



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

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

Alex Bosiljevac
Environmental Coordinator

January 19, 2016

CERTIFIED MAIL # 7015 0640 0000 9694 3017

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

**RE: G70B Permit Modification
EQT Production Company
BIG-177 Natural Gas Production Site**

Dear Mr. Durham,

Enclosed are two electronic copies and one original hard copy of a proposed modification to the G70-B General Air Permit for the BIG-177 Natural Gas Production Well Site. A legal advertisement will be published in the next few days and proof of publication will be forwarded as soon as it is received. Please contact me for payment of the application fee by credit card.

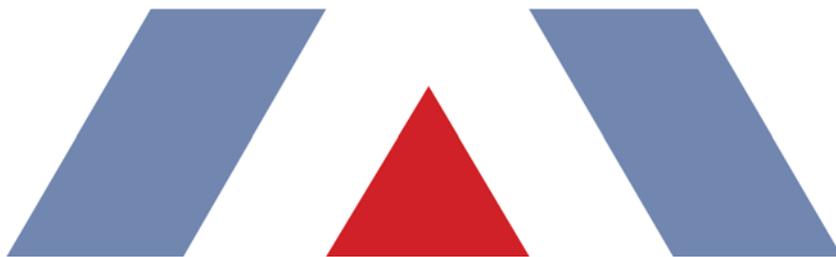
If you have any questions concerning this permit application, please contact me at (412) 395-3699 or by email at abosiljevac@eqt.com.

Sincerely,

A handwritten signature in blue ink, appearing to read 'RAB' with a large, sweeping flourish extending to the right.

Alex Bosiljevac
EQT Corporation

Enclosures



PROJECT REPORT

**EQT Production
BIG-177 Pad**

G70-B Permit Application



Where energy meets innovation.

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

January 2016



Environmental solutions delivered uncommonly well

TABLE OF CONTENTS

1. INTRODUCTION	4
1.1. FACILITY AND PROJECT DESCRIPTION	4
1.2. SOURCE STATUS	4
1.3. G70-B APPLICATION ORGANIZATION	4
2. SAMPLE EMISSION SOURCE CALCULATIONS	6
3. REGULATORY DISCUSSION	7
3.1. Prevention of Significant Deterioration (PSD) Source Classification	7
3.2. Title V Operating Permit Program	7
3.3. New Source Performance Standards	7
3.3.1. NSPS Subparts D, Da, Db, and Dc	8
3.3.2. NSPS Subparts K, Ka, and Kb	8
3.3.3. NSPS Subpart 0000—Crude Oil and Natural Gas Production, Transmission, and Distribution	8
3.3.4. NSPS Subpart 0000a—Crude Oil and Natural Gas Facilities	8
3.3.5. Non-Applicability of All Other NSPS	9
3.4. National Emission Standards for Hazardous Air Pollutants (NESHAP)	9
3.4.1. 40 CFR 63 Subpart HH – Oil and Natural Gas Production Facilities	10
3.4.2. 40 CFR 63 Subpart JJJJJ – Industrial, Commercial, and Institutional Boilers	10
3.5. West Virginia SIP Regulations	10
3.5.1. 45 CSR 2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers	10
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	10
3.5.3. 45 CSR 6: Control of Air Pollution from the Combustion of Refuse	10
3.5.4. 45 CSR 16: Standards of Performance for New Stationary Sources	11
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	11
3.5.6. 45 CSR 21-28: Petroleum Liquid Storage in Fixed Roof Tanks	11
3.5.7. 45 CSR 34: Emissions Standards for Hazardous Air Pollutants	11
3.5.8. Non-Applicability of Other SIP Rules	11
4. G70-B APPLICATION FORMS	12
ATTACHMENT A: SINGLE SOURCE DETERMINATION	
ATTACHMENT B: SITING CRITERIA WAIVER (NOT APPLICABLE)	
ATTACHMENT C: BUSINESS CERTIFICATE	
ATTACHMENT D: PROCESS FLOW DIAGRAM	
ATTACHMENT E: PROCESS DESCRIPTION	
ATTACHMENT F: PLOT PLAN	

ATTACHMENT G: AREA MAP
ATTACHMENT H: APPLICABILITY FORM
ATTACHMENT I: EMISSION UNITS TABLE
ATTACHMENT J: FUGITIVE EMISSIONS SUMMARY SHEET
ATTACHMENT K: GAS WELL DATA SHEET
ATTACHMENT L: STORAGE VESSEL DATA SHEET
ATTACHMENT M: HEATERS DATA SHEET
ATTACHMENT N: ENGINES DATA SHEET (NOT APPLICABLE)
ATTACHMENT O: TRUCK LOADING DATA SHEET
ATTACHMENT P: GLYCOL DEHYDRATOR DATA SHEET (NOT APPLICABLE)
ATTACHMENT Q: PNEUMATIC CONTROLLER DATA SHEET (NOT APPLICABLE)
ATTACHMENT R: AIR POLLUTION CONTROL DEVICE DATA SHEET
ATTACHMENT S: EMISSION CALCULATIONS
ATTACHMENT T: EMISSION SUMMARY SHEET
ATTACHMENT U: CLASS I LEGAL ADVERTISEMENT
ATTACHMENT V: GENERAL PERMIT REGISTRATION APPLICATION FEE

1. INTRODUCTION

EQT Production Company (EQT) is submitting this Class II General Permit (G70-B) application to the West Virginia Department of Environmental Protection (WVDEP) for the construction and operation of a new natural gas production well pad, BIG-177, to be located in Wetzel County, West Virginia.

1.1. FACILITY AND PROJECT DESCRIPTION

The BIG-177 pad is a natural gas production facility that will consist of seven (7) natural gas wells (six (6) Marcellus Shale wells and one (1) Utica Shale well). Natural gas and liquids (including water and condensate) are extracted from deposits underneath the surface. Natural gas is transported from the well to a gas line for additional processing and compression, as necessary. The liquids produced are stored in storage vessels.

This application seeks to permit the following equipment at the BIG-177 pad:

- > Eight (8) 400 barrel (bbl) storage tanks for condensate/water (produced fluids) controlled by one (1) of the two (2) enclosed combustors;
- > One (1) 140 bbl storage tank for sand and produced fluids;
- > Two (2) thermoelectric generators (TEG) each rated at 0.013 MMBtu/hr ;
- > Two (2) enclosed combustors, each rated at 11.66 MMBtu/hr;
- > Ten (10) line heaters, each rated at 1.54 MMBtu/hr (heat input);
- > Produced fluid truck loading, and
- > Associated piping and components

A process flow diagram is included as Attachment D.

1.2. SOURCE STATUS

WVDEP must make stationary source determinations on a case-by-case basis using the guidance under the Clean Air Act (CAA) and EPA's and WVDEP's implementing regulations. The definition of stationary source in 40 CFR 51.166(b) includes the following:

“(6) Building, structure, facility, or installation means all of the pollutant emitting activities which belong to the same industrial grouping, are located on or more contiguous or adjacent properties, and are under control of the same person (or persons under common control).”

Other additional pollutant emitting facilities should be aggregated with the proposed BIG-177 Pad for air permitting purposes if, and only if, all three elements of the “stationary source” definition above are fulfilled.

There are no EQT facilities within a one-mile radius of the BIG-177 pad. The nearest wellpad, BIG-7, is located approximately 1.8 miles west of BIG-177. Therefore, the BIG-177 pad should be considered a separate stationary source with respect to permitting programs, including Title V and Prevention of Significant Deterioration (PSD). Additional information is included as Attachment A. As discussed in this application, the facility is a minor source of air emissions with respect to New Source Review (NSR) and Title V permitting. Refer to the regulatory discussion section of Attachment B for detailed discussion regarding applicable requirements and compliance demonstration methodology.

1.3. G70-B APPLICATION ORGANIZATION

This West Virginia Code of State Regulations, Title 45 (CSR) Series 13 (45 CSR 13) G70-B permit application is

organized as follows:

- > Section 2: Sample Emission Source Calculations;
- > Section 3: Regulatory Discussion;
- > Section 4: G70-B Application Form;
- > Attachment A: Single Source Determination
- > Attachment B: Siting Criteria Waiver **(Not Applicable)**;
- > Attachment C: Business Certificate;
- > Attachment D: Process Flow Diagram;
- > Attachment E: Process Description;
- > Attachment F: Plot Plan;
- > Attachment G: Area Map;
- > Attachment H: Applicability Form;
- > Attachment I: Emission Units Table;
- > Attachment J: Fugitive Emissions Summary Sheet;
- > Attachment K: Gas Well Data Sheet;
- > Attachment L: Storage Vessel Data Sheet
- > Attachment M: Heaters Data Sheet
- > Attachment N: Engines Data Sheet **(Not Applicable)**;
- > Attachment O: Truck Loading Data Sheet;
- > Attachment P: Glycol Dehydrator Data Sheet **(Not Applicable)**;
- > Attachment Q: Pneumatic Controller Data Sheet **(Not Applicable)**;
- > Attachment R: Air Pollution Control Device Data Sheet;
- > Attachment S: Emission Calculations;
- > Attachment T: Emission Summary Sheet;
- > Attachment U: Class I Legal Advertisement; and
- > Attachment V: General Permit Registration Application Fee.

2. SAMPLE EMISSION SOURCE CALCULATIONS

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

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

- > **Line Heaters, Enclosed Combustors and TEGs:** Potential emissions of criteria pollutants and HAPs are calculated using U.S. EPA's AP-42 factors for natural gas external combustion.¹ These calculations assume a site-specific heat content of natural gas. Greenhouse gas emissions are calculated according to 40 CFR 98 Subpart C.² Please note that potential emissions of NO_x, CO, PM, SO₂ and GHGs from the combustors are also calculated according to the aforementioned methodologies.
- > **Fugitive Equipment Leaks:** Emissions of VOC and HAPs from leaking equipment components have been estimated using facility estimated component counts and types along with emission factors from the *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. Greenhouse gas emissions from component leaks are calculated according to the procedures in 40 CFR 98 Subpart W.³
- > **Storage Tanks:** Working, breathing and flashing emissions of VOC and HAPs from the storage tanks at the facility are calculated using Bryan Research & Engineering ProMax® Software. Controlled calculations assume an overall control efficiency (capture and destruction) of 98%. The throughput for the produced fluids tanks are based on the maximum annualized monthly condensate and produced water at the BIG-7 well pad (i.e., the maximum monthly throughput for the pad times 12). The composition for the analysis was from a sample taken at BIG-7. Emissions of VOC and HAPs from the sand separator tank are calculated using E&P TANK v2.0. The produced fluids throughput is calculated as follows:
$$\text{Throughput} \left(\frac{\text{bbl}}{\text{day}} \right) = \left(\text{Condensate Throughput} \left(\frac{\text{bbl}}{\text{month}} \right) + \left(\text{Produced Water Throughput} \left(\frac{\text{bbl}}{\text{month}} \right) * \frac{12 \left(\frac{\text{months}}{\text{year}} \right)}{365 \left(\frac{\text{days}}{\text{year}} \right)} \right) \right)$$
- > **Tank Truck Loading:** Uncontrolled emissions of VOC and HAPs from the loading of organic liquids from storage tanks to tank truck are calculated using Bryan Research Engineering ProMax® Software. Truck loading is controlled by the enclosed combustors. U.S. EPA's AP-42 Chapter 5 Section 2 factors were used for capture efficiency.⁴
- > **Haul Roads:** Fugitive dust emitted from facility roadways has been estimated using projected vehicle miles traveled along with U.S. EPA's AP-42 factors for unpaved haul roads.⁵

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

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

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

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

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

3. REGULATORY DISCUSSION

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

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

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

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

3.1. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) SOURCE CLASSIFICATION

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

3.2. TITLE V OPERATING PERMIT PROGRAM

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in West Virginia Code of State Regulations (CSR) 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP and 100 tpy of all other regulated pollutants.⁶ The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility after the proposed project. Therefore, the wellpad is not a major source for Title V purposes.

3.3. NEW SOURCE PERFORMANCE STANDARDS

New Source Performance Standards (NSPS), located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable

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

provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the wellpad. The following NSPS could potentially apply to the wellpad:

- > 40 CFR Part 60 Subparts D/Da/Db/Dc – Steam Generating Units
- > 40 CFR Part 60 Subpart K/Ka/Kb – Storage Vessels for Petroleum Liquids/Volatile Organic Liquids
- > 40 CFR Part 60 Subpart OOOO – Crude Oil and Natural Gas Production, Transmission, and Distribution
- > 40 CFR Part 60 Subpart OOOOa – Crude Oil and Natural Gas Facilities

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 m³ (~19,813 gallons). All of the tanks at the wellpad have a capacity of 19,813 gallons or less. As such, Subparts K, Ka, and Kb do not apply to the storage tanks at the wellpad.

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

Subpart OOOO, Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution, applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011 (see clarification below regarding dates). This NSPS was published in the Federal Register on August 16, 2012, and subsequently amended. Although there are sources proposed to be installed that could potentially be subject to this regulation, due to the anticipated installation dates, they will not be subject to the rule. This is due to the most recent proposed developments related to the rule, which are the inclusion of an end date for applicability to Subpart OOOO (September 18, 2015) and the promulgation of 40 CFR 60 Subpart OOOOa.⁷ The potential applicability of Subpart OOOOa is discussed in the following section.

3.3.4. NSPS Subpart OOOOa—Crude Oil and Natural Gas Facilities

Subpart OOOOa, Standards of Standards of Performance for Crude Oil and Natural Gas Facilities, will apply to affected facilities that commenced construction, reconstruction, or modification after September 18, 2015. This regulation has yet to be finalized. The currently proposed version of the rule includes provisions for the following facilities:

- > Hydraulically fractured wells;

⁷ September 18, 2015 publication in Federal Register: <https://www.federalregister.gov/articles/2015/09/18/2015-21023/oil-and-natural-gas-sector-emission-standards-for-new-and-modified-sources>

- > Centrifugal compressors located between the wellhead and the point of custody transfer to the natural gas distribution segment;
- > Reciprocating compressors located between the wellhead and the point of custody transfer to the natural gas distribution segment;
- > Continuous bleed natural gas-driven pneumatic controllers with a bleed rate of > 6 scfh located in the production, gathering, processing, or transmission and storage segments (excluding natural gas processing plants);
- > Continuous bleed natural gas-driven pneumatic controllers located at natural gas processing plants;
- > Pneumatic pumps located in the production, gathering, processing, or transmission and storage segments;
- > Storage vessels located in the production, gathering, processing, or transmission and storage segments;
- > The collection of fugitive emissions components at a well site;
- > The collection of fugitive emissions components at a compressor station; and
- > Sweetening units located onshore that process natural gas produced from either onshore or offshore wells.

Based on the current version of the proposed rule, the following paragraphs describe the potential applicability of the facilities to be located at the proposed facility.

There will be eight (8) produced fluid storage vessels 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-B permit. As such, per 60.5365a(e), the tanks will not be storage vessel affected facilities under the rule.

EQT will be required to monitor all fugitive emission components (ex. connectors, flanges, etc.) with an optical gas imaging (OGI) device, and repair all sources of fugitive emissions in accordance with the rule. EQT must also develop a corporate-wide monitoring plan and a site specific monitoring plan (or one plan that incorporates all required elements), and conduct surveys on a semi-annual basis. EQT is also subject to the applicable recordkeeping and reporting requirements of the rule.

The pneumatic controllers will potentially subject to NSPS 0000a. Per 60.5365a(d)(1), 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 0000a.

3.3.5. Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas processing plants (Subparts 0000) and associated equipment (Subparts D-Dc and K-Kb), the applicability of a particular NSPS to the wellpad can be readily ascertained based on the industrial source category covered. All other NSPS are categorically not applicable to the proposed project.

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

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

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

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

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

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

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

This MACT standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types at area sources. The 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 TEGs and line heaters are fuel burning units and therefore must comply with this regulation. Per 45 CSR 2-3, opacity of emissions from units shall not exceed 10 percent.

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

According to 45 CSR 4-3:

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

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

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

45 CSR 6 applies to activities involving incineration of refuse, defined as “the destruction of combustible refuse by burning in a furnace designed for that purpose. For the purposes of this rule, the destruction of any combustible liquid or gaseous material by burning in a flare or flare stack, thermal oxidizer or thermal catalytic oxidizer stack shall be considered incineration.” The enclosed combustors are incinerators and therefore must comply with this regulation. Per 45 CSR 6-4.3, opacity of emissions from 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 CFR Part 60 by reference. As such, by complying with all applicable requirements of 40 CFR Part 60 at the wellpad, EQT will be complying with 45 CSR 16.

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

According to 45 CSR 17-3.1:

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

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

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

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

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

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

3.5.8. Non-Applicability of Other SIP Rules

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

4. G70-B APPLICATION FORMS

The WVDEP permit application forms contained in this application include all applicable G70-B 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
Fax (304) 926-0479
www.dep.wv.gov

G70-B GENERAL PERMIT REGISTRATION APPLICATION

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION, RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF NATURAL GAS PRODUCTION FACILITIES LOCATED AT THE WELL SITE

- CONSTRUCTION
- MODIFICATION
- RELOCATION
- CLASS I ADMINISTRATIVE UPDATE
- CLASS II ADMINISTRATIVE UPDATE

SECTION 1. GENERAL INFORMATION

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

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

Applicant's Mailing Address: 625 Liberty Avenue, Suite 1700

City: Pittsburgh

State: PA

ZIP Code: 15222

Facility Name: BIG-177 Pad

Operating Site Physical Address: Pine Grove, WV 26419
If none available, list road, city or town and zip of facility.

City: Pine Grove

Zip Code: 26419

County: Wetzel

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):

Latitude: 39.58256 N

Longitude: 80.58412 W

SIC Code: 1311

DAQ Facility ID No. (For existing facilities)

NAICS Code: 211111

CERTIFICATION OF INFORMATION

This G70-B 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 the 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, 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 G70-B Registration Application will be returned to the applicant. Furthermore, if the G70-B forms are not utilized, the application will be returned to the applicant. No substitution of forms is allowed.**

I hereby certify that 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 Division of Air Quality immediately.

I hereby certify that all information contained in this G70-B 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.

Responsible Official Signature: [Signature] Phone: 412-553-5700 Fax: NA
Name and Title: Kenneth Kirk, Executive Vice President
Email: KKirk@eqt.com Date: 11/9/16

If applicable:
Authorized Representative Signature: _____
Name and Title: _____ Phone: _____ Fax: _____
Email: _____ Date: _____

If applicable:
Environmental Contact
Name and Title: Alex Bosiljevac, Environmental Coordinator Phone: 412-395-3699 Fax: 412-395-7027
Email: ABosiljevac@eqt.com Date: _____

OPERATING SITE INFORMATION	
Briefly describe the proposed new operation and/or any change(s) to the facility: General permit application for a new natural gas production well pad.	
Directions to the facility: From State Highway 20 in Pine Grove, WV, take N Fork Road for approximately 6 miles. Continue on Wiley Fork road for ½ mile. The facility will be on your right.	
ATTACHMENTS AND SUPPORTING DOCUMENTS	
I have enclosed the following required documents:	
Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22).	
<input type="checkbox"/> Check attached to front of application. <input type="checkbox"/> I wish to pay by electronic transfer. Contact for payment (incl. name and email address): <input checked="" type="checkbox"/> I wish to pay by credit card. Contact for payment (incl. name and email address): R. Alex Bosiljevac, abosiljevac@eqt.com	
<input checked="" type="checkbox"/> \$500 (Construction, Modification, and Relocation) <input type="checkbox"/> \$300 (Class II Administrative Update) <input checked="" type="checkbox"/> \$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO ¹ <input type="checkbox"/> \$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH ²	
¹ Only one NSPS fee will apply. ² Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ. <i>NSPS and NESHAP fees apply to new construction or if the source is being modified.</i>	
<input checked="" type="checkbox"/> Responsible Official or Authorized Representative Signature (if applicable)	
<input checked="" type="checkbox"/> Single Source Determination Form (must be completed in its entirety) – Attachment A	
<input type="checkbox"/> Siting Criteria Waiver (if applicable) – Attachment B	<input checked="" type="checkbox"/> Current Business Certificate – Attachment C
<input checked="" type="checkbox"/> Process Flow Diagram – Attachment D	<input checked="" type="checkbox"/> Process Description – Attachment E
<input checked="" type="checkbox"/> Plot Plan – Attachment F	<input checked="" type="checkbox"/> Area Map – Attachment G
<input checked="" type="checkbox"/> G70-B Section Applicability Form – Attachment H	<input checked="" type="checkbox"/> Emission Units/ERD Table – Attachment I
<input checked="" type="checkbox"/> Fugitive Emissions Summary Sheet – Attachment J	
<input checked="" type="checkbox"/> Gas Well Affected Facility Data Sheet (if applicable) – Attachment K	
<input checked="" type="checkbox"/> Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment L	
<input checked="" type="checkbox"/> Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPU's, Heater Treaters, In-Line Heaters if applicable) – Attachment M	
<input type="checkbox"/> Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N	
<input checked="" type="checkbox"/> Tanker Truck Loading Data Sheet (if applicable) – Attachment O	
<input type="checkbox"/> Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment P	
<input type="checkbox"/> Pneumatic Controllers Data Sheet – Attachment Q	
<input checked="" type="checkbox"/> Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment R	
<input checked="" type="checkbox"/> Emission Calculations (please be specific and include all calculation methodologies used) – Attachment S	
<input checked="" type="checkbox"/> Facility-wide Emission Summary Sheet(s) – Attachment T	
<input checked="" type="checkbox"/> Class I Legal Advertisement – Attachment U	
<input checked="" type="checkbox"/> One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments	

All attachments must be identified by name, divided into sections, and submitted in order.

