2.9372
Ethane	1.4533	34.879	6.3654
Propane	1.3705	32.891	6.0026
Isobutane	0.4144	9.945	1.8150
n-Butane	0.7896	18.949	3.4582
Isopentane	0.3358	8.059	1.4708
n-Pentane	0.2124	5.098	0.9303
n-Hexane	0.1576	3.781	0.6901
Cyclohexane	0.4254	10.210	1.8633
Other Hexanes	0.3874	9.298	1.6968

Heptanes	0.5749	13.799	2.5183
2,2,4-Trimethylpentane	0.0791	1.898	0.3464
Benzene	2.0999	50.398	9.1977
Toluene	7.3169	175.606	32.0482
Ethylbenzene	5.4547	130.914	23.8918
Xylenes	7.8121	187.491	34.2171
C8+ Heavies	36.9959	887.901	162.0419
Total Emissions	66.5505	1597.211	291.4910
Total Hydrocarbon Emissions	66.5505	1597.211	291.4910
Total VOC Emissions	64.4266	1546.238	282.1885
Total HAP Emissions	22.9204	550.089	100.3913
Total BTEX Emissions	22.6837	544.410	99.3548

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.5093	12.223	2.2307
Ethane	0.3177	7.625	1.3916
Propane	0.1256	3.015	0.5503
Isobutane	0.0250	0.601	0.1096
n-Butane	0.0360	0.865	0.1578
Isopentane	0.0132	0.316	0.0577
n-Pentane	0.0067	0.160	0.0292
n-Hexane	0.0027	0.065	0.0119
Cyclohexane	0.0019	0.047	0.0085
Other Hexanes	0.0088	0.212	0.0387
Heptanes	0.0048	0.116	0.0212
2,2,4-Trimethylpentane	0.0013	0.032	0.0058
Benzene	0.0012	0.030	0.0054
Toluene	0.0027	0.066	0.0120
Ethylbenzene	0.0012	0.028	0.0051
Xylenes	0.0011	0.027	0.0049
C8+ Heavies	0.0274	0.657	0.1199
Total Emissions	1.0868	26.083	4.7602
Total Hydrocarbon Emissions	1.0868	26.083	4.7602
Total VOC Emissions	0.2598	6.235	1.1379
Total HAP Emissions	0.0103	0.247	0.0450
Total BTEX Emissions	0.0062	0.150	0.0273

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	10.1858	244.458	44.6136
Ethane	6.3543	152.504	27.8320
Propane	2.5127	60.305	11.0057
Isobutane	0.5005	12.011	2.1921
n-Butane	0.7207	17.297	3.1568
Isopentane	0.2633	6.318	1.1531
n-Pentane	0.1331	3.195	0.5830
n-Hexane	0.0542	1.301	0.2374
Cyclohexane	0.0389	0.934	0.1705
Other Hexanes	0.1768	4.242	0.7742
Heptanes	0.0967	2.322	0.4238

2,2,4-Trimethylpentane	0.0265	0.636	0.1161
Benzene	0.0247	0.592	0.1081
Toluene	0.0547	1.314	0.2397
Ethylbenzene	0.0232	0.556	0.1015
Xylenes	0.0222	0.533	0.0973
C8+ Heavies	0.5475	13.141	2.3983
Total Emissions	21.7359	521.661	95.2031
Total Hydrocarbon Emissions	21.7359	521.661	95.2031
Total VOC Emissions	5.1958	124.699	22.7575
Total HAP Emissions	0.2055	4.932	0.9001
Total BTEX Emissions	0.1248	2.995	0.5467

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 70.00 deg. F
Excess Oxygen: 5.00 %
Combustion Efficiency: 95.00 %
Supplemental Fuel Requirement: 3.26e-001 MM BTU/hr

Component	Emitted	Destroyed
Methane	5.00%	95.00%
Ethane	5.00%	95.00%
Propane	5.00%	95.00%
Isobutane	5.00%	95.00%
n-Butane	5.00%	95.00%
Isopentane	5.00%	95.00%
n-Pentane	5.00%	95.00%
n-Hexane	5.00%	95.00%
Cyclohexane	5.00%	95.00%
Other Hexanes	5.00%	95.00%
Heptanes	5.00%	95.00%
2,2,4-Trimethylpentane	5.00%	95.00%
Benzene	5.00%	95.00%
Toluene	5.00%	95.00%
Ethylbenzene	5.00%	95.00%
Xylenes	5.00%	95.00%
C8+ Heavies	5.00%	95.00%

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: 2.91 lbs. H2O/MMSCF

Temperature: 80.0 deg. F
Pressure: 850.0 psig
Dry Gas Flow Rate: 130.0000 MMSCF/day

Glycol Losses with Dry Gas: 0.7710 lb/hr
Wet Gas Water Content: Saturated
Calculated Wet Gas Water Content: 36.11 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio: 2.50 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	8.04%	91.96%
Carbon Dioxide	99.92%	0.08%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.98%	0.02%
Propane	99.97%	0.03%
Isobutane	99.96%	0.04%
n-Butane	99.95%	0.05%
Isopentane	99.95%	0.05%
n-Pentane	99.93%	0.07%
n-Hexane	99.89%	0.11%
Cyclohexane	99.50%	0.50%
Other Hexanes	99.91%	0.09%
Heptanes	99.80%	0.20%
2,2,4-Trimethylpentane	99.92%	0.08%
Benzene	94.99%	5.01%
Toluene	92.72%	7.28%
Ethylbenzene	90.49%	9.51%
Xylenes	86.39%	13.61%
C8+ Heavies	99.58%	0.42%

FLASH TANK

Flash Control: Combustion device
Flash Control Efficiency: 95.00 %
Flash Temperature: 120.0 deg. F
Flash Pressure: 50.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.97%	0.03%
Carbon Dioxide	45.23%	54.77%
Nitrogen	5.77%	94.23%
Methane	6.18%	93.82%
Ethane	18.61%	81.39%
Propane	35.29%	64.71%
Isobutane	45.29%	54.71%
n-Butane	52.28%	47.72%
Isopentane	56.27%	43.73%
n-Pentane	61.67%	38.33%
n-Hexane	74.53%	25.47%
Cyclohexane	91.89%	8.11%
Other Hexanes	68.98%	31.02%
Heptanes	85.67%	14.33%
2,2,4-Trimethylpentane	75.28%	24.72%
Benzene	98.90%	1.10%
Toluene	99.32%	0.68%
Ethylbenzene	99.62%	0.38%
Xylenes	99.75%	0.25%
C8+ Heavies	98.72%	1.28%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	25.99%	74.01%
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	0.89%	99.11%
n-Pentane	0.81%	99.19%
n-Hexane	0.67%	99.33%
Cyclohexane	3.48%	96.52%
Other Hexanes	1.45%	98.55%
Heptanes	0.58%	99.42%
2,2,4-Trimethylpentane	1.99%	98.01%
Benzene	5.06%	94.94%
Toluene	7.96%	92.04%
Ethylbenzene	10.45%	89.55%
Xylenes	12.97%	87.03%
C8+ Heavies	12.17%	87.83%

STREAM REPORTS:

WET GAS STREAM

Temperature: 80.00 deg. F
Pressure: 864.70 psia
Flow Rate: 5.42e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.61e-002	1.96e+002
Carbon Dioxide	1.49e-001	9.39e+002
Nitrogen	3.29e-001	1.32e+003
Methane	8.56e+001	1.96e+005
Ethane	1.05e+001	4.51e+004
Propane	2.13e+000	1.34e+004
Isobutane	2.75e-001	2.28e+003
n-Butane	3.41e-001	2.83e+003
Isopentane	1.10e-001	1.13e+003
n-Pentane	4.86e-002	5.01e+002
n-Hexane	1.53e-002	1.88e+002
Cyclohexane	7.69e-003	9.25e+001
Other Hexanes	5.37e-002	6.61e+002
Heptanes	2.30e-002	3.29e+002
2,2,4-Trimethylpentane	7.69e-003	1.26e+002
Benzene	3.80e-003	4.24e+001
Toluene	7.69e-003	1.01e+002

Ethylbenzene	3.80e-003	5.76e+001
Xylenes	3.80e-003	5.76e+001
C8+ Heavies	3.64e-001	8.85e+003
Total Components	100.00	2.74e+005