ATTACHMENT A

Single Source Determination

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

Classifying multiple facilities as one “stationary source” under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of Building, structure, facility, or installation as given in §45-14-2.13 and §45-19-2.12. The definition states:

“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 the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same “Major Group” (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

Is there a facility owned by or associated with the natural gas industry located within one (1) mile of the proposed facility? Yes No

If Yes, please complete the questionnaire on the following page (Attachment A).

Please provide a source aggregation analysis for the proposed facility below:

Please see discussion in the Application Report.

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

Answer each question with a detailed explanation to determine contiguous or adjacent properties which are under a common control and any support facilities. This section must be completed in its entirety. – **Not Applicable**

Provide a map of contiguous or adjacent facilities (production facilities, compressor stations, dehydration facilities, etc.) which are under common control and those facilities that are not under common control but are support facilities. Please indicate the SIC code, permit number (if applicable), and the distance between facilities in question on the map.

Are the facilities owned by the same parent company or a subsidiary of the parent company? Provide the owners identity and the percentage of ownership of each facility.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does an entity such as a corporation have decision making authority over the operation of a second entity through a contractual agreement or voting interest? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Is there a contract for service relationship between the two (2) companies or, a support/dependency relationship that exists between the two (2) companies? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do the facilities share common workforces, plant managers, security forces, corporate executive officers or board executives?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Will managers or other workers frequently shuttle back and forth to be involved actively at both facilities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do the facilities share common payroll activities, employee benefits, health plans, retirement funds, insurance coverage, or other administrative functions? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does one (1) facility operation support the operation of the other facility?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Is one (1) facility dependent on the other? If one (1) facility shuts down, what are the limitations on the other to pursue outside business? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Are there any financial arrangements between the two (2) entities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Are there any legal or lease agreements between the two (2) facilities?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do the facilities share products, byproducts, equipment, or other manufacturing or air pollution control device equipment? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Do all the pollutant-emitting activities at the facilities belong to the same SIC Code? Please provide the SIC Codes.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Was the location of the new facility chosen primarily because of its proximity to the existing facility to integrate the operation of the two (2) facilities? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Will materials be routinely transferred between the two (2) facilities? Please explain the amount of transfer and how often the transfers take place and what percentages go to the various entities.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does the facility influence production levels or compliance with environmental regulations at other facilities? Who accepts the responsibility for compliance with air quality requirements? Please explain.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

ATTACHMENT B

Siting Criteria Waiver *(Not Applicable)*

ATTACHMENT B - SITING CRITERIA WAIVER – NOT APPLICABLE

If applicable, please complete this form and it must be notarized.

**G70-B General Permit
Siting Criteria Waiver**

WV Division of Air Quality 300' Waiver

I _____ hereby
Print Name
acknowledge and agree that _____ will
General Permit Applicant's Name

construct an emission unit(s) at a natural gas production facility
that will be located within 300' of my dwelling and/or business.

I hereby offer this waiver of siting criteria to the West Virginia Department of Environmental Protection
Division of Air Quality as permission to construct, install and operate in such location.

Signed:

Signature Date

Signature Date

Taken, subscribed and sworn before me this ____ day of

_____, 20____.

My commission expires: _____

SEAL _____
Notary Public

ATTACHMENT C

Business Certificate

**WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION
CERTIFICATE**

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

BUSINESS REGISTRATION ACCOUNT NUMBER: 1022-8081

This certificate is issued on: 08/4/2010

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

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

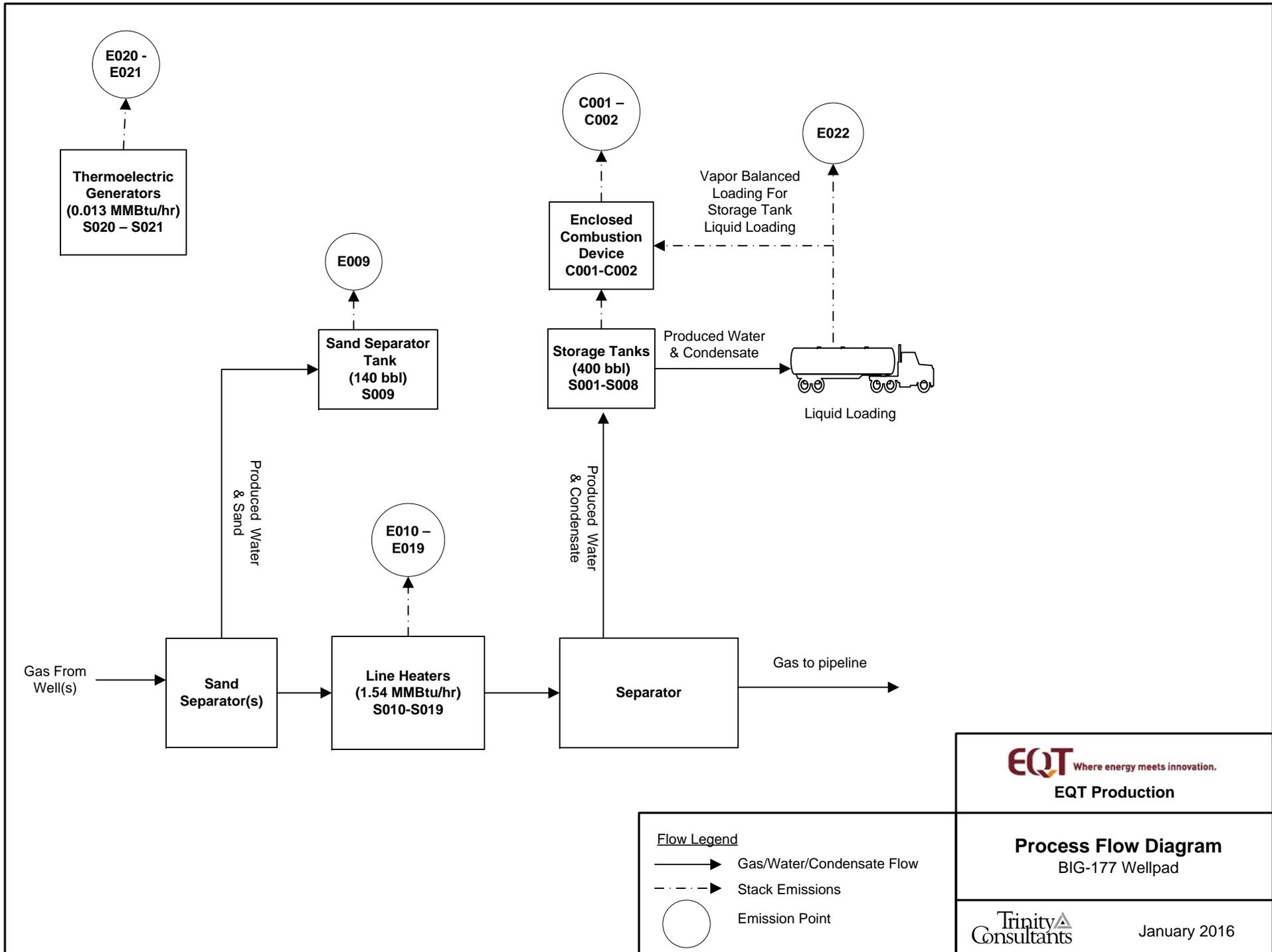
This certificate is not transferrable and must be displayed at the location for which issued.
This certificate shall be permanent until cessation of the business for which the certificate of registration
was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

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

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

ATTACHMENT D

Process Flow Diagram



EQT Where energy meets innovation.

EQT Production

Process Flow Diagram

BIG-177 Wellpad

Flow Legend

————▶ Gas/Water/Condensate Flow

- - - - -▶ Stack Emissions

○ Emission Point

Trinity
Consultants

January 2016

ATTACHMENT E

Process Description

ATTACHMENT E: PROCESS DESCRIPTION

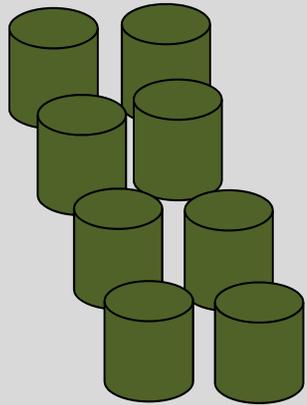
This project involves the construction and operation of eight (8) produced fluid storage tanks, one (1) sand separator storage tank, ten (10) line heaters, two (2) thermoelectric generators, and two (2) enclosed combustors at a new natural gas production wellpad (BIG-177).

The BIG-177 wellpad will consist of seven (7) wells, each with the same basic operation. The incoming gas/liquid/solid 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 (S009). The remnant gas/liquid stream from the then passes through a line heater (S010-S019) to raise/maintain temperature. The stream will then pass through a separator, which will separate gas (natural gas) from liquids (condensate and produced water). The liquid stream exiting the separator will be transferred to storage vessels (S001-S008). Emissions from the storage vessels are controlled by enclosed combustors (C001-C002). Once the tanks are filled, the contents are loaded into trucks for transport. EQT utilizes vapor balancing in the truck loading operations, which means the vapors displaced by the filling of tanker trucks (S022) are routed back into the battery of tanks and ultimately to the combustor. Facility electricity is provided by thermoelectric generators (S020-S021).

A process flow diagram is included as Attachment D.

ATTACHMENT F

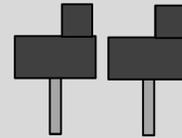
Plot Plan



(8) Produced Fluid Tanks
400 bbl
(S001-S008)

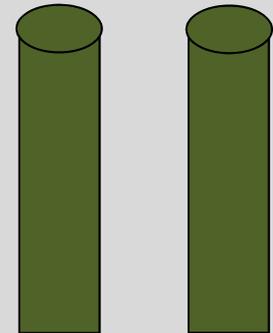


(1) Sand Separator Tank
140 bbl
(S009)



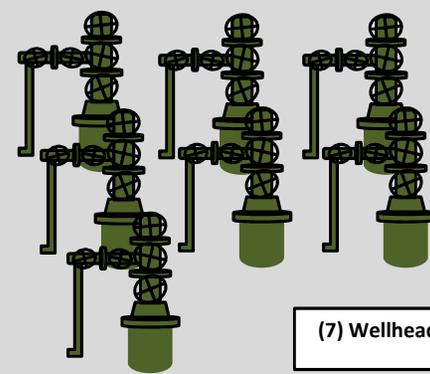
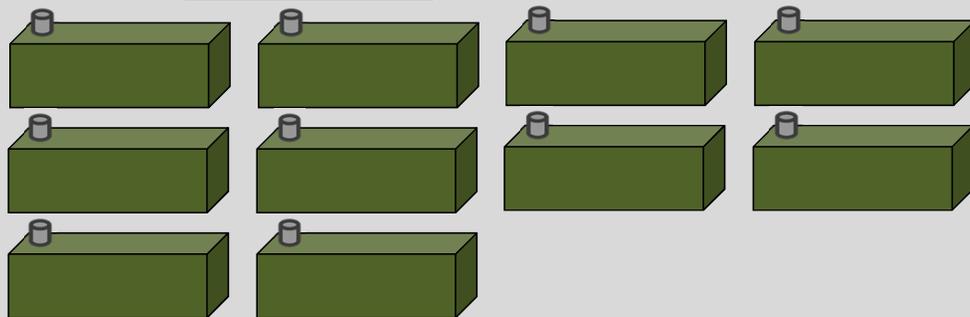
(2) Thermoelectric Generators
(S020-S021)

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



(2) Combustors
11.66 MMBTU/hr
(C001-C002)

(10) Line Heaters
(S010-S019)



(7) Wellheads

Entrance to BIG-177 pad

ATTACHMENT G

Area Map

ATTACHMENT G: AREA MAP



Figure 1 - Map of BIG-177 Location

UTM Northing (KM): 4,381.511
UTM Easting (KM): 535.715
Elevation: ~810 ft

ATTACHMENT H
Applicability Form

ATTACHMENT H – G70-B SECTION APPLICABILITY FORM

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

General Permit G70-B was developed to allow qualified applicants to seek registration for a variety of sources. These sources include gas well affected facilities, storage vessels, gas production units, in-line heaters, heater treaters, glycol dehydration units and associated reboilers, pneumatic controllers, centrifugal compressors, reciprocating compressors, reciprocating internal combustion engines (RICES), tank truck loading, fugitive emissions, 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-B 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.

GENERAL PERMIT G70-B APPLICABLE SECTIONS	
<input checked="" type="checkbox"/> Section 5.0	Gas Well Affected Facility (NSPS, Subpart OOOO)
<input checked="" type="checkbox"/> Section 6.0	Storage Vessels Containing Condensate and/or Produced Water ¹
<input type="checkbox"/> Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO)
<input checked="" type="checkbox"/> Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO and/or NESHAP Subpart HH
<input checked="" type="checkbox"/> Section 9.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
<input type="checkbox"/> Section 10.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO)
<input type="checkbox"/> Section 11.0	Centrifugal Compressor Affected Facility (NSPS, Subpart OOOO) ²
<input type="checkbox"/> Section 12.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO) ²
<input type="checkbox"/> Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines, Microturbines
<input checked="" type="checkbox"/> Section 14.0	Tanker Truck Loading ³
<input type="checkbox"/> Section 15.0	Glycol Dehydration Units ⁴

- 1 Applicants that are subject to Section 6 may also be subject to Section 7 if the applicant is subject to the NSPS, Subpart OOOO control requirements or the applicable control device requirements of Section 8.
- 2 Applicants that are subject to Section 11 and 12 may also be subject to the applicable RICE requirements of Section 13.
- 3 Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 8.
- 4 Applicants that are subject to Section 15 may also be subject to the requirements of Section 9 (reboilers). Applicants that are subject to Section 15 may also be subject to control device and emission reduction device requirements of Section 8.

ATTACHMENT I

Emission Units Table

ATTACHMENT I – EMISSION UNITS / EMISSION REDUCTION DEVICES (ERD) TABLE

Include ALL emission units and air pollution control devices/ERDs that will be part of this permit application review. Do not include fugitive emission sources in this table. Deminimis storage tanks shall be listed in the Attachment L table. This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

Emission Unit ID¹	Emission Point ID²	Emission Unit Description	Year Installed	Manufac. Date³	Design Capacity	Type⁴ and Date of Change	Control Device(s)⁵	ERD(s)⁶
S001	C001-C002	Produced Fluid Tank	TBD	---	400 bbl	New	C001-C002	---
S002	C001-C002	Produced Fluid Tank	TBD	---	400 bbl	New	C001-C002	---
S003	C001-C002	Produced Fluid Tank	TBD	---	400 bbl	New	C001-C002	---
S004	C001-C002	Produced Fluid Tank	TBD	---	400 bbl	New	C001-C002	---
S005	C001-C002	Produced Fluid Tank	TBD	---	400 bbl	New	C001-C002	---
S006	C001-C002	Produced Fluid Tank	TBD	---	400 bbl	New	C001-C002	---
S007	C001-C002	Produced Fluid Tank	TBD	---	400 bbl	New	C001-C002	---
S008	C001-C002	Produced Fluid Tank	TBD	---	400 bbl	New	C001-C002	---
S009	C001-C002	Sand Separator Tank	TBD	---	140 bbl	New	---	---
S010	E010	Line Heater	TBD	---	1.54 MMBtu/hr	New	---	---
S011	E011	Line Heater	TBD	---	1.54 MMBtu/hr	New	---	---
S012	E012	Line Heater	TBD	---	1.54 MMBtu/hr	New	---	---
S013	E013	Line Heater	TBD	---	1.54 MMBtu/hr	New	---	---
S014	E014	Line Heater	TBD	---	1.54 MMBtu/hr	New	---	---
S015	E015	Line Heater	TBD	---	1.54 MMBtu/hr	New	---	---
S016	E016	Line Heater	TBD	---	1.54 MMBtu/hr	New	---	---
S017	E017	Line Heater	TBD	---	1.54 MMBtu/hr	New	---	---
S018	E018	Line Heater	TBD	---	1.54 MMBtu/hr	New	---	---
S019	E019	Line Heater	TBD	---	1.54 MMBtu/hr	New	---	---
S020	E020	Thermoelectric Generator (TEG)	TBD	---	0.013 MMBtu/hr	New	---	---

S021	E021	Thermoelectric Generator (TEG)	TBD	---	0.013 MMBtu/hr	New	---	---
S022	C001-C002 (Captured, Controlled) E022 (Uncaptured, Uncontrolled)	Liquid Loading	TBD	---	9,142,352 gal/yr	New	C001-C002	---
C001	C001	Tank Combustor	TBD	---	11.66 MMBtu/hr	New	---	---
C002	C002	Tank Combustor	TBD	---	11.66 MMBtu/hr	New	---	---

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 When required by rule

⁴ New, modification, removal, existing

⁵ For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

⁶ For ERDs use the following numbering system: 1D, 2D, 3D,... or other appropriate designation.

ATTACHMENT J

Fugitive Emissions Summary Sheet

ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

Sources of fugitive emissions may include loading operations, equipment leaks, blowdown emissions, etc.
Use extra pages for each associated source or equipment if necessary.

Source/Equipment: Fugitive Emissions

Leak Detection Method Used		<input type="checkbox"/> Audible, visual, and olfactory (AVO) inspections	<input type="checkbox"/> Infrared (FLIR) cameras	<input checked="" type="checkbox"/> Other (please describe) Will satisfy condition 4.1.4. of the G70-B	<input checked="" type="checkbox"/> None required		
Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)		
					VOC	HAP	GHG (CO ₂ e)
Pumps	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	9	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	<input type="checkbox"/> Gas <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Both	1.73	0.05	0.34
Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	431	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	4.14	0.13	44.39
Safety Relief Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	33	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	5.52	0.17	5.04
Open Ended Lines	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	36	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Both	0.10	3.1E-3	8.39
Sampling Connections	<input type="checkbox"/> Yes <input type="checkbox"/> No	0	N/A	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	---	---	---
Connections (Not sampling)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1,910	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Both	5.62	0.18	21.88
Compressors	<input type="checkbox"/> Yes <input type="checkbox"/> No	0	N/A	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	---	---	---
Flanges	<input type="checkbox"/> Yes <input type="checkbox"/> No		(included in connections)	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	---	---	---
Other ¹	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	35	40 CFR 98 Subpart W	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	5.95	0.19	601.47

¹ Other equipment types may include compressor seals, relief valves, diaphragms, drains, meters, etc.

Please provide an explanation of the sources of fugitive emissions (e.g. pigging operations, equipment blowdowns, pneumatic controllers, etc.):
Pneumatic Controller count is 'Other' category. An estimate of Miscellaneous Gas Venting emissions are included in the Emission Calculations and serve to include such sources as compressor venting, pigging, vessel blowdowns and other sources.

Please indicate if there are any closed vent bypasses (include component): N/A

Specify all equipment used in the closed vent system (e.g. VRU, ERD, thief hatches, tanker truck loading, etc.) N/A

ATTACHMENT K

Gas Well Data Sheet

ATTACHMENT K – 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).