DRY GAS STREAM

Temperature: 80.00 deg. F
Pressure: 864.70 psia
Flow Rate: 5.42e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.12e-003	1.57e+001
Carbon Dioxide	1.49e-001	9.39e+002
Nitrogen	3.29e-001	1.32e+003
Methane	8.56e+001	1.96e+005
Ethane	1.05e+001	4.51e+004
Propane	2.13e+000	1.34e+004
Isobutane	2.75e-001	2.28e+003
n-Butane	3.41e-001	2.83e+003
Isopentane	1.10e-001	1.13e+003
n-Pentane	4.86e-002	5.00e+002
n-Hexane	1.53e-002	1.88e+002
Cyclohexane	7.66e-003	9.21e+001
Other Hexanes	5.37e-002	6.60e+002
Heptanes	2.30e-002	3.28e+002
2,2,4-Trimethylpentane	7.69e-003	1.25e+002
Benzene	3.61e-003	4.03e+001
Toluene	7.14e-003	9.39e+001
Ethylbenzene	3.44e-003	5.21e+001
Xylenes	3.28e-003	4.98e+001
C8+ Heavies	3.63e-001	8.82e+003
Total Components	100.00	2.74e+005

LEAN GLYCOL STREAM

Temperature: 80.00 deg. F
Flow Rate: 7.49e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.83e+001	4.14e+003
Water	1.50e+000	6.32e+001
Carbon Dioxide	1.85e-012	7.80e-011
Nitrogen	1.95e-013	8.20e-012
Methane	8.65e-018	3.65e-016
Ethane	8.74e-008	3.68e-006
Propane	3.75e-009	1.58e-007
Isobutane	6.52e-010	2.74e-008
n-Butane	8.89e-010	3.75e-008
Isopentane	7.15e-005	3.01e-003
n-Pentane	4.12e-005	1.74e-003
n-Hexane	2.53e-005	1.06e-003
Cyclohexane	3.64e-004	1.53e-002
Other Hexanes	1.35e-004	5.70e-003
Heptanes	8.01e-005	3.38e-003

2,2,4-Trimethylpentane	3.82e-005	1.61e-003
Benzene	2.66e-003	1.12e-001
Toluene	1.50e-002	6.33e-001
Ethylbenzene	1.51e-002	6.37e-001
Xylenes	2.76e-002	1.16e+000
C8+ Heavies	1.22e-001	5.13e+000
Total Components	100.00	4.21e+003

RICH GLYCOL STREAM

Temperature: 80.00 deg. F
Pressure: 864.70 psia
Flow Rate: 8.04e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.24e+001	4.14e+003
Water	5.43e+000	2.43e+002
Carbon Dioxide	1.74e-002	7.80e-001
Nitrogen	1.82e-003	8.16e-002
Methane	2.42e-001	1.09e+001
Ethane	1.74e-001	7.81e+000
Propane	8.67e-002	3.88e+000
Isobutane	2.04e-002	9.15e-001
n-Butane	3.37e-002	1.51e+000
Isopentane	1.34e-002	6.02e-001
n-Pentane	7.75e-003	3.47e-001
n-Hexane	4.75e-003	2.13e-001
Cyclohexane	1.07e-002	4.80e-001
Other Hexanes	1.27e-002	5.70e-001
Heptanes	1.51e-002	6.75e-001
2,2,4-Trimethylpentane	2.39e-003	1.07e-001
Benzene	4.99e-002	2.24e+000
Toluene	1.79e-001	8.00e+000
Ethylbenzene	1.36e-001	6.11e+000
Xylenes	2.01e-001	9.00e+000
C8+ Heavies	9.52e-001	4.27e+001
Total Components	100.00	4.48e+003

FLASH TANK OFF GAS STREAM

Temperature: 120.00 deg. F
Pressure: 64.70 psia
Flow Rate: 3.62e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	3.56e-001	6.12e-002
Carbon Dioxide	1.02e+000	4.27e-001
Nitrogen	2.88e-001	7.69e-002
Methane	6.65e+001	1.02e+001
Ethane	2.21e+001	6.35e+000
Propane	5.97e+000	2.51e+000
Isobutane	9.02e-001	5.00e-001

n-Butane	1.30e+000	7.21e-001
Isopentane	3.82e-001	2.63e-001
n-Pentane	1.93e-001	1.33e-001
n-Hexane	6.59e-002	5.42e-002
Cyclohexane	4.84e-002	3.89e-002
Other Hexanes	2.15e-001	1.77e-001
Heptanes	1.01e-001	9.67e-002
2,2,4-Trimethylpentane	2.43e-002	2.65e-002
Benzene	3.31e-002	2.47e-002
Toluene	6.22e-002	5.47e-002
Ethylbenzene	2.29e-002	2.32e-002
Xylenes	2.19e-002	2.22e-002
C8+ Heavies	3.37e-001	5.48e-001
Total Components	100.00	2.23e+001