API Number	Date of Flowback	Date of Well Completion	Green Completion and/or Combustion Device
047-103-02984	Feb 2016	Feb 2016	Green
PLANNED	Planned 2017	Planned 2017	Green
PLANNED	Planned 2017	Planned 2017	Green
PLANNED	Planned 2017	Planned 2017	Green
PLANNED	Planned 2017	Planned 2017	Green
PLANNED	Planned 2017	Planned 2017	Green
PLANNED	Planned 2017	Planned 2017	Green

Note: If future wells are planned and no API number is available please list as PLANNED. If there are existing wells that commenced construction prior to August 23, 2011, please acknowledge as existing.

This is the same API (American Petroleum Institute) 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 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.*

ATTACHMENT L

Storage Vessel Data Sheet

ATTACHMENT L – STORAGE VESSEL DATA SHEET

Complete this data sheet if you are the owner or operator of a storage vessel that contains condensate and/or produced water. This form must be completed for *each* new or modified bulk liquid storage vessel(s) that contains condensate and/or produced water . (If you have more than one (1) identical tank (i.e. 4-400 bbl condensate tanks), then you can list all on one (1) data sheet). **Include gas sample analysis, flashing emissions, working and breathing losses, USEPA Tanks, simulation software (ProMax, E&P Tanks, HYSYS, etc.), and any other supporting documents where applicable.**

The following information is REQUIRED:

- Composition of the representative sample used for the simulation
- For each stream that contributes to flashing emissions:
 - Temperature and pressure (inlet and outlet from separator(s))
 - Simulation-predicted composition
 - Molecular weight
 - Flow rate
- Resulting flash emission factor or flashing emissions from simulation
- Working/breathing loss emissions from tanks and/or loading emissions if simulation is used to quantify those emissions

Additional information may be requested if necessary.

GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name BIG-177 Pad	2. Tank Name Produced Fluid Tanks (water and condensate)
3. Emission Unit ID number S001-S008	4. Emission Point ID number C001-C002
5. Date Installed , Modified or Relocated <i>(for existing tanks)</i> Was the tank manufactured after August 23, 2011? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Type of change: <input checked="" type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other (Low Pressure Tower) <input type="checkbox"/> Relocation
7A. Description of Tank Modification <i>(if applicable)</i> N/A	
7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Was USEPA Tanks simulation software utilized? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<p><i>If Yes, please provide the appropriate documentation and items 8-42 below are not required.</i></p>	

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

TANK CONSTRUCTION AND OPERATION INFORMATION			
21. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunitite lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) Welded or riveted			
21A. Shell Color: Green	21B. Roof Color: Green	21C. Year Last Painted: New	
22. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable			
22A. Is the tank heated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?	
23. Operating Pressure Range (psig): Must be listed for tanks using VRUs with closed vent system.			
24. Is the tank a Vertical Fixed Roof Tank ? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	24A. If yes, for dome roof provide radius (ft): 6	24B. If yes, for cone roof, provide slop (ft/ft): N/A	
25. Complete item 25 for Floating Roof Tanks <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/>			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type (<i>check one</i>): <input type="checkbox"/> Metallic (mechanical) shoe seal <input type="checkbox"/> Liquid mounted resilient seal <input type="checkbox"/> Vapor mounted resilient seal <input type="checkbox"/> Other (describe):			
25C. Is the Floating Roof equipped with a secondary seal? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25D. If yes, how is the secondary seal mounted? (<i>check one</i>) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):			
25E. Is the floating roof equipped with a weather shield? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25F. Describe deck fittings:			
26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does not apply			
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded		26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft ²):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
27. Closed Vent System with VRU? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
28. Closed Vent System with Enclosed Combustor? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
SITE INFORMATION - Not Applicable: Tank calculations performed using ProMax software			
29. Provide the city and state on which the data in this section are based:			
30. Daily Avg. Ambient Temperature (°F):		31. Annual Avg. Maximum Temperature (°F):	
32. Annual Avg. Minimum Temperature (°F):		33. Avg. Wind Speed (mph):	
34. Annual Avg. Solar Insulation Factor (BTU/ft ² -day):		35. Atmospheric Pressure (psia):	
LIQUID INFORMATION - Not Applicable: Tank calculations performed using ProMax software			
36. Avg. daily temperature range of bulk liquid (°F):	36A. Minimum (°F):	36B. Maximum (°F):	
37. Avg. operating pressure range of tank (psig):	37A. Minimum (psig):	37B. Maximum (psig):	
38A. Minimum liquid surface temperature (°F):		38B. Corresponding vapor pressure (psia):	
39A. Avg. liquid surface temperature (°F):		39B. Corresponding vapor pressure (psia):	
40A. Maximum liquid surface temperature (°F):		40B. Corresponding vapor pressure (psia):	
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:			
41B. CAS number:			
41C. Liquid density (lb/gal):			
41D. Liquid molecular weight (lb/lb-mole):			
41E. Vapor molecular weight (lb/lb-mole):			
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year. From: To:			
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.			

GENERAL INFORMATION (REQUIRED)

1. Bulk Storage Area Name BIG-177 Pad	2. Tank Name San Separator Tank
3. Emission Unit ID number S009	4. Emission Point ID number E009
5. Date Installed , Modified or Relocated <i>(for existing tanks)</i> Was the tank manufactured after August 23, 2011? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Type of change: <input checked="" type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other (Low Pressure Tower) <input type="checkbox"/> Relocation
7A. Description of Tank Modification <i>(if applicable)</i> N/A	
7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Was USEPA Tanks simulation software utilized? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>If Yes, please provide the appropriate documentation and items 8-42 below are not required.</i>	

TANK INFORMATION

8. Design Capacity <i>(specify barrels or gallons)</i> . Use the internal cross-sectional area multiplied by internal height. 140 bbls	
9A. Tank Internal Diameter (ft.) 10	9B. Tank Internal Height (ft.) 10
10A. Maximum Liquid Height (ft.) 10	10B. Average Liquid Height (ft.) 5
11A. Maximum Vapor Space Height (ft.) 10	11B. Average Vapor Space Height (ft.) 5
12. Nominal Capacity <i>(specify barrels or gallons)</i> . This is also known as “working volume”. 140 bbls	
13A. Maximum annual throughput (gal/yr) See attached emissions calculations for all throughput values	13B. Maximum daily throughput (gal/day) See attached emissions calculations for all throughput values
14. Number of tank turnovers per year See attached emissions calculations for all throughput values	15. Maximum tank fill rate (gal/min) See attached emissions calculations for all throughput values
16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Is the tank system a variable vapor space system? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof <input type="checkbox"/> vertical <input checked="" type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Other (describe)	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:	
<input checked="" type="checkbox"/> Does Not Apply	<input type="checkbox"/> Rupture Disc (psig)
<input type="checkbox"/> Inert Gas Blanket of _____	<input type="checkbox"/> Carbon Adsorption ¹
<input type="checkbox"/> Vent to Vapor Combustion Device ¹ (vapor combustors, flares, thermal oxidizers, enclosed combustors)	
<input type="checkbox"/> Conservation Vent (psig)	<input type="checkbox"/> Condenser ¹
Vacuum Setting Pressure Setting	
<input type="checkbox"/> Emergency Relief Valve (psig)	
Vacuum Setting Pressure Setting	
<input type="checkbox"/> Thief Hatch Weighted <input type="checkbox"/> Yes <input type="checkbox"/> No	

¹ Complete appropriate Air Pollution Control Device Sheet									
20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).									
Material Name	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 Emissions Calculation for all values									

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.

TANK CONSTRUCTION AND OPERATION INFORMATION			
21. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunit lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) Welded			
21A. Shell Color: Gray	21B. Roof Color: Gray	21C. Year Last Painted: New	
22. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable			
22A. Is the tank heated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?	
23. Operating Pressure Range (psig): Must be listed for tanks using VRUs with closed vent system.			
24. Is the tank a Vertical Fixed Roof Tank ? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):	
25. Complete item 25 for Floating Roof Tanks <input type="checkbox"/> Does not apply <input checked="" type="checkbox"/>			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type (check one): <input type="checkbox"/> Metallic (mechanical) shoe seal <input type="checkbox"/> Liquid mounted resilient seal <input type="checkbox"/> Vapor mounted resilient seal <input type="checkbox"/> Other (describe):			
25C. Is the Floating Roof equipped with a secondary seal? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25D. If yes, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):			
25E. Is the floating roof equipped with a weather shield? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25F. Describe deck fittings:			
26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does not apply			
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded		26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft ²):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
27. Closed Vent System with VRU? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
28. Closed Vent System with Enclosed Combustor? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
SITE INFORMATION - Not Applicable: Tank calculations performed using E&P Tank software			
29. Provide the city and state on which the data in this section are based:			
30. Daily Avg. Ambient Temperature (°F):		31. Annual Avg. Maximum Temperature (°F):	
32. Annual Avg. Minimum Temperature (°F):		33. Avg. Wind Speed (mph):	
34. Annual Avg. Solar Insulation Factor (BTU/ft ² -day):		35. Atmospheric Pressure (psia):	
LIQUID INFORMATION - Not Applicable: Tank calculations performed using E&P Tank software			

36. Avg. daily temperature range of bulk liquid (°F):	36A. Minimum (°F):	36B. Maximum (°F):	
37. Avg. operating pressure range of tank (psig):	37A. Minimum (psig):	37B. Maximum (psig):	
38A. Minimum liquid surface temperature (°F):	38B. Corresponding vapor pressure (psia):		
39A. Avg. liquid surface temperature (°F):	39B. Corresponding vapor pressure (psia):		
40A. Maximum liquid surface temperature (°F):	40B. Corresponding vapor pressure (psia):		
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:			
41B. CAS number:			
41C. Liquid density (lb/gal):			
41D. Liquid molecular weight (lb/lb-mole):			
41E. Vapor molecular weight (lb/lb-mole):			
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year. From: To:			
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.			

ATTACHMENT M

Heaters Data Sheet

**ATTACHMENT M – SMALL HEATERS AND REBOILERS NOT SUBJECT TO
40CFR60 SUBPART DC
DATA SHEET**

Complete this data sheet for each small heater and reboiler not subject to 40CFR60 Subpart Dc at the facility. *The Maximum Design Heat Input (MDHI) must be less than 10 MMBTU/hr.*

Emission Unit ID# ¹	Emission Point ID# ²	Emission Unit Description (manufacturer, model #)	Year Installed/Modified	Type ³ and Date of Change	Maximum Design Heat Input (MMBTU/hr) ⁴	Fuel Heating Value (BTU/scf) ⁵
S010	E010	Line Heater	TBD	New	1.54	~1,194
S011	E011	Line Heater	TBD	New	1.54	~1,194
S012	E012	Line Heater	TBD	New	1.54	~1,194
S013	E013	Line Heater	TBD	New	1.54	~1,194
S014	E014	Line Heater	TBD	New	1.54	~1,194
S015	E015	Line Heater	TBD	New	1.54	~1,194
S016	E016	Line Heater	TBD	New	1.54	~1,194
S017	E017	Line Heater	TBD	New	1.54	~1,194
S018	E018	Line Heater	TBD	New	1.54	~1,194
S019	E019	Line Heater	TBD	New	1.54	~1,194
S020	E020	Thermoelectric Generator	TBD	New	0.013	~1,194
S021	E021	Thermoelectric Generator	TBD	New	0.013	~1,194

- ¹ Enter the appropriate Emission Unit (or Source) identification number 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 Enter design heat input capacity in MMBtu/hr.
- ⁵ Enter the fuel heating value in BTU/standard cubic foot.

ATTACHMENT N

Engines Data Sheet *(Not Applicable)*

ATTACHMENT N – INTERNAL COMBUSTION ENGINE DATA SHEET
NOT APPLICABLE

Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form.*

Emission Unit ID# ¹							
Engine Manufacturer/Model							
Manufacturers Rated bhp/rpm							
Source Status ²							
Date Installed/ Modified/Removed/Relocated ³							
Engine Manufactured /Reconstruction Date ⁴							
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable) ⁵		<input type="checkbox"/> 40CFR60 Subpart JJJ <input type="checkbox"/> JJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources	<input type="checkbox"/> 40CFR60 Subpart JJJ <input type="checkbox"/> JJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources	<input type="checkbox"/> 40CFR60 Subpart JJJ <input type="checkbox"/> JJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources			
Engine Type ⁶							
APCD Type ⁷							
Fuel Type ⁸							
H ₂ S (gr/100 scf)							
Operating bhp/rpm							
BSFC (BTU/bhp-hr)							
Hourly Fuel Throughput		ft ³ /hr gal/hr		ft ³ /hr gal/hr		ft ³ /hr gal/hr	
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)		MMft ³ /yr gal/yr		MMft ³ /yr gal/yr		MMft ³ /yr gal/yr	
Fuel Usage or Hours of Operation Metered		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		Yes <input type="checkbox"/> No <input type="checkbox"/>		Yes <input type="checkbox"/> No <input type="checkbox"/>	
Calculation Methodology ⁹	Pollutant ¹⁰	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ¹¹	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ¹¹	Hourly PTE (lb/hr) ¹¹	Annual PTE (tons/year) ¹¹
	NO _x						
	CO						
	VOC						
	SO ₂						
	PM ₁₀						
	Formaldehyde						
	Total HAPs						
	GHG (CO ₂ e)						

1 Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the compressor station. Multiple compressor engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. Microturbine generator engines should be designated MT-1, MT-2, MT-3 etc. If more than three (3) engines exist, please use additional sheets.

2 Enter the Source Status using the following codes:

- | | | | |
|----|---|----|------------------|
| NS | Construction of New Source (installation) | ES | Existing Source |
| MS | Modification of Existing Source | RS | Relocated Source |

ATTACHMENT O

Truck Loading Data Sheet

ATTACHMENT O – TANKER TRUCK LOADING DATA SHEET

Complete this data sheet for each new or modified bulk liquid transfer area or loading rack at the facility. This is to be used for bulk liquid transfer operations to tanker trucks. Use extra pages if necessary.

Truck Loadout Collection Efficiencies

The following applicable capture efficiencies of a truck loadout are allowed:

- For tanker trucks passing the MACT level annual leak test – 99.2%
- For tanker trucks passing the NSPS level annual leak test – 98.7%
- For tanker trucks not passing one of the annual leak tests listed above – 70%

Compliance with this requirement shall be demonstrated by keeping records of the applicable MACT or NSPS Annual Leak Test certification for *every* truck and railcar loaded/unloaded. This requirement can be satisfied if the trucking company provided certification that its entire fleet was compliant. This certification must be submitted in writing to the Director of the DAQ. These additional requirements must be noted in the Registration Application.

Emission Unit ID#: S022	Emission Point ID#: C001-C002, E022	Year Installed/Modified: N/A		
Emission Unit Description: Uncaptured losses from loading of produced fluids into tanker trucks				
Loading Area Data				
Number of Pumps: 1	Number of Liquids Loaded: 1	Max number of trucks loading at one (1) time: 1		
Are tanker trucks pressure tested for leaks at this or any other location? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Not Required If Yes, Please describe:				
Provide description of closed vent system and any bypasses. Trucks utilize vapor recovery lines to route displaced vapors back into battery of tanks.				
Are any of the following truck loadout systems utilized? <input type="checkbox"/> Closed System to tanker truck passing a MACT level annual leak test? <input type="checkbox"/> Closed System to tanker truck passing a NSPS level annual leak test? <input checked="" type="checkbox"/> Closed System to tanker truck not passing an annual leak test and has vapor return?				
Projected Maximum Operating Schedule (for rack or transfer point as a whole)				
Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	Varies	Varies	Varies	Varies
Days/week	7	7	7	7
Bulk Liquid Data (use extra pages as necessary)				
Liquid Name	Produced Fluids			
Max. Daily Throughput (1000 gal/day)	See attached emissions calculations for all throughput values			
Max. Annual Throughput (1000 gal/yr)	See attached emissions calculations for all throughput values			
Loading Method ¹	SP			
Max. Fill Rate (gal/min)	Varies			
Average Fill Time (min/loading)	Varies			
Max. Bulk Liquid Temperature (°F)	See ProMax results			
True Vapor Pressure ²	See ProMax results			
Cargo Vessel Condition ³	U			
Control Equipment or Method ⁴	VB, ECD (captured loading losses)			

Max. Collection Efficiency (%)		70		
Max. Control Efficiency (%)		98		
Max.VOC Emission Rate	Loading (lb/hr)	See attached emission calculations for breakdown		
	Annual (ton/yr)	See attached emission calculations for breakdown		
Max.HAP Emission Rate	Loading (lb/hr)	See attached emission calculations for breakdown		
	Annual (ton/yr)	See attached emission calculations for breakdown		
Estimation Method ⁵		AP-42 Section 5.2 Methodology (via ProMax)		

- 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)
- CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
- ECD Enclosed Combustion Device F Flare
- TO Thermal Oxidization or Incineration
- 5 EPA EPA Emission Factor in AP-42 MB Material Balance
- TM Test Measurement based upon test data submittal O Other (describe)

ATTACHMENT P

Glycol Dehydrator Data Sheet *(Not Applicable)*

**ATTACHMENT P – GLYCOL DEHYDRATION UNIT
DATA SHEET – NOT APPLICABLE**

Complete this data sheet for each Glycol Dehydration Unit, Reboiler, Flash Tank and/or Regenerator at the facility. Include gas sample analysis and GRI- GLYCalc™ input and aggregate report. Use extra pages if necessary.

Manufacturer:		Model:			
Max. Dry Gas Flow Rate:		Reboiler Design Heat Input			
Design Type: <input type="checkbox"/> TEG <input type="checkbox"/> DEG <input type="checkbox"/> EG		Source Status ¹ :			
Date Installed/Modified/Removed ² :		Regenerator Still Vent APCD/ERD ³ :			
Control Device/ERD ID# ³ :		Fuel HV (BTU/scf):			
H ₂ S Content (gr/100 scf):		Operation (hours/year):			
Pump Rate (gpm):					
Water Content (wt %) in: Wet Gas: Dry Gas:					
Is the glycol dehydration unit exempt from 40CFR63 Section 764(d)? <input type="checkbox"/> Yes <input type="checkbox"/> No: If Yes, answer the following:					
The actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters per day, as determined by the procedures specified in §63.772(b)(1) of this subpart. <input type="checkbox"/> Yes <input type="checkbox"/> No					
The actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram per year (1 ton per year), as determined by the procedures specified in §63.772(b)(2) of this subpart. <input type="checkbox"/> Yes <input type="checkbox"/> No					
Is the glycol dehydration unit located within an Urbanized Area (UA) or Urban Cluster (UC)? <input type="checkbox"/> Yes <input type="checkbox"/> No					
Is a lean glycol pump optimization plan being utilized? <input type="checkbox"/> Yes <input type="checkbox"/> No					
Recycling the glycol dehydration unit back to the flame zone of the reboiler. <input type="checkbox"/> Yes <input type="checkbox"/> No					
Recycling the glycol dehydration unit back to the flame zone of the reboiler and mixed with fuel. <input type="checkbox"/> Yes <input type="checkbox"/> No					
What happens when temperature controller shuts off fuel to the reboiler? <input type="checkbox"/> Still vent emissions to the atmosphere. <input type="checkbox"/> Still vent emissions stopped with valve. <input type="checkbox"/> Still vent emissions to glow plug. <input type="checkbox"/> None of the above: Still vent emissions are controlled by an enclosed combustor					
Please indicate if the following equipment is present. <input type="checkbox"/> Flash Tank <input type="checkbox"/> Burner management system that continuously burns condenser or flash tank vapors					
Control Device Technical Data					
Pollutants Controlled		Manufacturer's Guaranteed Control Efficiency (%)			
Emissions Data					
Emission Unit ID / Emission Point ID ⁴	Description	Calculation Methodology ⁵	PTE ⁶	Controlled Maximum Hourly Emissions (lb/hr)	Controlled Maximum Annual Emissions (tpy)

ATTACHMENT Q

Pneumatic Controller Data Sheet *(Not Applicable)*

**ATTACHMENT Q – PNEUMATIC CONTROLLERS
DATA SHEET**

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after August 23, 2011?

Yes No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after August 23, 2011?

Yes No

Please list approximate number.

ATTACHMENT R

Air Pollution Control Device Data Sheet

**ATTACHMENT R – AIR POLLUTION CONTROL DEVICE /
EMISSION REDUCTION DEVICE SHEETS**

Complete the applicable air pollution control device sheets for each flare, vapor combustor, thermal oxidizer, condenser, adsorption system, vapor recovery unit, BTEX Eliminator, Reboiler with and without Glow Plug, etc. at the facility. Use extra pages if necessary.

Emissions calculations must be performed using the most conservative control device efficiency.

The following five (5) rows are only to be completed if registering an alternative air pollution control device.

Emission Unit ID: Not Applicable	Make/Model:
Primary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: <input type="checkbox"/> Yes <input type="checkbox"/> No
Secondary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: <input type="checkbox"/> Yes <input type="checkbox"/> No

VAPOR COMBUSTION (Including Enclosed Combustors)

General Information

Control Device ID#: C001-C002	Installation Date: <input checked="" type="checkbox"/> New <input type="checkbox"/> Modified <input type="checkbox"/> Relocated	
Maximum Rated Total Flow Capacity ~7,800 scfh 188,000 scfd	Maximum Design Heat Input (from mfg. spec sheet) 11.66 MMBTU/hr	Design Heat Content 1,500 BTU/scf

Control Device Information

Type of Vapor Combustion Control?		
<input checked="" type="checkbox"/> Enclosed Combustion Device <input type="checkbox"/> Thermal Oxidizer	<input type="checkbox"/> Elevated Flare	<input type="checkbox"/> Ground Flare
Manufacturer: LEED Fabrication Model: Enclosed Combustor 48"	Hours of operation per year? 8,760	

List the emission units whose emissions are controlled by this vapor control device (Emission Point ID# S001-S008, S022)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description
S001-S008	Produced Fluid Tanks		
S022	Liquid Loading		

If this vapor combustor controls emissions from more than six (6) emission units, please attach additional pages.

Assist Type (Flares only)	Flare Height	Tip Diameter	Was the design per §60.18?
<input type="checkbox"/> Steam <input type="checkbox"/> Air <input type="checkbox"/> Pressure <input type="checkbox"/> Non	~25 feet	4 feet	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Provide determination.

Waste Gas Information

Maximum Waste Gas Flow Rate 130 (scfm)	Heat Value of Waste Gas Stream Varies BTU/ft ³	Exit Velocity of the Emissions Stream Varies (ft/s)
<i>Provide an attachment with the characteristics of the waste gas stream to be burned.</i>		

Pilot Gas Information

Number of Pilot Lights 1	Fuel Flow Rate to Pilot Flame per Pilot ~30 scfh	Heat Input per Pilot 0.03 MMBTU/hr	Will automatic re-ignition be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
-----------------------------	--	---------------------------------------	--

If automatic re-ignition is used, please describe the method.

Is pilot flame equipped with a monitor to detect the presence of the flame? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If Yes, what type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infrared <input type="checkbox"/> Ultraviolet <input type="checkbox"/> Camera <input type="checkbox"/> Other:
---	---

Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty. *(If unavailable, please indicate).* See attached information on unit

Additional information attached? Yes No
 Please attach copies of manufacturer's data sheets, drawings, flame demonstration per §60.18 or §63.11(b) and performance testing.

CONDENSER – Not Applicable

General Information

Control Device ID#:	Installation Date: <input type="checkbox"/> New <input type="checkbox"/> Modified <input type="checkbox"/> Relocated	
Manufacturer:	Model:	Control Device Name:
Control Efficiency (%):		
Manufacturer's required temperature range for control efficiency. °F		
Describe the warning and/or alarm system that protects against operation when unit is not meeting the design requirements:		
Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty.		
Additional information attached? <input type="checkbox"/> Yes <input type="checkbox"/> No Please attach copies of manufacturer's data sheets.		
Is condenser routed to a secondary APCD or ERD? <input type="checkbox"/> Yes <input type="checkbox"/> No		

ADSORPTION SYSTEM – Not Applicable

General Information

Control Device ID#:	Installation Date: <input type="checkbox"/> New <input type="checkbox"/> Modified <input type="checkbox"/> Relocated	
Manufacturer:	Model:	Control Device Name:
Design Inlet Volume: scfm	Adsorbent charge per adsorber vessel and number of adsorber vessels:	
Length of Mass Transfer Zone supplied by the manufacturer:	Adsorber diameter: ft	Adsorber area: ft ²
Adsorbent type and physical properties:	Overall Control Efficiency (%):	
Working Capacity of Adsorbent (%):		

Operating Parameters

Inlet volume: scfm @ °F	
Adsorption time per adsorption bed (life expectancy):	Breakthrough Capacity (lbs of VOC/100 lbs of adsorbent):
Temperature range of carbon bed adsorber. °F - °F	

Control Device Technical Data

Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)

Describe the warning and/or alarm system that protects against operation when unit is not meeting the design requirements:

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

Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty.

Additional information attached? Yes No

Please attach copies of manufacturer's data sheets, drawings, and performance testing.

VAPOR RECOVERY UNIT – Not Applicable

General Information

Emission Unit ID#:

Installation Date: TBD

New

Modified

Relocated

Device Information

Manufacturer:

Model:

List the emission units whose emissions are controlled by this vapor recovery unit (Emission Point ID# Low Pressure Tower)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description

If this vapor recovery unit controls emissions from more than six (6) emission units, please attach additional pages.

Additional information attached? Yes No

Please attach copies of manufacturer's data sheets, drawings, and performance testing.

The registrant may claim a capture and control efficiency of 95 % (which accounts for 5% downtime) for the vapor recovery unit.

The registrant may claim a capture and control efficiency of 98% if the VRU has a backup flare that meet the requirements of Section 8.1.2 of this general permit.

The registrant may claim a capture and control efficiency of 98% if the VRU has a backup VRU.



Environmental Control Equipment Data Sheet

Item/Tag No., Project No., Project, P.O. No., RFQ No., Ref. P&ID, Remarks, Page, Revision, Date, By, Checked, Approved, Supplier, Model No.

Client, Site, Unit/Lease

GENERAL

Design Code, Service, Description, NDE, Customer Specs

PROCESS DATA

Gas Composition, Process Conditions, Detailed Process Description / Process Notes, Other Components, Available Utilities

DESIGN DATA

Ambient Temperatures, Design Conditions, Area Classification, Electrical Design Code, Noise Performance Requirements, Structural Design Code, Wind Design Code, Pressure/Speed, Category, Seismic Design Code, Location

EQUIPMENT SPECIFICATION

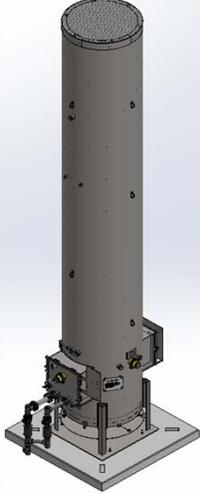
Type, Equipment Design, Component, Material / Size / Rating / Other, Burner, Pilot, Firebox / Stack, Flare Burner, Pilot, Pilot Air Inspirator, Pilot Flame Control, Pilot Ignition, Pilot Ignition Backup



**Environmental Control Equipment
Data Sheet**

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

EQUIPMENT SPECIFICATION

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

FABRICATION AND INSPECTION

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

Additional Notes:

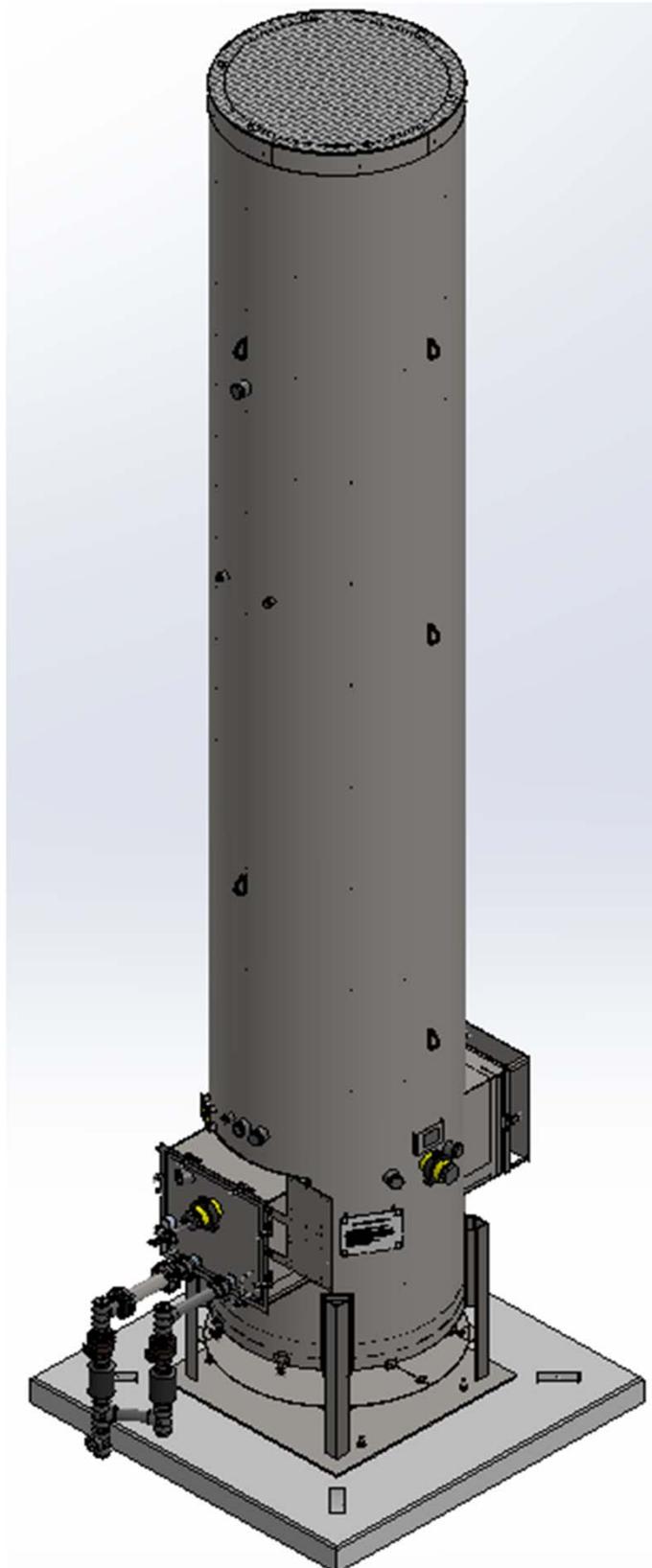


Environmental Control Equipment
Data Sheet

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

Client:	
Site:	
Unit/Lease:	

GENERAL ARRANGEMENT



§ MMBTU/hr values are calculated based on 1500 BTU/scf gas

Flare Size	# of Orifices (N)	Pressure (OZ/in ²)	m ³ /s	mSCFD	MMBTU/hr
18	2	1	0.0021	6.34	0.39
18	2	2	0.0029	8.97	0.56
18	2	3	0.0036	10.99	0.68
18	2	4	0.0042	12.69	0.78
18	2	5	0.0046	14.18	0.88
18	2	6	0.0051	15.54	0.96
18	2	7	0.0055	16.78	1.04
18	2	8	0.0059	17.94	1.11
18	2	9	0.0062	19.03	1.18
18	2	10	0.0066	20.06	1.24
18	2	11	0.0069	21.04	1.30
18	2	12	0.0072	21.97	1.36
18	2	13	0.0075	22.87	1.42
18	2	14	0.0078	23.73	1.47
18	2	15	0.0081	24.57	1.52
18	2	16	0.0083	25.37	1.57
18	2	17	0.0086	26.15	1.62
18	2	18	0.0088	26.91	1.67
24	4	1	0.0042	12.69	0.78
24	4	2	0.0059	17.94	1.11
24	4	3	0.0072	21.97	1.36
24	4	4	0.0083	25.37	1.57
24	4	5	0.0093	28.37	1.76
24	4	6	0.0102	31.08	1.92
24	4	7	0.0110	33.56	2.08
24	4	8	0.0118	35.88	2.22
24	4	9	0.0125	38.06	2.35
24	4	10	0.0131	40.12	2.48
24	4	11	0.0138	42.08	2.60
24	4	12	0.0144	43.95	2.72
24	4	13	0.0150	45.74	2.83
24	4	14	0.0156	47.47	2.94
24	4	15	0.0161	49.13	3.04
24	4	16	0.0166	50.75	3.14
24	4	17	0.0171	52.31	3.24
24	4	18	0.0176	53.82	3.33
36	10	1	0.0104	31.72	1.96
36	10	2	0.0147	44.85	2.78
36	10	3	0.0180	54.93	3.40

36	10	4	0.0208	63.43	3.92
36	10	5	0.0232	70.92	4.39
36	10	6	0.0255	77.69	4.81
36	10	7	0.0275	83.91	5.19
36	10	8	0.0294	89.71	5.55
36	10	9	0.0312	95.15	5.89
36	10	10	0.0329	100.29	6.21
36	10	11	0.0345	105.19	6.51
36	10	12	0.0360	109.87	6.80
36	10	13	0.0375	114.35	7.08
36	10	14	0.0389	118.67	7.34
36	10	15	0.0403	122.83	7.60
36	10	16	0.0416	126.86	7.85
36	10	17	0.0429	130.77	8.09
36	10	18	0.0441	134.56	8.33
48	14	1	0.0146	44.40	2.75
48	14	2	0.0206	62.79	3.89
48	14	3	0.0252	76.91	4.76
48	14	4	0.0291	88.80	5.49
48	14	5	0.0325	99.29	6.14
48	14	6	0.0356	108.76	6.73
48	14	7	0.0385	117.48	7.27
48	14	8	0.0412	125.59	7.77
48	14	9	0.0437	133.21	8.24
48	14	10	0.0460	140.41	8.69
48	14	11	0.0483	147.27	9.11
48	14	12	0.0504	153.81	9.52
48	14	13	0.0525	160.09	9.91
48	14	14	0.0545	166.14	10.28
48	14	15	0.0564	171.97	10.64
48	14	16	0.0582	177.61	10.99
48	14	17	0.0600	183.07	11.33
48	14	18	0.0617	188.38	11.66

ATTACHMENT S

Emission Calculations

Company Name: EOT Production, LLC
 Facility Name: BIG 177 Wellpad
 Project Description: G70B Application

Facility-Wide Emission Summary - Controlled

Wells	7	per pad	Carbon equivalent emissions (CO ₂ e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:			
Storage Tanks	8	per pad	CO ₂	1		
Sand Separator Tank	1	per pad	CH ₄	25		
Line Heaters	10	per pad	N ₂ O	298		
TEGs	2	per pad				
Dehy Reboiler	0	per pad				
Glycol Dehy	0	per pad				
Dehy Drip Tank	0	per pad				
Dehy Combustor	0	per pad				
Compressor	0	per pad				
High Pressure Separator	7	per pad				
Low Pressure Separator	0	per pad				
Vapor Recovery Unit	0	per pad				
Tank Combustor	2	per pad				
Length of lease road	1,000	feet				

Emission Point ID #	Emission Source ID#s	Emission Source Description	NO _x		CO		VOC		SO ₂		PM ₁₀		PM _{2.5}		CO ₂ e	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
C001-C002	S001-S008	Storage Vessels	---	---	---	---	0.61	2.66	---	---	---	---	---	---	6	26
C001-C002	S022	Captured Liquid Loading	---	---	---	---	0.16	0.04	---	---	---	---	---	---	---	---
C001	C001	Tank Combustor	1.15	5.02	0.96	4.22	0.00	0.00	0.01	0.03	0.09	0.38	0.09	0.38	1,368	5,992
C002	C002	Tank Combustor	1.15	5.02	0.96	4.22	0.00	0.00	0.01	0.03	0.09	0.38	0.09	0.38	1,368	5,992
C001	S001-S008, S022, C001	---	1.15	5.02	0.96	4.22	0.38	1.35	0.01	0.03	0.09	0.38	0.09	0.38	1,371	6,005
C002	S001-S008, S022, C002	---	1.15	5.02	0.96	4.22	0.38	1.35	0.01	0.03	0.09	0.38	0.09	0.38	1,371	6,005
E009	S009	Sand Separator Tank	---	---	---	---	0.10	0.42	---	---	---	---	---	---	0	2
E010	S010	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E011	S011	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E012	S012	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E013	S013	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E014	S014	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E015	S015	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E016	S016	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E017	S017	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E018	S018	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E019	S019	Line Heater	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E020	S020	TEG	1.2E-03	5.4E-03	1.0E-03	4.5E-03	6.8E-05	3.0E-04	7.4E-06	3.2E-05	9.4E-05	4.1E-04	9.4E-05	4.1E-04	2	7
E021	S021	TEG	1.2E-03	5.4E-03	1.0E-03	4.5E-03	6.8E-05	3.0E-04	7.4E-06	3.2E-05	9.4E-05	4.1E-04	9.4E-05	4.1E-04	2	7
E022	S022	Uncaptured Liquid Loading	---	---	---	---	3.45	0.90	---	---	---	---	---	---	---	---
---	---	Fugitives	---	---	---	---	---	27.36	---	---	---	---	---	---	---	1,117
---	---	Haul Roads	---	---	---	---	---	---	---	---	0.97	---	0.10	---	---	---
Facility Total			3.76	16.46	3.16	13.83	4.39	31.74	0.02	0.10	0.29	2.23	0.29	1.35	4,547	21,034
Facility Total (excluding fugitive emissions)			3.76	16.46	3.16	13.83	0.95	3.48	0.02	0.10	0.29	1.25	0.29	1.25	4,547	19,917

Company Name: EOT Production, LLC
 Facility Name: BIG 177 Wellpad
 Project Description: G70B Application

Facility-Wide Emission Summary - Controlled
--

Emission Point ID #	Emission Source ID#s	Emission Source Description	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		n-Hexane		Total HAP	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
C001-C002	S001-S008	Storage Vessels	---	---	4.0E-04	1.8E-03	1.4E-03	0.01	2.3E-04	1.0E-03	1.3E-03	0.01	0.01	0.06	0.03	0.14
C001-C002	S022	Captured Liquid Loading	---	---	7.0E-05	1.8E-05	2.1E-04	5.4E-05	3.7E-05	9.7E-06	2.0E-04	5.2E-05	3.0E-03	7.8E-04	0.01	0.00
C001	C001	Tank Combustor	---	---	---	---	---	---	---	---	---	---	---	---	---	---
C002	C002	Tank Combustor	---	---	---	---	---	---	---	---	---	---	---	---	---	---
C001	S001-S008, S022, C001	---	---	---	2.4E-04	8.9E-04	7.8E-04	3.0E-03	1.3E-04	5.1E-04	7.3E-04	2.8E-03	0.01	0.03	0.02	0.07
C002	S001-S008, S022, C002	---	---	---	2.4E-04	8.9E-04	7.8E-04	3.0E-03	1.3E-04	5.1E-04	7.3E-04	2.8E-03	0.01	0.03	0.02	0.07
E009	S009	Sand Separator Tank	---	---	<0.01	1.0E-03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.0E-03	0.01	2.0E-03	0.01
E010	S010	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E011	S011	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E012	S012	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E013	S013	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E014	S014	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E015	S015	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E016	S016	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E017	S017	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E018	S018	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E019	S019	Line Heater	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E020	S020	TEG	9.3E-07	4.1E-06	2.6E-08	1.1E-07	4.2E-08	1.8E-07	---	---	---	---	2.2E-05	9.7E-05	2.3E-05	1.0E-04
E021	S021	TEG	9.3E-07	4.1E-06	2.6E-08	1.1E-07	4.2E-08	1.8E-07	---	---	---	---	2.2E-05	9.7E-05	2.3E-05	1.0E-04
E022	S022	Uncaptured Liquid Loading	---	---	1.5E-03	3.9E-04	4.4E-03	1.1E-03	8.0E-04	2.1E-04	4.3E-03	1.1E-03	0.06	0.02	0.15	0.04
---	---	Fugitives	---	---	---	0.02	---	0.06	---	7.8E-03	---	0.07	---	0.65	---	0.86
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Facility Total			1.1E-03	4.8E-03	2.0E-03	0.03	0.01	0.07	1.1E-03	0.01	0.01	0.07	0.11	0.85	0.22	1.17
Facility Total (excluding fugitive emissions)			1.1E-03	4.8E-03	5.0E-04	2.9E-03	1.6E-03	0.01	2.7E-04	1.0E-03	1.5E-03	0.01	0.04	0.18	0.07	0.28

1. Emissions routed to combustors are divided equally between the total number of combustors. However, emissions can be routed to either combustor.