FLASH TANK GLYCOL STREAM

Temperature: 120.00 deg. F
Flow Rate: 7.99e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.29e+001	4.14e+003
Water	5.45e+000	2.43e+002
Carbon Dioxide	7.91e-003	3.53e-001
Nitrogen	1.06e-004	4.71e-003
Methane	1.50e-002	6.71e-001
Ethane	3.26e-002	1.45e+000
Propane	3.07e-002	1.37e+000
Isobutane	9.29e-003	4.14e-001
n-Butane	1.77e-002	7.90e-001
Isopentane	7.60e-003	3.39e-001
n-Pentane	4.80e-003	2.14e-001
n-Hexane	3.56e-003	1.59e-001
Cyclohexane	9.89e-003	4.41e-001
Other Hexanes	8.82e-003	3.93e-001
Heptanes	1.30e-002	5.78e-001
2,2,4-Trimethylpentane	1.81e-003	8.07e-002
Benzene	4.96e-002	2.21e+000
Toluene	1.78e-001	7.95e+000
Ethylbenzene	1.37e-001	6.09e+000
Xylenes	2.01e-001	8.98e+000
C8+ Heavies	9.45e-001	4.21e+001
Total Components	100.00	4.46e+003

FLASH GAS EMISSIONS

Flow Rate: 1.38e+003 scfh
Control Method: Combustion Device
Control Efficiency: 95.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.14e+001	4.02e+001
Carbon Dioxide	3.72e+001	5.96e+001
Nitrogen	7.54e-002	7.69e-002

Methane	8.73e-001	5.09e-001
Ethane	2.90e-001	3.18e-001
Propane	7.83e-002	1.26e-001
Isobutane	1.18e-002	2.50e-002
n-Butane	1.70e-002	3.60e-002
Isopentane	5.01e-003	1.32e-002
n-Pentane	2.54e-003	6.66e-003
n-Hexane	8.64e-004	2.71e-003
Cyclohexane	6.35e-004	1.95e-003
Other Hexanes	2.82e-003	8.84e-003
Heptanes	1.33e-003	4.84e-003
2,2,4-Trimethylpentane	3.19e-004	1.32e-003
Benzene	4.34e-004	1.23e-003
Toluene	8.16e-004	2.74e-003
Ethylbenzene	3.00e-004	1.16e-003
Xylenes	2.88e-004	1.11e-003
C8+ Heavies	4.42e-003	2.74e-002
Total Components	100.00	1.01e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 4.03e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.41e+001	1.80e+002
Carbon Dioxide	7.55e-002	3.53e-001
Nitrogen	1.58e-003	4.71e-003
Methane	3.94e-001	6.71e-001
Ethane	4.55e-001	1.45e+000
Propane	2.93e-001	1.37e+000
Isobutane	6.72e-002	4.14e-001
n-Butane	1.28e-001	7.90e-001
Isopentane	4.38e-002	3.36e-001
n-Pentane	2.77e-002	2.12e-001
n-Hexane	1.72e-002	1.58e-001
Cyclohexane	4.76e-002	4.25e-001
Other Hexanes	4.23e-002	3.87e-001
Heptanes	5.40e-002	5.75e-001
2,2,4-Trimethylpentane	6.52e-003	7.91e-002
Benzene	2.53e-001	2.10e+000
Toluene	7.48e-001	7.32e+000
Ethylbenzene	4.84e-001	5.45e+000
Xylenes	6.93e-001	7.81e+000
C8+ Heavies	2.05e+000	3.70e+001
Total Components	100.00	2.47e+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	6.79e+000	3.35e-002
Ethane	7.85e+000	7.27e-002
Propane	5.05e+000	6.85e-002
Isobutane	1.16e+000	2.07e-002
n-Butane	2.21e+000	3.95e-002
Isopentane	7.56e-001	1.68e-002
n-Pentane	4.78e-001	1.06e-002
n-Hexane	2.97e-001	7.88e-003
Cyclohexane	8.21e-001	2.13e-002
Other Hexanes	7.30e-001	1.94e-002
Heptanes	9.32e-001	2.87e-002
2,2,4-Trimethylpentane	1.12e-001	3.95e-003
Benzene	4.37e+000	1.05e-001
Toluene	1.29e+001	3.66e-001
Ethylbenzene	8.34e+000	2.73e-001
Xylenes	1.19e+001	3.91e-001
C8+ Heavies	3.53e+001	1.85e+000
Total Components	100.00	3.33e+000