Company Name: EQT Production, LLC
 Facility Name: BIG 177 Wellpad
 Project Description: G70B Application

Storage Vessels

Potential Throughput

Operational Hours 8,760 hrs/yr
 Maximum Condensate Throughput¹ 861 bbl/month
 Maximum Produced Water Throughput² 17,187 bbl/month

¹ Based on the highest monthly throughput recorded at the BIG 7 Wellpad (November 2013).

² Based on the highest monthly throughput recorded at the BIG 7 Wellpad (November 2013).

³ Composition was taken from the BIG7 well pad, located approximately 1.8 miles from the proposed well pad and determined to be representative of the composition of the proposed pad.

Overall Control Efficiency of Combustor 98%

Storage Tanks - Uncontrolled

	Breathing		Working		Flashing		Total Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Methane	<0.001	<0.001	<0.001	<0.001	11.960	52.384	11.960	52.384
Ethane	<0.001	<0.001	<0.001	<0.001	10.854	47.541	10.854	47.541
Propane	2.2E-01	9.7E-01	9.1E-02	4.0E-01	9.208	40.330	9.521	41.702
Isobutane	7.5E-02	3.3E-01	3.1E-02	1.4E-01	3.632	15.910	3.739	16.377
n-Butane	1.3E-01	5.7E-01	5.4E-02	2.4E-01	6.395	28.010	6.579	28.817
Isopentane	6.2E-02	2.7E-01	2.6E-02	1.1E-01	3.153	13.810	3.241	14.196
n-Pentane	4.3E-02	1.9E-01	1.8E-02	7.8E-02	2.221	9.729	2.282	9.996
n-Hexane	1.2E-02	5.1E-02	4.8E-03	2.1E-02	0.630	2.761	0.647	2.833
Cyclohexane	1.1E-03	4.8E-03	4.6E-04	2.0E-03	0.070	0.306	0.071	0.313
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	2.1E-02	9.4E-02	8.8E-03	3.9E-02	1.270	5.561	1.300	5.694
n-Octane	7.2E-03	3.1E-02	2.9E-03	1.3E-02	0.442	1.937	0.452	1.981
n-Nonane	3.6E-03	1.6E-02	1.5E-03	6.6E-03	0.235	1.031	0.241	1.053
n-Decane	2.0E-03	8.8E-03	8.3E-04	3.6E-03	0.138	0.604	0.141	0.617
n-Undecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dodecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Triethylene Glycol	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Isohexane	2.2E-02	9.4E-02	8.9E-03	3.9E-02	1.152	5.044	1.182	5.177
3-Methylpentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2,3-Dimethylbutane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methylcyclohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Decane, 2-Methyl-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	2.7E-04	1.2E-03	1.1E-04	4.8E-04	0.020	0.087	0.020	0.088
Toluene	7.9E-04	3.5E-03	3.3E-04	1.4E-03	0.066	0.291	0.068	0.296
Ethylbenzene	1.4E-04	6.3E-04	5.9E-05	2.6E-04	0.011	0.050	0.012	0.051
m-Xylene	7.7E-04	3.4E-03	3.2E-04	1.4E-03	0.062	0.271	0.063	0.276
Isooctane	1.4E-02	6.0E-02	5.6E-03	2.5E-02	0.802	3.511	0.821	3.595
Total VOC Emissions:	0.62	2.70	0.25	1.12	29.51	129.24	30.38	133.06
Total HAP Emissions:	0.03	0.12	0.01	0.05	1.59	6.97	1.63	7.14

¹ Uncontrolled emissions calculation using Promax (sum of produced water and condensate). Non-methane emissions are taken from the tank emissions stencil. Methane emissions are taken from the flash stream composition.

Company Name: EQT Production, LLC
 Facility Name: BIG 177 Wellpad
 Project Description: G70B Application

Storage Vessels

Storage Tanks - Controlled

	Breathing		Working		Flashing		Total Emissions	
	lb/hr	tpy			lb/hr	tpy	lb/hr	tpy
Methane	<0.001	<0.001	<0.001	<0.001	0.239	1.048	0.239	1.048
Ethane	<0.001	<0.001	<0.001	<0.001	0.217	0.951	0.217	0.951
Propane	4.4E-03	1.9E-02	1.8E-03	8.0E-03	0.184	0.807	0.190	0.834
Isobutane	1.5E-03	6.6E-03	6.2E-04	2.7E-03	0.073	0.318	0.075	0.328
n-Butane	2.6E-03	1.1E-02	1.1E-03	4.7E-03	0.128	0.560	0.132	0.576
Isopentane	1.2E-03	5.5E-03	5.2E-04	2.3E-03	0.063	0.276	0.065	0.284
n-Pentane	8.6E-04	3.8E-03	3.6E-04	1.6E-03	0.044	0.195	0.046	0.200
n-Hexane	2.3E-04	1.0E-03	9.5E-05	4.2E-04	0.013	0.055	0.013	0.057
Cyclohexane	2.2E-05	9.7E-05	9.1E-06	4.0E-05	0.001	0.006	0.001	0.006
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	4.3E-04	1.9E-03	1.8E-04	7.8E-04	0.025	0.111	0.026	0.114
n-Octane	1.4E-04	6.3E-04	5.9E-05	2.6E-04	0.009	0.039	0.009	0.040
n-Nonane	7.3E-05	3.2E-04	3.0E-05	1.3E-04	0.005	0.021	0.005	0.021
n-Decane	4.0E-05	1.8E-04	1.7E-05	7.3E-05	0.003	0.012	0.003	0.012
n-Undecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dodecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Triethylene Glycol	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Isohexane	4.3E-04	1.9E-03	1.8E-04	7.8E-04	0.023	0.101	0.024	0.104
3-Methylpentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2,3-Dimethylbutane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methylcyclohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Decane, 2-Methyl-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	5.3E-06	2.3E-05	2.2E-06	9.7E-06	0.000	0.002	0.000	0.002
Toluene	1.6E-05	6.9E-05	6.5E-06	2.9E-05	0.001	0.006	0.001	0.006
Ethylbenzene	2.9E-06	1.3E-05	1.2E-06	5.2E-06	0.000	0.001	0.000	0.001
m-Xylene	1.5E-05	6.7E-05	6.3E-06	2.8E-05	0.001	0.005	0.001	0.006
Isooctane	2.7E-04	1.2E-03	1.1E-04	4.9E-04	0.016	0.070	0.016	0.072
Total VOC Emissions:	0.01	0.05	0.01	0.02	0.59	2.58	0.61	2.66
Total HAP Emissions:	5.4E-04	2.4E-03	2.2E-04	9.8E-04	0.03	0.14	0.03	0.14

Company Name: EQT Production, LLC
Facility Name: BIG 177 Wellpad
Project Description: G70B Application

Sand Separator Tank

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

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

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

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

Constituent	Total Emissions ¹	
	lb/hr	tpy
Methane	0.016	0.069
Ethane	0.015	0.065
Propane	0.027	0.119
Isobutane	0.019	0.084
n-Butane	0.018	0.079
Isopentane	0.015	0.065
n-Pentane	0.006	0.028
n-Hexane	0.002	0.009
Cyclohexane	---	---
Other Hexanes	0.005	0.020
Heptanes	0.002	0.009
Benzene	<0.001	0.001
Toluene	<0.001	<0.001
Ethylbenzene	<0.001	<0.001
Xylenes	<0.001	<0.001
2,2,4-Trimethylpentane	<0.001	<0.001
C8+ Heavies	0.001	0.004
Total HC Emissions:	0.126	0.553
Total VOC Emissions:	0.096	0.419
Total HAP Emissions:	0.002	0.010

¹ E&P TANK 2.0 calculates working, breathing and flashing losses and reports the sum as one total.

² E&P TANK v2.0 emission calculations are based on a sample in E&P TANK Geographic Database.

Company Name: EQT Production, LLC
Facility Name: BIG 177 Wellpad
Project Description: G70B Application

Sand Separator Tank

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

Constituent	Total Emissions	
	lb/hr	tpy
Methane	0.016	0.069
Ethane	0.015	0.065
Propane	0.027	0.119
Isobutane	0.019	0.084
n-Butane	0.018	0.079
Isopentane	0.015	0.065
n-Pentane	0.006	0.028
n-Hexane	0.002	0.009
Cyclohexane	<0.001	<0.001
Other Hexanes	0.005	0.020
Heptanes	0.002	0.009
Benzene	<0.001	0.001
Toluene	<0.001	<0.001
Ethylbenzene	<0.001	<0.001
Xylenes	<0.001	<0.001
2,2,4-Trimethylpentane	<0.001	<0.001
C8+ Heavies	0.001	0.004
Total Emissions:	0.126	0.554
Total VOC Emissions:	0.096	0.419
Total HAP Emissions:	0.002	0.010

Company Name: EQT Production, LLC
 Facility Name: BIG 177 Wellpad
 Project Description: G70B Application

Tank Combustors

Source Designation:	C001-C002
Pilot Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,050
Pilot Rating (MMBtu/hr)	0.03
Combustor Rating (MMBtu/hr) ¹	11.66
Combustor Rating (Mscfd) ¹	188.38
Combustor Rating (scf/hr)	7849.17
Pilot Fuel Consumption (scf/hr):	24.72
Potential Annual Hours of Operation (hr/yr):	8,760

¹ Maximum heat input for 48" model from Leed Enclosed Combustor Operations Manual

Enclosed Combustor Emissions

Pollutant	Emission	Combustor			Pilot		Total	
	Factors ² (lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	
NO _x	0.10	1.14	5.01	2.5E-03	0.01	1.15	5.02	
CO	0.08	0.96	4.21	2.1E-03	0.01	0.96	4.22	
VOC	5.4E-03	---	---	1.4E-04	6.1E-04	1.4E-04	6.1E-04	
SO ₂	5.9E-04	0.01	0.03	1.5E-05	6.7E-05	0.01	0.03	
PM/PM ₁₀	0.01	0.09	0.38	1.9E-04	8.5E-04	0.09	0.38	
CO ₂	116.997	1364.189	5975.146	3.04	13.30	1367.23	5988.45	
CH ₄	2.2E-03	---	---	5.7E-05	2.5E-04	5.7E-05	2.5E-04	
N ₂ O	2.2E-04	2.6E-03	0.01	5.7E-06	2.5E-05	2.6E-03	0.01	

² 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 the BIG-177 Pad. 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.

Combustor Maximum Loading:

$$\frac{7849.17 \text{ scf}}{\text{hr}} \times \frac{\text{lb-mol}}{379.5 \text{ scf}} \times \frac{19.6 \text{ lb}}{\text{lb-mol}} = 405.45 \text{ lb/hr}$$

Company Name: EQT Production, LLC
Facility Name: BIG 177 Wellpad
Project Description: G70B Application

Line Heaters

Source Designation:	S010-S019
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,050
Heat Input (MMBtu/hr)	1.54
Fuel Consumption (mmscf/hr):	1.47E-03
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf) ¹	Potential Emissions	
		(lb/hr) ²	(tons/yr) ³
NO _x	100	0.15	0.64
CO	84	0.12	0.54
VOC	5.5	0.01	0.04
SO ₂	0.6	8.8E-04	3.9E-03
PM Total	7.6	0.01	0.05
PM Condensable	5.7	0.01	0.04
PM ₁₀ (Filterable)	1.9	0.00	0.01
PM _{2.5} (Filterable)	1.9	0.00	0.01
Lead	5.00E-04	7.3E-07	3.2E-06
CO ₂ ⁴	117.0	180.00	788.38
CH ₄ ⁴	2.21E-03	3.4E-03	1.5E-02
N ₂ O ⁴	2.21E-04	3.4E-04	1.5E-03

Company Name: EQT Production, LLC
 Facility Name: BIG 177 Wellpad
 Project Description: G70B Application

Line Heaters

Hazardous Air Pollutant (HAP) Potential Emissions:

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

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

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 177 Wellpad
 Project Description: G70B Application

Thermoelectric Generator

Source Designation:	S020-S021
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,050
Heat Input (MMBtu/hr) ¹	0.013
Fuel Consumption (mmscf/hr):	1.23E-05
Potential Annual Hours of Operation (hr/yr):	8,760

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

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf) ¹	Potential Emissions	
		(lb/hr) ²	(tons/yr) ³
NO _x	100	1.2E-03	0.01
CO	84	1.0E-03	4.5E-03
VOC	5.5	6.8E-05	3.0E-04
SO ₂	0.6	7.4E-06	3.2E-05
PM Total	7.6	9.4E-05	4.1E-04
PM Condensable	5.7	7.0E-05	3.1E-04
PM ₁₀ (Filterable)	1.9	2.3E-05	1.0E-04
PM _{2.5} (Filterable)	1.9	2.3E-05	1.0E-04
Lead	5.00E-04	6.2E-09	2.7E-08
CO ₂ ⁴	116.9	1.51	6.64
CH ₄ ⁴	2.21E-03	2.9E-05	1.3E-04
N ₂ O ⁴	2.21E-04	2.9E-06	1.3E-05

Company Name: EQT Production, LLC
 Facility Name: BIG 177 Wellpad
 Project Description: G70B Application

Thermoelectric Generator

Hazardous Air Pollutant (HAP) Potential Emissions:

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

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

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 177 Wellpad
 Project Description: G70B Application

Liquid Loading

Throughput 9,142,352 gal/yr
 Capture Efficiency 70% non-tested tanker trucks
 Control Efficiency 98% Combustor destruction efficiency

Liquid Loading Emissions

	Uncontrolled Emissions		Uncaptured Emissions		Controlled Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Propane	4.127	1.073	1.238	0.322	0.058	0.015
Isobutane	1.405	0.365	0.422	0.110	0.020	0.005
n-Butane	2.427	0.631	0.728	0.189	0.034	0.009
Isopentane	1.163	0.302	0.349	0.091	0.016	0.004
n-Pentane	0.804	0.209	0.241	0.063	0.011	0.003
n-Hexane	0.215	0.056	0.065	0.017	0.003	0.001
Cyclohexane	0.021	0.005	0.006	0.002	2.9E-04	7.5E-05
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	0.399	0.104	0.120	0.031	0.006	0.001
n-Octane	0.133	0.035	0.040	0.010	0.002	4.8E-04
n-Nonane	0.068	0.018	0.020	0.005	0.001	2.5E-04
n-Decane	0.037	0.010	0.011	0.003	0.001	1.4E-04
n-Undecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dodecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Triethylene Glycol	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Isohexane	0.401	0.104	0.120	0.031	0.006	0.001
3-Methylpentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Neohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2,3-Dimethylbutane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methylcyclohexane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Decane, 2-Methyl-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	0.005	0.001	0.001	3.9E-04	7.0E-05	1.8E-05
Toluene	0.015	0.004	0.004	0.001	2.1E-04	5.4E-05
Ethylbenzene	0.003	0.001	0.001	2.1E-04	3.7E-05	9.7E-06
m-Xylene	0.014	0.004	0.004	0.001	2.0E-04	5.2E-05
Isooctane	0.254	0.066	0.076	0.020	0.004	0.001
Total VOC Emissions:	11.491	2.988	3.447	0.896	0.161	0.042
Total HAP Emissions:	0.506	0.132	0.152	0.039	0.007	0.002

¹ Uncontrolled emissions calculation using Promax (sum of produced water and condensate).

² Hourly emissions assume two hours of loading per day, five days per week.

Company Name: EOT Production, LLC
 Facility Name: BIG 177 Wellpad
 Project Description: G70B Application

Fugitive Emissions

Fugitive Emissions from Component Leaks

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

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

Fugitive VOC/Total Emissions from Component Leaks

Equipment Type	Service	Emission Factors ¹ (kg/hr/source)	Facility Equipment Count ² (units)	TOC Annual Fugitive Emissions (tpy)	Weight Fraction VOC	Weight Fraction HAP	VOC Emissions ³ (tpy)	HAP Emissions ³ (tpy)
Pumps	Light Liquid	0.01990	9	1.73	1.000	0.031	1.73	0.05
Valves	Gas	0.00597	431	24.82	0.167	0.005	4.14	0.13
Pressure Relief Valves	Gas	0.10400	33	33.14	0.167	0.005	5.52	0.17
Open-Ended Lines	All	0.00170	36	0.59	0.167	0.005	0.10	3.08E-03
Connectors	All	0.00183	1910	33.74	0.167	0.005	5.62	0.18
Pneumatic Devices ⁴	Gas	13.5	35				5.95	0.19
Emission Totals:				94.02			23.05	0.72

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). SOCM1 factors were used as it was representative of natural gas liquids extraction. The pneumatic controller value is from 40 CFR 98 Subpart W, Table W-1A. Pneumatic assumes operation 1/3 of the year.

² Assumes one pump for each tank, no compressors, and one meter per wellhead. Pressure relief valves count includes an Enardo valve and Emergency Pressure Relief valve for each storage tank. Pneumatic devices assume 5 per well. A 50% compliance margin is added to the component counts based on Subpart W counts.

³ Potential emissions VOC/HAP (tpy) = Emission factor (kg/hr/source) * Number of Sources * Weight % VOC/HAP x 2.2046 (lb/kg) x 8,760 (hr/yr) ÷ 2,000 (lb/ton)

⁴ Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

Company Name: EOT Production, LLC
 Facility Name: BIG 177 Wellpad
 Project Description: G70B Application

Fugitive Emissions

Fugitive Emissions from Venting

Source	Volume (scf/yr)	VOC Emissions (tpy)	Benzene Emissions (tpy)	Toluene Emissions (tpy)	Ethylbenzene Emissions (tpy)	Xylene Emissions (tpy)	n-Hexane Emissions (tpy)	HAP Emissions (tpy)	CH ₄ Emissions (tpy)	CO ₂ Emissions (tpy)	CO ₂ e Emissions (tpy)
Miscellaneous Gas Venting	1,000,000	4.31	0.00	0.01	0.00	0.01	0.11	0.13	17.43	0.09	435.95
Total		4.31	0.00	0.01	0.00	0.01	0.11	0.13	17.43	0.09	435.95

¹ VOC and HAP emissions are based on sum of the fractions of the pollutants in the site-specific gas analysis in those classifications, and are calculated in accordance with standard conversion methodology and factors.

² CH₄ and CO₂ emissions are based on fractions of these pollutants in the site-specific gas analysis, and are calculated in accordance with Equations W-35 and W-36 in Subpart W of 40 CFR 98.

³ GHG (CO₂e) is carbon dioxide equivalent, which is the summation of CO₂ (GWP = 1) + CH₄ (GWP = 25) + N₂O (GWP = 298).

⁴ Total gas volume emitted (and thus subsequent emissions values) is estimated based on engineering judgement and is conservative.

⁵ Total gas volume emitted includes blowdowns and other venting activities.

⁶ Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

⁷ Potential emissions CH₄/CO₂ (tpy) = Gas volume vented (scf/yr) * Mole % CH₄/CO₂ ÷ 100 * Density CH₄/CO₂ (kg/scf) * 1,000 (g/kg) ÷ 453.6 (g/lb) ÷ 2,000 (lb/ton)

Company Name: EQT Production, LLC
 Facility Name: BIG 177 Wellpad
 Project Description: G70B Application

Haul Roads

Estimated Potential Road Fugitive Emissions

Unpaved Road Emissions

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

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

Description	Weight of Empty Truck (tons)	Weight of Truck w/ Max Load (tons)	Mean Vehicle Weight (tons)	Length of Unpaved Road Traveled (mile)	Trips Per Year	Mileage Per Year	Control (%)	Emissions (tpy)		
								PM	PM ₁₀	PM _{2.5}
Liquids Hauling	20	40	30	0.38	2,286	1,732	0	3.71	0.95	0.09
Employee Vehicles	3	3	3	0.38	200	152	0	0.12	0.03	0.00
Total Potential Emissions								3.82	0.97	0.10

Company Name: EQT Production, LLC
 Facility Name: BIG 177 Wellpad
 Project Description: G70B Application

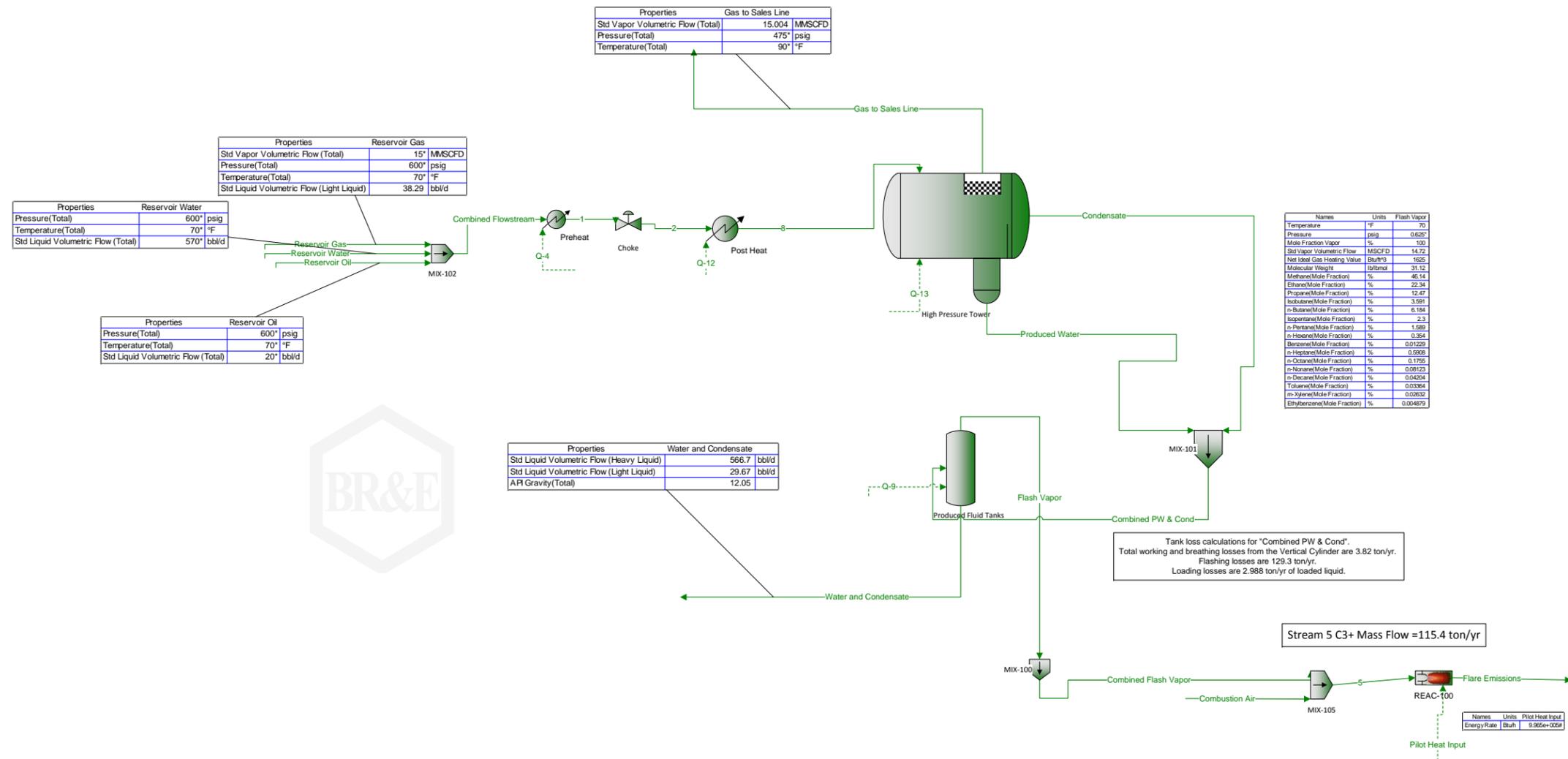
Gas Analysis

Sample Location: BIG 7 (513867)
 Sample Date: 10/28/2015
 HHV (Btu/scf): 1,194 Note: A conservatively low BTU content of 1,050 was used for calculations.

Constituent	Natural Gas Stream Speciation (Mole %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.156	44.01	0.07	0.00	0.450
Nitrogen	0.451	28.01	0.13	0.01	0.533
Methane	82.377	16.04	13.21	0.67	63.492
Ethane	12.410	30.07	3.73	0.19	18.861
Propane	2.765	44.10	1.22	0.06	7.659
Isobutane	0.481	58.12	0.28	0.01	1.399
n-Butane	0.710	58.12	0.41	0.02	2.672
Isopentane	0.206	72.15	0.15	0.01	0.780
n-Pentane	0.136	72.15	0.10	0.00	0.613
Cyclopentane	<0.001	70.1	<0.01	<0.01	0.000
n-Hexane	0.027	86.18	0.02	0.00	0.416
Cyclohexane	0.004	84.16	0.00	0.00	0.058
Other Hexanes	0.051	86.18	0.04	0.00	0.885
Heptanes	0.053	100.21	0.05	0.00	0.789
Methylcyclohexane	<0.001	98.19	<0.01	<0.01	0.000
2,2,4-Trimethylpentane	0.044	114.23	0.05	0.00	0.002
Benzene*	0.001	78.11	0.00	0.00	0.014
Toluene*	0.003	92.14	0.00	0.00	0.041
Ethylbenzene*	0.001	106.17	0.00	0.00	0.005
Xylenes*	0.005	106.16	0.01	0.00	0.043
C8 + Heavies	0.093	130.80	0.12	0.01	1.288
Totals	99.973		19.60	1.00	100

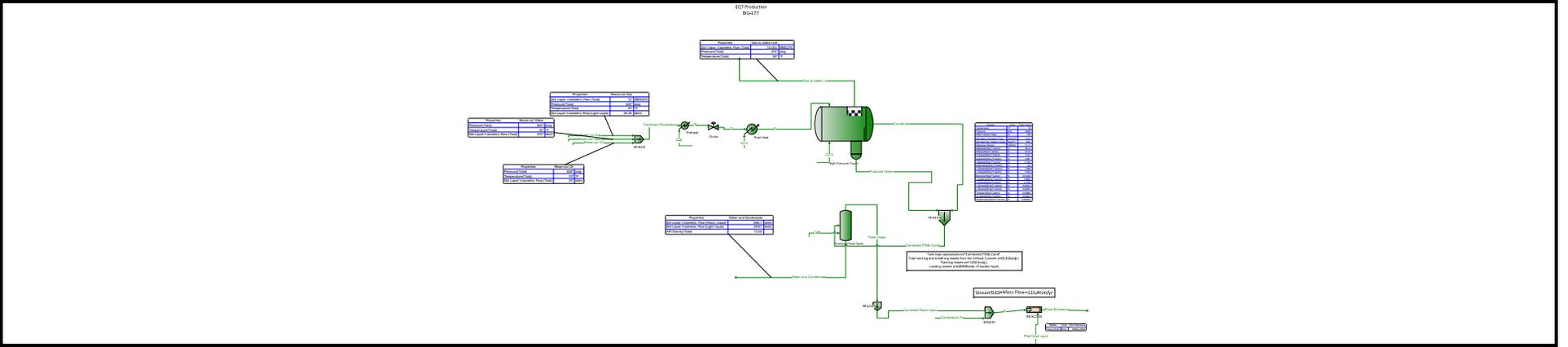
TOC (Total)	99.36	99.02
VOC (Total)	4.58	16.66
HAP (Total)	0.08	0.52

EQT Production
BIG-177



BIG 177 Plant Schematic

Client Name:	EQT	Job: V1.0
Location:	BIG-177	
Flowsheet:	BIG 177	



* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	EQT	Job: V1.0
Location:	BIG-177	
Flowsheet:	BIG 177	

Connections

	Combined Flash Vapor	Combined Flowstream	Combined PW & Cond	Flash Vapor
From Block	MIX-100	MIX-102	MIX-101	Produced Fluid Tanks
To Block	MIX-105	Preheat	Produced Fluid Tanks	MIX-100

Stream Composition

Mole Fraction	Combined Flash Vapor %	Combined Flowstream %	Combined PW & Cond %	Flash Vapor %
Nitrogen	0.105895	0.352018	0.000371657	0.105895
Methane	46.1385	64.2976	0.163558	46.1385
CO2	0.553142	0.121765	0.00227591	0.553142
Ethane	22.3397	9.68667	0.0829352	22.3397
Propane	12.4739	2.15968	0.0535647	12.4739
Isobutane	3.59096	0.3767	0.0196439	3.59096
n-Butane	6.18437	0.558223	0.0392651	6.18437
Isopentane	2.30006	0.166084	0.0259712	2.30006
n-Pentane	1.58874	0.112192	0.0222103	1.58874
n-Hexane	0.353955	0.0272942	0.0140613	0.353955
Methylcyclopentane	0	0	0	0
Benzene	0.0122874	0.000930903	0.000558159	0.0122874
Cyclohexane	0.0400997	0.00312211	0.00200832	0.0400997
n-Heptane	0.590773	0.0636512	0.0712558	0.590773
n-Octane	0.175477	0.0326429	0.0696776	0.175477
n-Nonane	0.0812332	0.032624	0.104091	0.0812332
n-Decane	0.0420414	0.0446008	0.173912	0.0420414
n-Undecane	0	0	0	0
Dodecane	0	0	0	0
Water	2.37794	21.8717	99.0776	2.37794
Triethylene Glycol	0	0	0	0
Oxygen	0	0	0	0
Argon	0	0	0	0
Carbon Monoxide	0	0	0	0
Cyclopentane	0	0	0	0
Isohexane	0.656696	0.0479483	0.0192569	0.656696
3-Methylpentane	0	0	0	0
Neohexane	0	0	0	0
2,3-Dimethylbutane	0	0	0	0
Methylcyclohexane	0	0	0	0
Isooctane	0.329314	0.0343816	0.0366187	0.329314
Decane, 2-Methyl-	0	0	0	0
Toluene	0.0336421	0.00361642	0.00474229	0.0336421
m-Xylene	0.0263231	0.00564392	0.0142297	0.0263231
Ethylbenzene	0.00487931	0.000933776	0.00219641	0.00487931

Molar Flow	Combined Flash Vapor lbmol/h	Combined Flowstream lbmol/h	Combined PW & Cond lbmol/h	Flash Vapor lbmol/h
Nitrogen	0.00171107	7.42977	0.00172169	0.00171107
Methane	0.745517	1357.08	0.757675	0.745517
CO2	0.0089378	2.57	0.0105431	0.0089378
Ethane	0.360971	204.449	0.384195	0.360971
Propane	0.201557	45.5826	0.248137	0.201557
Isobutane	0.0580236	7.95072	0.0909997	0.0580236
n-Butane	0.0999285	11.782	0.181894	0.0999285
Isopentane	0.0371649	3.50539	0.120311	0.0371649
n-Pentane	0.0256712	2.36794	0.102889	0.0256712
n-Hexane	0.00571928	0.576077	0.0651386	0.00571928
Methylcyclopentane	0	0	0	0

* User Specified Values
 ? Extrapolated or Approximate Values

ProMax 3.2.15289.0
 Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	EQT	Job: V1.0
Location:	BIG-177	
Flowsheet:	BIG 177	

Molar Flow	Combined Flash Vapor lbmol/h	Combined Flowstream lbmol/h	Combined PW & Cond lbmol/h	Flash Vapor lbmol/h
Benzene	0.000198543	0.0196478	0.00258565	0.000198543
Cyclohexane	0.00064794	0.065896	0.00930345	0.00064794
n-Heptane	0.00954585	1.34344	0.33009	0.00954585
n-Octane	0.00283541	0.688967	0.322779	0.00283541
n-Nonane	0.00131259	0.688569	0.482196	0.00131259
n-Decane	0.000679315	0.941354	0.805644	0.000679315
n-Undecane	0	0	0	0
Dodecane	0	0	0	0
Water	0.0384234	461.628	458.974	0.0384234
Triethylene Glycol	0	0	0	0
Oxygen	0	0	0	0
Argon	0	0	0	0
Carbon Monoxide	0	0	0	0
Cyclopentane	0	0	0	0
Isohexane	0.0106111	1.01201	0.0892068	0.0106111
3-Methylpentane	0	0	0	0
Neohexane	0	0	0	0
2,3-Dimethylbutane	0	0	0	0
Methylcyclohexane	0	0	0	0
Isooctane	0.00532113	0.725664	0.169635	0.00532113
Decane, 2-Methyl-	0	0	0	0
Toluene	0.000543597	0.0763289	0.0219685	0.000543597
m-Xylene	0.000425336	0.119122	0.0659186	0.000425336
Ethylbenzene	7.8841E-05	0.0197085	0.0101748	7.8841E-05

Mass Fraction	Combined Flash Vapor %	Combined Flowstream %	Combined PW & Cond %	Flash Vapor %
Nitrogen	0.0953254	0.509869	0.000559137	0.0953254
Methane	23.785	53.3327	0.140913	23.785
CO2	0.782261	0.277075	0.00537914	0.782261
Ethane	21.5857	15.0599	0.133927	21.5857
Propane	17.6754	4.92394	0.126848	17.6754
Isobutane	6.70689	1.13205	0.0613169	6.70689
n-Butane	11.5506	1.67756	0.122563	11.5506
Isopentane	5.33257	0.61956	0.100631	5.33257
n-Pentane	3.68341	0.418522	0.0860586	3.68341
n-Hexane	0.980166	0.121613	0.0650758	0.980166
Methylcyclopentane	0	0	0	0
Benzene	0.0308422	0.00375967	0.00234145	0.0308422
Cyclohexane	0.108446	0.0135856	0.00907706	0.108446
n-Heptane	1.90224	0.32977	0.383448	1.90224
n-Octane	0.644117	0.192793	0.427443	0.644117
n-Nonane	0.334794	0.216341	0.716963	0.334794
n-Decane	0.192218	0.32811	1.32889	0.192218
n-Undecane	0	0	0	0
Dodecane	0	0	0	0
Water	1.37661	20.3728	95.8577	1.37661
Triethylene Glycol	0	0	0	0
Oxygen	0	0	0	0
Argon	0	0	0	0
Carbon Monoxide	0	0	0	0
Cyclopentane	0	0	0	0
Isohexane	1.81851	0.213641	0.0891209	1.81851
3-Methylpentane	0	0	0	0
Neohexane	0	0	0	0
2,3-Dimethylbutane	0	0	0	0
Methylcyclohexane	0	0	0	0
Isooctane	1.2088	0.203062	0.22464	1.2088
Decane, 2-Methyl-	0	0	0	0

* User Specified Values
 ? Extrapolated or Approximate Values

ProMax 3.2.15289.0
 Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Process Streams Report
All Streams
 Tabulated by Total Phase

Client Name:	EQT	Job: V1.0
Location:	BIG-177	
Flowsheet:	BIG 177	

Mass Fraction	Combined Flash Vapor %	Combined Flowstream %	Combined PW & Cond %	Flash Vapor %
Toluene	0.0996077	0.0172285	0.023466	0.0996077
m-Xylene	0.0898024	0.0309806	0.0811311	0.0898024
Ethylbenzene	0.0166459	0.00512569	0.0125229	0.0166459

Mass Flow	Combined Flash Vapor lb/h	Combined Flowstream lb/h	Combined PW & Cond lb/h	Flash Vapor lb/h
Nitrogen	0.0479329	208.133	0.0482303	0.0479329
Methane	11.9599	21770.9	12.155	11.9599
CO2	0.393348	113.105	0.463996	0.393348
Ethane	10.854	6147.58	11.5524	10.854
Propane	8.88778	2009.99	10.9417	8.88778
Isobutane	3.37246	462.113	5.28911	3.37246
n-Butane	5.80806	684.794	10.5721	5.80806
Isopentane	2.6814	252.91	8.68028	2.6814
n-Pentane	1.85214	170.844	7.42328	1.85214
n-Hexane	0.492861	49.6437	5.61334	0.492861
Methylcyclopentane	0	0	0	0
Benzene	0.0155085	1.53473	0.20197	0.0155085
Cyclohexane	0.0545303	5.54577	0.782974	0.0545303
n-Heptane	0.956513	134.615	33.0756	0.956513
n-Octane	0.323884	78.6997	36.8706	0.323884
n-Nonane	0.168346	88.3124	61.8441	0.168346
n-Decane	0.0966541	133.937	114.628	0.0966541
n-Undecane	0	0	0	0
Dodecane	0	0	0	0
Water	0.692208	8316.36	8268.54	0.692208
Triethylene Glycol	0	0	0	0
Oxygen	0	0	0	0
Argon	0	0	0	0
Carbon Monoxide	0	0	0	0
Cyclopentane	0	0	0	0
Isohexane	0.914412	87.21	7.68743	0.914412
3-Methylpentane	0	0	0	0
Neohexane	0	0	0	0
2,3-Dimethylbutane	0	0	0	0
Methylcyclohexane	0	0	0	0
Isooctane	0.607825	82.8916	19.3771	0.607825
Decane, 2-Methyl-	0	0	0	0
Toluene	0.0500862	7.03282	2.02414	0.0500862
m-Xylene	0.0451558	12.6466	6.99825	0.0451558
Ethylbenzene	0.00837016	2.09235	1.08021	0.00837016

Stream Properties

Property	Units	Combined Flash Vapor	Combined Flowstream	Combined PW & Cond	Flash Vapor
Temperature	°F	70	69.3402	90.7999	70
Pressure	psig	0.625	600	70 *	0.625 *
Mole Fraction Vapor	%	100	77.8024	0.242039	100
Mole Fraction Light Liquid	%	0	0.35874	0.669536	0
Mole Fraction Heavy Liquid	%	0	21.8388	99.0884	0
Molecular Weight	lb/lbmol	31.1194	19.3407	18.6204	31.1194
Mass Density	lb/ft ³	0.0845531	3.01991	39.7366	0.0845531
Molar Flow	lbmol/h	1.61582	2110.62	463.247	1.61582
Mass Flow	lb/h	50.2835	40820.9	8625.85	50.2835
Vapor Volumetric Flow	ft ³ /h	594.697	13517.3	217.076	594.697
Liquid Volumetric Flow	gpm	74.144	1685.27	27.064	74.144
Std Vapor Volumetric Flow	MMSCFD	0.0147163	19.2227	4.21908	0.0147163
Std Liquid Volumetric Flow	sgpm	0.235271	212.25	17.631	0.235271

* User Specified Values

? Extrapolated or Approximate Values

ProMax 3.2.15289.0
Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Process Streams Report All Streams Tabulated by Total Phase						
Client Name:	EQT				Job: V1.0	
Location:	BIG-177					
Flowsheet:	BIG 177					
Stream Properties						
Property	Units	Combined Flash Vapor	Combined Flowstream	Combined PW & Cond	Flash Vapor	
Specific Gravity		1.07447			1.07447	
API Gravity						
Net Ideal Gas Heating Value	Btu/ft ³	1625.13	846.362	39.264	1625.13	
Net Liquid Heating Value	Btu/lb	19687	16351.2	-221.938	19687	
Gross Ideal Gas Heating Value	Btu/ft ³	1776.97	945.452	92.2296	1776.97	
Gross Liquid Heating Value	Btu/lb	21538.5	18295.5	857.503	21538.5	
Remarks						

Process Streams Report
Stream: Combined Flash Vapor
 Phases Grouped by Columns

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 10:44 AM, 10/30/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Connections

From: MIX-100 To: MIX-105

Composition

Mole Fraction	Total %	Vapor %			
Nitrogen	0.105895	0.105895			
Methane	46.1385	46.1385			
CO2	0.553142	0.553142			
Ethane	22.3397	22.3397			
Propane	12.4739	12.4739			
Isobutane	3.59096	3.59096			
n-Butane	6.18437	6.18437			
Isopentane	2.30006	2.30006			
n-Pentane	1.58874	1.58874			
n-Hexane	0.353955	0.353955			
Methylcyclopentane	0	0			
Benzene	0.0122874	0.0122874			
Cyclohexane	0.0400997	0.0400997			
n-Heptane	0.590773	0.590773			
n-Octane	0.175477	0.175477			
n-Nonane	0.0812332	0.0812332			
n-Decane	0.0420414	0.0420414			
n-Undecane	0	0			
Dodecane	0	0			
Water	2.37794	2.37794			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.656696	0.656696			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0.329314	0.329314			
Decane, 2-Methyl-	0	0			
Toluene	0.0336421	0.0336421			
m-Xylene	0.0263231	0.0263231			
Ethylbenzene	0.00487931	0.00487931			