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

Identification

User Identification:	BIG 192 Liquid Loading
City:	
State:	West Virginia
Company:	EQT Production, LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	400 BBL

Tank Dimensions

Shell Height (ft):	20.00
Diameter (ft):	12.00
Liquid Height (ft) :	20.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	16,800.00
Turnovers:	3,623.31
Net Throughput(gal/yr):	60,871,608.00
Is Tank Heated (y/n):	N

Paint Characteristics

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

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

Vacuum Settings (psig):	-0.30
Pressure Settings (psig)	0.70

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

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

BIG 192 Liquid Loading - Vertical Fixed Roof Tank
, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Condensate	All	55.41	46.54	64.27	51.30	0.2217	0.1658	0.2935	19.2883			18.82	
Benzene						1.0267	0.7943	1.3132	78.1100	0.0000	0.0000	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Butane (-n)						0.4614	0.3889	0.5438	58.1200	0.0002	0.0004	58.12	Option 2: A=5.09536, B=935.86, C=238.73
Decane (-n)						0.0301	0.0245	0.0369	142.2900	0.0295	0.0039	142.29	Option 1: VP50 = .026411 VP60 = .033211
Ethylbenzene						0.0923	0.0669	0.1257	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Heptane (-n)						0.5323	0.4043	0.6943	100.2000	0.0028	0.0066	100.20	Option 3: A=37358, B=8.2585
Hexane (-n)						1.6957	1.3330	2.1360	86.1700	0.0006	0.0046	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopentane						9.0329	7.1932	11.0836	72.1500	0.0002	0.0068	72.15	Option 1: VP50 = 7.889 VP60 = 10.005
methane						100.7917	87.8791	115.0985	44.0956	0.0000	0.0133	44.10	Option 2: A=7.3408624923, B=1104.2267744, C=291.70993941
Nonane (-n)						0.0588	0.0475	0.0729	128.2600	0.0066	0.0017	128.26	Option 1: VP50 = .051285 VP60 = .065278
Octane (-n)						0.1303	0.1035	0.1637	114.2300	0.0071	0.0041	114.23	Option 1: VP50 = .112388 VP60 = .145444
Pentane (-n)						6.1673	5.0301	7.5097	72.1500	0.0001	0.0041	72.15	Option 3: A=27691, B=7.558
Propane (-n)						100.7917	87.8791	115.0985	44.0956	0.0001	0.0532	44.10	Option 2: A=7.340862493, B=1104.2267744, C=291.70993941
Toluene						0.2857	0.2141	0.3766	92.1300	0.0003	0.0004	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Water						0.2153	0.1602	0.2863	18.0150	0.9500	0.9002	18.02	Option 1: VP50 = .178 VP60 = .247
Xylene (-o)						0.0601	0.0431	0.0827	106.1700	0.0023	0.0006	106.17	Option 2: A=6.998, B=1474.679, C=213.69