Molar Flow	Total lbmol/h	Vapor lbmol/h			
Nitrogen	0.00171107	0.00171107			
Methane	0.745517	0.745517			
CO2	0.0089378	0.0089378			
Ethane	0.360971	0.360971			
Propane	0.201557	0.201557			
Isobutane	0.0580236	0.0580236			
n-Butane	0.0999285	0.0999285			
Isopentane	0.0371649	0.0371649			
n-Pentane	0.0256712	0.0256712			
n-Hexane	0.00571928	0.00571928			
Methylcyclopentane	0	0			
Benzene	0.000198543	0.000198543			
Cyclohexane	0.00064794	0.00064794			
n-Heptane	0.00954585	0.00954585			
n-Octane	0.00283541	0.00283541			
n-Nonane	0.00131259	0.00131259			
n-Decane	0.000679315	0.000679315			
n-Undecane	0	0			

* User Specified Values
 ? Extrapolated or Approximate Values

ProMax 3.2.15289.0
 Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Process Streams Report
Stream: Combined Flash Vapor
 Phases Grouped by Columns

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 10:44 AM, 10/30/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Molar Flow	Total lbmol/h	Vapor lbmol/h			
Dodecane	0	0			
Water	0.0384234	0.0384234			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.0106111	0.0106111			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0.00532113	0.00532113			
Decane, 2-Methyl-	0	0			
Toluene	0.000543597	0.000543597			
m-Xylene	0.000425336	0.000425336			
Ethylbenzene	7.8841E-05	7.8841E-05			

Mass Fraction	Total %	Vapor %			
Nitrogen	0.0953254	0.0953254			
Methane	23.785	23.785			
CO2	0.782261	0.782261			
Ethane	21.5857	21.5857			
Propane	17.6754	17.6754			
Isobutane	6.70689	6.70689			
n-Butane	11.5506	11.5506			
Isopentane	5.33257	5.33257			
n-Pentane	3.68341	3.68341			
n-Hexane	0.980166	0.980166			
Methylcyclopentane	0	0			
Benzene	0.0308422	0.0308422			
Cyclohexane	0.108446	0.108446			
n-Heptane	1.90224	1.90224			
n-Octane	0.644117	0.644117			
n-Nonane	0.334794	0.334794			
n-Decane	0.192218	0.192218			
n-Undecane	0	0			
Dodecane	0	0			
Water	1.37661	1.37661			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	1.81851	1.81851			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	1.2088	1.2088			
Decane, 2-Methyl-	0	0			
Toluene	0.0996077	0.0996077			
m-Xylene	0.0898024	0.0898024			
Ethylbenzene	0.0166459	0.0166459			

Mass Flow	Total lb/h	Vapor lb/h			
Nitrogen	0.0479329	0.0479329			
Methane	11.9599	11.9599			

Process Streams Report
Stream: Combined Flash Vapor
 Phases Grouped by Columns

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 10:44 AM, 10/30/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Mass Flow	Total lb/h	Vapor lb/h			
CO2	0.393348	0.393348			
Ethane	10.854	10.854			
Propane	8.88778	8.88778			
Isobutane	3.37246	3.37246			
n-Butane	5.80806	5.80806			
Isopentane	2.6814	2.6814			
n-Pentane	1.85214	1.85214			
n-Hexane	0.492861	0.492861			
Methylcyclopentane	0	0			
Benzene	0.0155085	0.0155085			
Cyclohexane	0.0545303	0.0545303			
n-Heptane	0.956513	0.956513			
n-Octane	0.323884	0.323884			
n-Nonane	0.168346	0.168346			
n-Decane	0.0966541	0.0966541			
n-Undecane	0	0			
Dodecane	0	0			
Water	0.692208	0.692208			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.914412	0.914412			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0.607825	0.607825			
Decane, 2-Methyl-	0	0			
Toluene	0.0500862	0.0500862			
m-Xylene	0.0451558	0.0451558			
Ethylbenzene	0.00837016	0.00837016			

Properties

Property	Units	Total	Vapor		
Temperature	°F	70	70		
Pressure	psig	0.625	0.625		
Mole Fraction Vapor	%	100	100		
Mole Fraction Light Liquid	%	0	0		
Mole Fraction Heavy Liquid	%	0	0		
Molecular Weight	lb/lbmol	31.1194	31.1194		
Mass Density	lb/ft ³	0.0845531	0.0845531		
Molar Flow	lbmol/h	1.61582	1.61582		
Mass Flow	lb/h	50.2835	50.2835		
Vapor Volumetric Flow	ft ³ /h	594.697	594.697		
Liquid Volumetric Flow	gpm	74.144	74.144		
Std Vapor Volumetric Flow	MMSCFD	0.0147163	0.0147163		
Std Liquid Volumetric Flow	sgpm	0.235271	0.235271		
Specific Gravity		1.07447	1.07447		
API Gravity					
Net Ideal Gas Heating Value	Btu/ft ³	1625.13	1625.13		
Net Liquid Heating Value	Btu/lb	19687	19687		
Gross Ideal Gas Heating Value	Btu/ft ³	1776.97	1776.97		
Gross Liquid Heating Value	Btu/lb	21538.5	21538.5		

Remarks

Process Streams Report
Stream: Combined Flowstream
 Phases Grouped by Columns

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 10:16 AM, 4/7/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Connections

From: MIX-102 To: Preheat

Composition

Mole Fraction	Total %	Vapor %	Light Liquid %	Heavy Liquid %	Mixed Liquid %
Nitrogen	0.352018	0.452236	0.0325067	0.000234885	0.000756438
Methane	64.2976	82.5415	17.1127	0.0774669	0.352777
CO2	0.121765	0.155377	0.0774961	0.00274961	0.00395761
Ethane	9.68667	12.3916	12.0898	0.0106838	0.205897
Propane	2.15968	2.73714	8.26136	0.00220688	0.135685
Isobutane	0.3767	0.469783	3.11441	0.000116334	0.0504472
n-Butane	0.558223	0.68864	6.23337	0.00038003	0.101113
Isopentane	0.166084	0.19507	3.98669	5.82048E-05	0.0644871
n-Pentane	0.112192	0.12862	3.37701	3.63693E-05	0.0546125
n-Hexane	0.0272942	0.0260179	1.96552	2.49359E-06	0.0317677
Methylcyclopentane	0	0	0	0	0
Benzene	0.000930903	0.000861214	0.0696468	5.04003E-05	0.00117516
Cyclohexane	0.00312211	0.00279154	0.264621	4.24735E-06	0.00428078
n-Heptane	0.0636512	0.043429	8.324	3.9593E-06	0.13453
n-Octane	0.0326429	0.01228	6.43603	5.87508E-07	0.104015
n-Nonane	0.032624	0.0055636	7.88738	6.94549E-07	0.127471
n-Decane	0.0446008	0.00330384	11.7161	2.50328E-07	0.189347
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	21.8717	0.0684687	0.0362282	99.9058	98.2918
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	0.0479483	0.0487921	2.78352	5.31855E-06	0.0449904
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	0.0343816	0.0243518	4.30262	2.27416E-07	0.0695359
Decane, 2-Methyl-	0	0	0	0	0
Toluene	0.00361642	0.00221552	0.522158	8.92802E-05	0.00852656
m-Xylene	0.00564392	0.00164309	1.21355	5.53247E-05	0.0196668
Ethylbenzene	0.000933776	0.000305812	0.193364	9.94405E-06	0.00313479

Molar Flow	Total lbmol/h	Vapor lbmol/h	Light Liquid lbmol/h	Heavy Liquid lbmol/h	Mixed Liquid lbmol/h
Nitrogen	7.42977	7.42623	0.00246129	0.00108267	0.00354396
Methane	1357.08	1355.43	1.29571	0.357072	1.65278
CO2	2.57	2.55146	0.00586773	0.0126739	0.0185416
Ethane	204.449	203.484	0.915394	0.0492456	0.96464
Propane	45.5826	44.9469	0.625521	0.0101723	0.635693
Isobutane	7.95072	7.71437	0.235812	0.000536222	0.236349
n-Butane	11.782	11.3082	0.471969	0.00175169	0.47372
Isopentane	3.50539	3.20327	0.301858	0.000268286	0.302126
n-Pentane	2.36794	2.11208	0.255696	0.000167639	0.255863
n-Hexane	0.576077	0.427244	0.148822	1.14938E-05	0.148834
Methylcyclopentane	0	0	0	0	0
Benzene	0.0196478	0.0141421	0.00527341	0.000232313	0.00550572
Cyclohexane	0.065896	0.0458402	0.0200362	1.95775E-05	0.0200557
n-Heptane	1.34344	0.713154	0.630264	1.82498E-05	0.630282
n-Octane	0.688967	0.201651	0.487314	2.70803E-06	0.487317
n-Nonane	0.688569	0.0913607	0.597205	3.20142E-06	0.597208
n-Decane	0.941354	0.0542529	0.8871	1.15385E-06	0.887101
n-Undecane	0	0	0	0	0

* User Specified Values
 ? Extrapolated or Approximate Values

ProMax 3.2.15289.0
 Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Process Streams Report
Stream: Combined Flowstream
 Phases Grouped by Columns

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 10:16 AM, 4/7/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Molar Flow	Total lbmol/h	Vapor lbmol/h	Light Liquid lbmol/h	Heavy Liquid lbmol/h	Mixed Liquid lbmol/h
Dodecane	0	0	0	0	0
Water	461.628	1.12433	0.00274307	460.501	460.504
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	1.01201	0.801223	0.210759	2.4515E-05	0.210783
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	0.725664	0.399884	0.325779	1.04824E-06	0.32578
Decane, 2-Methyl-	0	0	0	0	0
Toluene	0.0763289	0.0363814	0.039536	0.000411524	0.0399475
m-Xylene	0.119122	0.0269813	0.0918855	0.000255011	0.0921405
Ethylbenzene	0.0197085	0.00502178	0.0146409	4.58356E-05	0.0146867

Mass Fraction	Total %	Vapor %	Light Liquid %	Heavy Liquid %	Mixed Liquid %
Nitrogen	0.509869	0.651087	0.0122138	0.000365212	0.00111938
Methane	53.3327	68.0536	3.68215	0.0689779	0.298957
CO2	0.277075	0.351431	0.0457445	0.00671646	0.0092006
Ethane	15.0599	19.1494	4.87585	0.0178308	0.327044
Propane	4.92394	6.20298	4.88607	0.00540129	0.316056
Isobutane	1.13205	1.40329	2.4279	0.000375293	0.154888
n-Butane	1.67756	2.05704	4.85935	0.00122598	0.310446
Isopentane	0.61956	0.723314	3.85793	0.000233083	0.245776
n-Pentane	0.418522	0.476918	3.26795	0.000145642	0.208141
n-Hexane	0.121613	0.115229	2.27182	1.1927E-05	0.144613
Methylcyclopentane	0	0	0	0	0
Benzene	0.00375967	0.00345729	0.0729677	0.000218511	0.00484901
Cyclohexane	0.0135856	0.0120741	0.298703	1.98401E-05	0.0190311
n-Heptane	0.32977	0.223648	11.1872	2.202E-05	0.712086
n-Octane	0.192793	0.0720907	9.86066	3.72487E-06	0.627635
n-Nonane	0.216341	0.0366724	13.5681	4.94425E-06	0.863618
n-Decane	0.32811	0.0241589	22.3586	1.97688E-06	1.42313
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	20.3728	0.063393	0.00875388	99.8976	93.5396
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	0.213641	0.216093	3.2173	2.54389E-05	0.204805
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	0.203062	0.14296	6.59205	1.44184E-06	0.419586
Decane, 2-Methyl-	0	0	0	0	0
Toluene	0.0172285	0.0104912	0.645291	0.000456582	0.0415004
m-Xylene	0.0309806	0.00896499	1.72803	0.000326004	0.110294
Ethylbenzene	0.00512569	0.00166857	0.275341	5.85959E-05	0.0175803

Mass Flow	Total lb/h	Vapor lb/h	Light Liquid lb/h	Heavy Liquid lb/h	Mixed Liquid lb/h
Nitrogen	208.133	208.034	0.0689492	0.0303292	0.0992784
Methane	21770.9	21744.4	20.7864	5.72831	26.5147

* User Specified Values
 ? Extrapolated or Approximate Values

Promax 3.2.15289.0
 Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Process Streams Report
Stream: Combined Flowstream
 Phases Grouped by Columns

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 10:16 AM, 4/7/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Mass Flow	Total lb/h	Vapor lb/h	Light Liquid lb/h	Heavy Liquid lb/h	Mixed Liquid lb/h
CO2	113.105	112.289	0.258236	0.557772	0.816008
Ethane	6147.58	6118.58	27.525	1.48077	29.0058
Propane	2009.99	1981.96	27.5827	0.448554	28.0313
Isobutane	462.113	448.376	13.7059	0.0311664	13.7371
n-Butane	684.794	657.26	27.4319	0.101812	27.5337
Isopentane	252.91	231.112	21.7787	0.0193565	21.798
n-Pentane	170.844	152.384	18.4481	0.0120949	18.4602
n-Hexane	49.6437	36.8179	12.8248	0.000990487	12.8258
Methylcyclopentane	0	0	0	0	0
Benzene	1.53473	1.10467	0.411916	0.0181464	0.430062
Cyclohexane	5.54577	3.85789	1.68623	0.00164763	1.68788
n-Heptane	134.615	71.4594	63.1537	0.00182866	63.1555
n-Octane	78.6997	23.0343	55.6651	0.000309334	55.6654
n-Nonane	88.3124	11.7175	76.5945	0.000410598	76.595
n-Decane	133.937	7.71919	126.218	0.000164171	126.218
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	8316.36	20.2552	0.0494172	8296.05	8296.1
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	87.21	69.0456	18.1622	0.00211259	18.1643
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	82.8916	45.6782	37.2133	0.000119739	37.2134
Decane, 2-Methyl-	0	0	0	0	0
Toluene	7.03282	3.35212	3.64278	0.0379171	3.6807
m-Xylene	12.6466	2.86447	9.75502	0.0270732	9.78209
Ethylbenzene	2.09235	0.533137	1.55435	0.00486613	1.55921

Properties

Property	Units	Total	Vapor	Light Liquid	Heavy Liquid	Mixed Liquid
Temperature	°F	69.3402	69.3402	69.3402	69.3402	69.3402
Pressure	psig	600	600	600	600	600
Mole Fraction Vapor	%	77.8024	100	0	0	0
Mole Fraction Light Liquid	%	0.35874	0	100	0	1.61612
Mole Fraction Heavy Liquid	%	21.8388	0	0	100	98.3839
Molecular Weight	lb/lbmol	19.3407	19.4577	74.5567	18.0168	18.9305
Mass Density	lb/ft ³	3.01991	2.38985	40.2619	62.2449	60.1544
Molar Flow	lbmol/h	2110.62	1642.11	7.57165	460.935	468.507
Mass Flow	lb/h	40820.9	31951.8	564.517	8304.56	8869.08
Vapor Volumetric Flow	ft ³ /h	13517.3	13369.8	14.0211	133.417	147.439
Liquid Volumetric Flow	gpm	1685.27	1666.89	1.74809	16.6339	18.382
Std Vapor Volumetric Flow	MMSCFD	19.2227	14.9558	0.0689597	4.19802	4.26698
Std Liquid Volumetric Flow	sgpm	212.25	193.805	1.80995	16.6349	18.4448
Specific Gravity			0.671822	0.645543	0.99801	0.964491
API Gravity				85.8592	10.0967	14.9512
Net Ideal Gas Heating Value	Btu/ft ³	846.362	1069.99	3811.62	0.956673	62.5418
Net Liquid Heating Value	Btu/lb	16351.2	20819.8	19249.7	-1038.57	252.78
Gross Ideal Gas Heating Value	Btu/ft ³	945.452	1181.8	4118.26	51.3198	117.047
Gross Liquid Heating Value	Btu/lb	18295.5	23000.4	20810.5	22.2212	1345.4

Remarks

* User Specified Values
 ? Extrapolated or Approximate Values

ProMax 3.2.15289.0
 Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Process Streams Report
Stream: Combined PW & Cond
 Phases Grouped by Columns

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 4:01 PM, 11/19/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Connections

From: MIX-101 To: Produced Fluid Tanks

Composition

Mole Fraction	Total %	Vapor %	Light Liquid %	Heavy Liquid %	Mixed Liquid %
Nitrogen	0.000371657	0.146164	0.00130253	9.24735E-06	1.79274E-05
Methane	0.163558	59.8861	1.67839	0.00744025	0.018655
CO2	0.00227591	0.441639	0.0316467	0.00100424	0.0012099
Ethane	0.0829352	23.2817	3.50875	0.00312045	0.0266488
Propane	0.0535647	8.74545	4.66932	0.00114499	0.0324759
Isobutane	0.0196439	1.79457	2.27254	8.56776E-05	0.0153375
n-Butane	0.0392651	2.73035	4.83135	0.000311769	0.0327358
Isopentane	0.0259712	0.801521	3.58125	5.39587E-05	0.0240895
n-Pentane	0.0222103	0.533607	3.11899	3.6353E-05	0.0209695
n-Hexane	0.0140613	0.111909	2.05924	3.11691E-06	0.0138239
Methylcyclopentane	0	0	0	0	0
Benzene	0.000558159	0.00385904	0.0748311	4.82375E-05	0.00055015
Cyclohexane	0.00200832	0.0125239	0.294717	4.80842E-06	0.0019828
n-Heptane	0.0712558	0.197608	10.5705	4.31696E-06	0.0709492
n-Octane	0.0696776	0.0638777	10.3836	1.12806E-06	0.0696917
n-Nonane	0.104091	0.0321753	15.5348	1.64518E-06	0.104265
n-Decane	0.173912	0.0185606	25.9683	6.54618E-07	0.174289
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	99.0776	0.860985	0.0682896	99.9865	99.3159
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	0.0192569	0.206977	2.80038	6.45253E-06	0.0188014
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	0.0366187	0.107906	5.4302	4.07026E-07	0.0364457
Decane, 2-Methyl-	0	0	0	0	0
Toluene	0.00474229	0.0110759	0.687623	0.000112623	0.00472692
m-Xylene	0.0142297	0.00963935	2.10882	8.78356E-05	0.0142408
Ethylbenzene	0.00219641	0.00175437	0.32521	1.49054E-05	0.00219748

Molar Flow	Total lbmol/h	Vapor lbmol/h	Light Liquid lbmol/h	Heavy Liquid lbmol/h	Mixed Liquid lbmol/h
Nitrogen	0.00172169	0.00163884	4.03994E-05	4.24475E-05	8.28469E-05
Methane	0.757675	0.671466	0.0520568	0.0341525	0.0862094
CO2	0.0105431	0.00495183	0.000981555	0.00460971	0.00559126
Ethane	0.384195	0.261044	0.108827	0.0143236	0.123151
Propane	0.248137	0.0980573	0.144824	0.00525578	0.15008
Isobutane	0.0909997	0.0201214	0.070485	0.000393281	0.0708783
n-Butane	0.181894	0.0306137	0.149849	0.0014311	0.151281
Isopentane	0.120311	0.00898696	0.111076	0.000247683	0.111324
n-Pentane	0.102889	0.005983	0.0967387	0.000166869	0.0969055
n-Hexane	0.0651386	0.00125477	0.0638695	1.43073E-05	0.0638838
Methylcyclopentane	0	0	0	0	0
Benzene	0.00258565	4.3269E-05	0.00232096	0.000221422	0.00254239
Cyclohexane	0.00930345	0.000140422	0.00914096	2.20718E-05	0.00916303
n-Heptane	0.33009	0.00221565	0.327854	1.98159E-05	0.327874
n-Octane	0.322779	0.000716221	0.322058	5.17805E-06	0.322063
n-Nonane	0.482196	0.000360761	0.481828	7.55177E-06	0.481836
n-Decane	0.805644	0.000208108	0.805432	3.00485E-06	0.805435
n-Undecane	0	0	0	0	0

* User Specified Values
 ? Extrapolated or Approximate Values

ProMax 3.2.15289.0
 Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Process Streams Report
Stream: Combined PW & Cond
 Phases Grouped by Columns