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

BIG 192 Liquid Loading - Vertical Fixed Roof Tank , West Virginia

Annual Emission Calcaulations	
Standing Losses (lb):	1.2368
Vapor Space Volume (cu ft):	1,145.1105
Vapor Density (lb/cu ft):	0.0008
Vapor Space Expansion Factor:	0.0043
Vented Vapor Saturation Factor:	0.8937
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,145.1105
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	10.1250
Tank Shell Height (ft):	20.0000
Average Liquid Height (ft):	10.0000
Roof Outage (ft):	0.1250
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1250
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0625
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0008
Vapor Molecular Weight (lb/lb-mole):	19.2883
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2217
Daily Avg. Liquid Surface Temp. (deg. R):	515.0759
Daily Average Ambient Temp. (deg. F):	49.0583
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	510.9683
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,193.8870
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0043
Daily Vapor Temperature Range (deg. R):	35.4636
Daily Vapor Pressure Range (psia):	0.1277
Breather Vent Press. Setting Range(psia):	1.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2217
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1658
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.2935
Daily Avg. Liquid Surface Temp. (deg R):	515.0759
Daily Min. Liquid Surface Temp. (deg R):	506.2100
Daily Max. Liquid Surface Temp. (deg R):	523.9417
Daily Ambient Temp. Range (deg. R):	24.1833
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8937
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2217
Vapor Space Outage (ft):	10.1250
Working Losses (lb):	1,084.3214
Vapor Molecular Weight (lb/lb-mole):	19.2883
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2217
Annual Net Throughput (gal/yr.):	60,871,608.0000
Annual Turnovers:	3,623.3100
Turnover Factor:	0.1749
Maximum Liquid Volume (gal):	16,800.0000
Maximum Liquid Height (ft):	20.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	1,085.5582

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

Emissions Report for: Annual

BIG 192 Liquid Loading - Vertical Fixed Roof Tank , West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Condensate	1,084.32	1.24	1,085.56
Butane (-n)	0.44	0.00	0.44
Pentane (-n)	4.42	0.01	4.42
Hexane (-n)	4.94	0.01	4.94
Heptane (-n)	7.16	0.01	7.17

Benzene	0.05	0.00	0.05
Toluene	0.45	0.00	0.45
Octane (-n)	4.44	0.01	4.45
Nonane (-n)	1.85	0.00	1.85
Decane (-n)	4.23	0.00	4.24
Propane (-n)	57.72	0.07	57.79
methane	14.43	0.02	14.45
Isopentane	7.33	0.01	7.34
Ethylbenzene	0.05	0.00	0.05
Xylene (-o)	0.65	0.00	0.66
Water	976.16	1.11	977.27

ATTACHMENT J

Class I Legal Advertisement

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that EQT Production has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a modification to a Class II General Permit (G70-A082) for an existing natural gas production wellpad BIG-192. The facility is a natural gas production wellpad operation located off Route 20 in Wetzel County, West Virginia, about 2.5 miles northwest of Smithfield WV at 39.52757°, -80.58259°.

The applicant estimates the potential increase to discharge the following Regulated Air Pollutants on a facility-wide basis after the change will be:

Pollutant	Emissions in tpy (tons per year)
NOx	7.08
CO	5.95
VOC	18.91
SO_2	0.04
PM	35.12
Total HAPs	0
Carbon Dioxide Equivalents (CO_2e)	9,782

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

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

Dated this the XX day of October, 2015.

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

ATTACHMENT K

Electronic Submittal

ATTACHMENT L

General Permit Registration Application Fee

ATTACHMENT M

Siting Criteria Waiver (*not applicable*)

ATTACHMENT N

Material Safety Data Sheet (*not applicable*)

ATTACHMENT O

Emission Summary Sheet

G70-A EMISSIONS SUMMARY SHEET

Emission Point ID No.	Emission Point Type[1]	Emission Unit Vented Through This Point		Air Pollution Control Device		All Regulated Pollutants - Chemical Name/CAS[2] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [3]		Maximum Potential Controlled Emissions [4]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [5]
		ID No.	Source	ID No.	Device Type		lb/hr	ton/yr	lb/hr	ton/yr		
C001[1]	Upward Vertical Stack	S001-S012 S026-S029 S038-S041, S048, S037	Produced Fluid Tanks, Dehy Drip Tank, Liquid Loading, Combustor (11.66 MMBtu/hr)	C001	Enclosed Combustor	VOC NO_X CO PM SO_2 CO_2e HAP	42.19 1.01 0.85 0.08 0.01 1,401 4.69	184.77 4.42 3.71 0.34 0.03 6,137 20.55	2.98 1.01 0.85 0.08 0.01 1,376 0.33	13.04 4.42 3.71 0.34 0.03 6,028 1.44	Gas/Vapor	AP-42, E&P TANK
C002[1]	Upward Vertical Stack	S001-S012 S026-S029 S038-S041, S048, S037	Produced Fluid Tanks, Dehy Drip Tank, Liquid Loading, Combustor (11.66 MMBtu/hr)	C002	Enclosed Combustor	VOC NO_X CO PM SO_2 CO_2e HAP	42.19 1.01 0.85 0.08 0.01 1,401 4.69	184.77 4.42 3.71 0.34 0.03 6,137 20.55	2.98 1.01 0.85 0.08 0.01 1,376 0.33	13.04 4.42 3.71 0.34 0.03 6,028 1.44	Gas/Vapor	AP-42, E&P TANK
C004[2]	Upward Vertical Stack	S001-S012 S026-S029 S038-S041, S048, S037	Produced Fluid Tanks, Dehy Drip Tank, Liquid Loading, Combustor (18.75 MMBtu/hr)	C004	Enclosed Combustor	VOC NO_X CO PM SO_2 CO_2e HAP	84.35 1.62 1.36 0.12 0.01 2,231 9.38	369.45 7.09 5.95 0.54 0.04 9,774 41.10	5.94 1.62 1.36 0.12 0.01 2,207 0.66	25.99 7.09 5.95 0.54 0.04 9,665 2.88	Gas/Vapor	AP-42, E&P TANK
E013-E023 E030-E034 E043-E044 (Each)	Upward Vertical Stack	S013-S023 S030-S034 S043-S044	Line Heaters	None	---	NO_X CO PM SO_2 VOC CO_2e HAPs	0.13 0.11 0.01 <0.01 <0.01 180 <0.01	0.58 0.49 0.04 <0.01 0.03 789 0.01	0.13 0.11 0.01 <0.01 0.01 180 <0.01	0.58 0.49 0.04 <0.01 0.03 789 0.01	Gas/Vapor	AP-42
E024-E025 E045-E047 (Total – All Units)	Upward Vertical Stack	S024-S025 S045-S047	TEGs	None	---	NO_X CO PM SO_2 VOC CO_2e HAPs	<0.01 <0.01 <0.01 <0.01 <0.01 11 <0.01	0.04 0.03 <0.01 <0.01 <0.01 50 <0.01	<0.01 <0.01 <0.01 <0.01 <0.01 11 <0.01	0.04 0.03 <0.01 <0.01 <0.01 50 <0.01	Gas/Vapor	AP-42

E036	Upward Vertical Stack	S036	Reboiler	None	---	NO_X CO PM SO_2 VOC CO_2e HAPs	0.20 0.17 0.02 <0.01 0.01 270 <0.01	0.87 0.73 0.07 0.01 0.05 1,184 0.02	0.20 0.17 0.02 <0.01 0.01 270 <0.01	0.87 0.73 0.07 0.01 0.05 1,184 0.02	Gas/Vapor	AP-42
E037 (Uncaptured)	Fugitive	S037	Liquid Loading	None	---	VOC HAPs	0.96 0.02	4.20 0.10	0.29 0.01	1.26 0.03	Gas/Vapor	AP-42
E042	Upward Vertical Stack	S042	Sand Separator Tank	None	---	VOC HAPs	0.012 0.01	0.53 0.06	0.12 0.01	0.53 0.06	Gas/Vapor	E&P TANK
C003	Upward Vertical Stack	S035, C003	Dehy, Combustor (8.33 MMBtu/hr)	C003	Enclosed Combustor	VOC NO_X CO PM SO_2 CO_2e HAPs	69.62 0.72 0.60 0.05 <0.01 979 23.13	304.95 3.15 2.64 0.24 0.02 4,287 101.29	3.48 0.72 0.61 0.05 <0.01 1,058 1.16	15.25 3.16 2.66 0.24 0.02 4,634 5.06	Gas/Vapor	GLY-Calc, AP-42

1. Emissions from the combustors are the total from all sources routed to the combustors divided evenly between the combustors. Note that emissions can be routed to one or the other combustor.
2. Emissions from the combustor are the total from all sources routed to the combustor and assumes the other combustors are not operating.

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

1 Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.
2 List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS2, VOCs, H2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO2 and methane), etc. **DO NOT LIST** H2, H2O, N2, O2, and Noble Gases
3 Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
4 Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
5 Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; M = modeling; O = other (specify).