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 4:01 PM, 11/19/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Molar Flow	Total lbmol/h	Vapor lbmol/h	Light Liquid lbmol/h	Heavy Liquid lbmol/h	Mixed Liquid lbmol/h
Dodecane	0	0	0	0	0
Water	458.974	0.00965368	0.00211807	458.962	458.964
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	0.0892068	0.00232071	0.0868565	2.96186E-05	0.0868861
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	0.169635	0.00120988	0.168423	1.86835E-06	0.168425
Decane, 2-Methyl-	0	0	0	0	0
Toluene	0.0219685	0.000124188	0.0213273	0.000516968	0.0218443
m-Xylene	0.0659186	0.00010808	0.0654073	0.000403186	0.0658105
Ethylbenzene	0.0101748	1.96707E-05	0.0100867	6.84193E-05	0.0101551

Mass Fraction	Total %	Vapor %	Light Liquid %	Heavy Liquid %	Mixed Liquid %
Nitrogen	0.000559137	0.16235	0.000345492	1.43785E-05	2.69939E-05
Methane	0.140913	38.093	0.254945	0.00662504	0.0160861
CO2	0.00537914	0.770659	0.0131874	0.00245309	0.00286207
Ethane	0.133927	27.7577	0.998976	0.00520795	0.0430707
Propane	0.126848	15.2906	1.94954	0.00280238	0.0769735
Isobutane	0.0613169	4.13572	1.25065	0.000276401	0.0479159
n-Butane	0.122563	6.29228	2.65885	0.00100578	0.10227
Isopentane	0.100631	2.29294	2.44651	0.000216083	0.0934204
n-Pentane	0.0860586	1.5265	2.13072	0.000145579	0.0813208
n-Hexane	0.0650758	0.382382	1.68025	1.49086E-05	0.0640322
Methylcyclopentane	0	0	0	0	0
Benzene	0.00234145	0.0119521	0.0553455	0.000209137	0.00230984
Cyclohexane	0.00907706	0.0417916	0.234851	2.24613E-05	0.00896946
n-Heptane	0.383448	0.785106	10.0289	2.40095E-05	0.382127
n-Octane	0.427443	0.289316	11.2307	7.15213E-06	0.427897
n-Nonane	0.716963	0.163623	18.8653	1.17116E-05	0.718783
n-Decane	1.32889	0.10471	34.9845	5.16971E-06	1.33292
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	95.8577	0.615013	0.0116487	99.9797	96.1709
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	0.0891209	0.707218	2.28498	3.08633E-05	0.0870879
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	0.22464	0.488728	5.87318	2.58064E-06	0.223772
Decane, 2-Methyl-	0	0	0	0	0
Toluene	0.023466	0.040464	0.599894	0.000575968	0.0234101
m-Xylene	0.0811311	0.0405767	2.11985	0.000517585	0.0812645
Ethylbenzene	0.0125229	0.00738501	0.32691	8.78323E-05	0.0125398

Mass Flow	Total lb/h	Vapor lb/h	Light Liquid lb/h	Heavy Liquid lb/h	Mixed Liquid lb/h
Nitrogen	0.0482303	0.0459095	0.00113172	0.0011891	0.00232082
Methane	12.155	10.772	0.83512	0.547891	1.38301

* User Specified Values
 ? Extrapolated or Approximate Values

ProMax 3.2.15289.0
 Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Process Streams Report
Stream: Combined PW & Cond
 Phases Grouped by Columns

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 4:01 PM, 11/19/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Mass Flow	Total lb/h	Vapor lb/h	Light Liquid lb/h	Heavy Liquid lb/h	Mixed Liquid lb/h
CO2	0.463996	0.217927	0.0431977	0.202871	0.246069
Ethane	11.5524	7.84933	3.27234	0.430698	3.70303
Propane	10.9417	4.3239	6.38609	0.231757	6.61785
Isobutane	5.28911	1.1695	4.09674	0.0228583	4.1196
n-Butane	10.5721	1.77934	8.70958	0.0831784	8.79276
Isopentane	8.68028	0.648398	8.01402	0.0178701	8.03189
n-Pentane	7.42328	0.431666	6.97958	0.0120394	6.99162
n-Hexane	5.61334	0.10813	5.50398	0.00123294	5.50521
Methylcyclopentane	0	0	0	0	0
Benzene	0.20197	0.00337982	0.181295	0.0172957	0.19859
Cyclohexane	0.782974	0.0118179	0.769299	0.00185755	0.771156
n-Heptane	33.0756	0.222013	32.8516	0.00198559	32.8536
n-Octane	36.8706	0.0818129	36.7882	0.000591481	36.7888
n-Nonane	61.8441	0.0462695	61.7969	0.000968553	61.7979
n-Decane	114.628	0.02961	114.598	0.000427535	114.599
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	8268.54	0.173914	0.0381577	8268.33	8268.37
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	7.68743	0.199988	7.48489	0.0025524	7.48744
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	19.3771	0.138203	19.2387	0.000213419	19.2389
Decane, 2-Methyl-	0	0	0	0	0
Toluene	2.02414	0.0114424	1.96507	0.0476326	2.0127
m-Xylene	6.99825	0.0114743	6.94397	0.0428043	6.98677
Ethylbenzene	1.08021	0.00208834	1.07086	0.00726374	1.07812

Properties

Property	Units	Total	Vapor	Light Liquid	Heavy Liquid	Mixed Liquid
Temperature	°F	90.7999	90.7999	90.7999	90.7999	90.7999
Pressure	psig	70 *	70	70	70	70
Mole Fraction Vapor	%	0.242039	100	0	0	0
Mole Fraction Light Liquid	%	0.669536	0	100	0	0.67116
Mole Fraction Heavy Liquid	%	99.0884	0	0	100	99.3288
Molecular Weight	lb/lbmol	18.6204	25.2204	105.613	18.0165	18.6044
Mass Density	lb/ft^3	39.7366	0.371144	43.0443	62.0525	61.0258
Molar Flow	lbmol/h	463.247	1.12124	3.1016	459.024	462.125
Mass Flow	lb/h	8625.85	28.2781	327.569	8270	8597.57
Vapor Volumetric Flow	ft^3/h	217.076	76.1917	7.61004	133.274	140.884
Liquid Volumetric Flow	gpm	27.064	9.49922	0.948785	16.616	17.5648
Std Vapor Volumetric Flow	MMSCFD	4.21908	0.0102118	0.0282482	4.18062	4.20887
Std Liquid Volumetric Flow	sgpm	17.631	0.150086	0.943662	16.5372	17.4809
Specific Gravity			0.870792	0.690155	0.994926	0.978463
API Gravity				69.1835	10.0229	12.313
Net Ideal Gas Heating Value	Btu/ft^3	39.264	1348.64	5351.27	0.172714	36.0872
Net Liquid Heating Value	Btu/lb	-221.938	20192	19071.2	-1055.93	-289.081
Gross Ideal Gas Heating Value	Btu/ft^3	92.2296	1480.45	5767.32	50.4923	88.8614
Gross Liquid Heating Value	Btu/lb	857.503	22175.4	20566.1	3.96396	787.387

Remarks

* User Specified Values
 ? Extrapolated or Approximate Values

	Process Streams Report Stream: Flash Vapor Phases Grouped by Columns	
--	--	--

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 1:28 PM, 11/6/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Connections	
--------------------	--

From: Produced Fluid Tanks	To: MIX-100
----------------------------	-------------

Composition					
--------------------	--	--	--	--	--

Mole Fraction	Total %	Vapor %			
Nitrogen	0.105895	0.105895			
Methane	46.1385	46.1385			
CO2	0.553142	0.553142			
Ethane	22.3397	22.3397			
Propane	12.4739	12.4739			
Isobutane	3.59096	3.59096			
n-Butane	6.18437	6.18437			
Isopentane	2.30006	2.30006			
n-Pentane	1.58874	1.58874			
n-Hexane	0.353955	0.353955			
Methylcyclopentane	0	0			
Benzene	0.0122874	0.0122874			
Cyclohexane	0.0400997	0.0400997			
n-Heptane	0.590773	0.590773			
n-Octane	0.175477	0.175477			
n-Nonane	0.0812332	0.0812332			
n-Decane	0.0420414	0.0420414			
n-Undecane	0	0			
Dodecane	0	0			
Water	2.37794	2.37794			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.656696	0.656696			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0.329314	0.329314			
Decane, 2-Methyl-	0	0			
Toluene	0.0336421	0.0336421			
m-Xylene	0.0263231	0.0263231			
Ethylbenzene	0.00487931	0.00487931			

Molar Flow	Total lbmol/h	Vapor lbmol/h			
Nitrogen	0.00171107	0.00171107			
Methane	0.745517	0.745517			
CO2	0.0089378	0.0089378			
Ethane	0.360971	0.360971			
Propane	0.201557	0.201557			
Isobutane	0.0580236	0.0580236			
n-Butane	0.0999285	0.0999285			
Isopentane	0.0371649	0.0371649			
n-Pentane	0.0256712	0.0256712			
n-Hexane	0.00571928	0.00571928			
Methylcyclopentane	0	0			
Benzene	0.000198543	0.000198543			
Cyclohexane	0.00064794	0.00064794			
n-Heptane	0.00954585	0.00954585			
n-Octane	0.00283541	0.00283541			
n-Nonane	0.00131259	0.00131259			
n-Decane	0.000679315	0.000679315			
n-Undecane	0	0			

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
Stream: Flash Vapor
 Phases Grouped by Columns

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 1:28 PM, 11/6/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Molar Flow	Total lbmol/h	Vapor lbmol/h			
Dodecane	0	0			
Water	0.0384234	0.0384234			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.0106111	0.0106111			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0.00532113	0.00532113			
Decane, 2-Methyl-	0	0			
Toluene	0.000543597	0.000543597			
m-Xylene	0.000425336	0.000425336			
Ethylbenzene	7.8841E-05	7.8841E-05			

Mass Fraction	Total %	Vapor %			
Nitrogen	0.0953254	0.0953254			
Methane	23.785	23.785			
CO2	0.782261	0.782261			
Ethane	21.5857	21.5857			
Propane	17.6754	17.6754			
Isobutane	6.70689	6.70689			
n-Butane	11.5506	11.5506			
Isopentane	5.33257	5.33257			
n-Pentane	3.68341	3.68341			
n-Hexane	0.980166	0.980166			
Methylcyclopentane	0	0			
Benzene	0.0308422	0.0308422			
Cyclohexane	0.108446	0.108446			
n-Heptane	1.90224	1.90224			
n-Octane	0.644117	0.644117			
n-Nonane	0.334794	0.334794			
n-Decane	0.192218	0.192218			
n-Undecane	0	0			
Dodecane	0	0			
Water	1.37661	1.37661			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	1.81851	1.81851			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	1.2088	1.2088			
Decane, 2-Methyl-	0	0			
Toluene	0.0996077	0.0996077			
m-Xylene	0.0898024	0.0898024			
Ethylbenzene	0.0166459	0.0166459			

Mass Flow	Total lb/h	Vapor lb/h			
Nitrogen	0.0479329	0.0479329			
Methane	11.9599	11.9599			

Process Streams Report
Stream: Flash Vapor
 Phases Grouped by Columns

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 1:28 PM, 11/6/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Mass Flow	Total lb/h	Vapor lb/h			
CO2	0.393348	0.393348			
Ethane	10.854	10.854			
Propane	8.88778	8.88778			
Isobutane	3.37246	3.37246			
n-Butane	5.80806	5.80806			
Isopentane	2.6814	2.6814			
n-Pentane	1.85214	1.85214			
n-Hexane	0.492861	0.492861			
Methylcyclopentane	0	0			
Benzene	0.0155085	0.0155085			
Cyclohexane	0.0545303	0.0545303			
n-Heptane	0.956513	0.956513			
n-Octane	0.323884	0.323884			
n-Nonane	0.168346	0.168346			
n-Decane	0.0966541	0.0966541			
n-Undecane	0	0			
Dodecane	0	0			
Water	0.692208	0.692208			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.914412	0.914412			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0.607825	0.607825			
Decane, 2-Methyl-	0	0			
Toluene	0.0500862	0.0500862			
m-Xylene	0.0451558	0.0451558			
Ethylbenzene	0.00837016	0.00837016			

Properties

Property	Units	Total	Vapor		
Temperature	°F	70	70		
Pressure	psig	0.625 *	0.625		
Mole Fraction Vapor	%	100	100		
Mole Fraction Light Liquid	%	0	0		
Mole Fraction Heavy Liquid	%	0	0		
Molecular Weight	lb/lbmol	31.1194	31.1194		
Mass Density	lb/ft^3	0.0845531	0.0845531		
Molar Flow	lbmol/h	1.61582	1.61582		
Mass Flow	lb/h	50.2835	50.2835		
Vapor Volumetric Flow	ft^3/h	594.697	594.697		
Liquid Volumetric Flow	gpm	74.144	74.144		
Std Vapor Volumetric Flow	MMSCFD	0.0147163	0.0147163		
Std Liquid Volumetric Flow	sgpm	0.235271	0.235271		
Specific Gravity		1.07447	1.07447		
API Gravity					
Net Ideal Gas Heating Value	Btu/ft^3	1625.13	1625.13		
Net Liquid Heating Value	Btu/lb	19687	19687		
Gross Ideal Gas Heating Value	Btu/ft^3	1776.97	1776.97		
Gross Liquid Heating Value	Btu/lb	21538.5	21538.5		

Remarks

* User Specified Values
 ? Extrapolated or Approximate Values

	Blocks Produced Fluid Tanks Separator Report		
--	---	--	--

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 5:29 PM, 11/12/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Connections					
-------------	--	--	--	--	--

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Combined PW & Cond	Inlet	MIX-101	Flash Vapor	Vapor Outlet	MIX-100
Water and Condensate	Light Liquid Outlet		Q-9	Energy	

Energy Streams					
----------------	--	--	--	--	--

Energy Stream	Energy Rate	Power	From Block	To Block
Q-9	-168993 Btu/h	-66.4169 hp	--	Produced Fluid Tanks

Block Parameters					
------------------	--	--	--	--	--

Pressure Drop	69.375 psi	Main Liquid Phase	Light Liquid
Mole Fraction Vapor	0.348804 %	Heat Duty	-168993 Btu/h
Mole Fraction Light Liquid	0.578939 %	Heat Release Curve Type	Plug Flow
Mole Fraction Heavy Liquid	99.0723 %	Heat Release Curve Increments	5

Process Streams					
-----------------	--	--	--	--	--

Stream: Combined PW & Cond					
----------------------------	--	--	--	--	--

Composition					
-------------	--	--	--	--	--

Mole Fraction	Total %	Vapor %	Light Liquid %	Heavy Liquid %	Mixed Liquid %
Nitrogen	0.000371657	0.146164	0.00130253	9.24735E-06	1.79274E-05
Methane	0.163558	59.8861	1.67839	0.00744025	0.018655
CO2	0.00227591	0.441639	0.0316467	0.00100424	0.0012099
Ethane	0.0829352	23.2817	3.50875	0.00312045	0.0266488
Propane	0.0535647	8.74545	4.66932	0.00114499	0.0324759
Isobutane	0.0196439	1.79457	2.27254	8.56776E-05	0.0153375
n-Butane	0.0392651	2.73035	4.83135	0.000311769	0.0327358
Isopentane	0.0259712	0.801521	3.58125	5.39587E-05	0.0240895
n-Pentane	0.0222103	0.533607	3.11899	3.6353E-05	0.0209695
n-Hexane	0.0140613	0.111909	2.05924	3.11691E-06	0.0138239
Methylcyclopentane	0	0	0	0	0
Benzene	0.000558159	0.00385904	0.0748311	4.82375E-05	0.00055015
Cyclohexane	0.00200832	0.0125239	0.294717	4.80842E-06	0.0019828
n-Heptane	0.0712558	0.197608	10.5705	4.31696E-06	0.0709492
n-Octane	0.0696776	0.0638777	10.3836	1.12806E-06	0.0696917
n-Nonane	0.104091	0.0321753	15.5348	1.64518E-06	0.104265
n-Decane	0.173912	0.0185606	25.9683	6.54618E-07	0.174289
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	99.0776	0.860985	0.0682896	99.9865	99.3159
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	0.0192569	0.206977	2.80038	6.45253E-06	0.0188014
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	0.0366187	0.107906	5.4302	4.07026E-07	0.0364457
Decane, 2-Methyl-	0	0	0	0	0
Toluene	0.00474229	0.0110759	0.687623	0.000112623	0.00472692
m-Xylene	0.0142297	0.00963935	2.10882	8.78356E-05	0.0142408
Ethylbenzene	0.00219641	0.00175437	0.32521	1.49054E-05	0.00219748

Molar Flow	Total lbmol/h	Vapor lbmol/h	Light Liquid lbmol/h	Heavy Liquid lbmol/h	Mixed Liquid lbmol/h
Nitrogen	0.00172169	0.00163884	4.03994E-05	4.24475E-05	8.28469E-05

* User Specified Values
 ? Extrapolated or Approximate Values

Blocks Produced Fluid Tanks Separator Report

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 5:29 PM, 11/12/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Molar Flow	Total lbmol/h	Vapor lbmol/h	Light Liquid lbmol/h	Heavy Liquid lbmol/h	Mixed Liquid lbmol/h
Methane	0.757675	0.671466	0.0520568	0.0341525	0.0862094
CO2	0.0105431	0.00495183	0.000981555	0.00460971	0.00559126
Ethane	0.384195	0.261044	0.108827	0.0143236	0.123151
Propane	0.248137	0.0980573	0.144824	0.00525578	0.15008
Isobutane	0.0909997	0.0201214	0.070485	0.000393281	0.0708783
n-Butane	0.181894	0.0306137	0.149849	0.0014311	0.151281
Isopentane	0.120311	0.00898696	0.111076	0.000247683	0.111324
n-Pentane	0.102889	0.005983	0.0967387	0.000166869	0.0969055
n-Hexane	0.0651386	0.00125477	0.0638695	1.43073E-05	0.0638838
Methylcyclopentane	0	0	0	0	0
Benzene	0.00258565	4.3269E-05	0.00232096	0.000221422	0.00254239
Cyclohexane	0.00930345	0.000140422	0.00914096	2.20718E-05	0.00916303
n-Heptane	0.33009	0.00221565	0.327854	1.98159E-05	0.327874
n-Octane	0.322779	0.000716221	0.322058	5.17805E-06	0.322063
n-Nonane	0.482196	0.000360761	0.481828	7.55177E-06	0.481836
n-Decane	0.805644	0.000208108	0.805432	3.00485E-06	0.805435
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	458.974	0.00965368	0.00211807	458.962	458.964
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	0.0892068	0.00232071	0.0868565	2.96186E-05	0.0868861
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	0.169635	0.00120988	0.168423	1.86835E-06	0.168425
Decane, 2-Methyl-	0	0	0	0	0
Toluene	0.0219685	0.000124188	0.0213273	0.000516968	0.0218443
m-Xylene	0.0659186	0.00010808	0.0654073	0.000403186	0.0658105
Ethylbenzene	0.0101748	1.96707E-05	0.0100867	6.84193E-05	0.0101551

Mass Fraction	Total %	Vapor %	Light Liquid %	Heavy Liquid %	Mixed Liquid %
Nitrogen	0.000559137	0.16235	0.000345492	1.43785E-05	2.69939E-05
Methane	0.140913	38.093	0.254945	0.00662504	0.0160861
CO2	0.00537914	0.770659	0.0131874	0.00245309	0.00286207
Ethane	0.133927	27.7577	0.998976	0.00520795	0.0430707
Propane	0.126848	15.2906	1.94954	0.00280238	0.0769735
Isobutane	0.0613169	4.13572	1.25065	0.000276401	0.0479159
n-Butane	0.122563	6.29228	2.65885	0.00100578	0.10227
Isopentane	0.100631	2.29294	2.44651	0.000216083	0.0934204
n-Pentane	0.0860586	1.5265	2.13072	0.000145579	0.0813208
n-Hexane	0.0650758	0.382382	1.68025	1.49086E-05	0.0640322
Methylcyclopentane	0	0	0	0	0
Benzene	0.00234145	0.0119521	0.0553455	0.000209137	0.00230984
Cyclohexane	0.00907706	0.0417916	0.234851	2.24613E-05	0.00896946
n-Heptane	0.383448	0.785106	10.0289	2.40095E-05	0.382127
n-Octane	0.427443	0.289316	11.2307	7.15213E-06	0.427897
n-Nonane	0.716963	0.163623	18.8653	1.17116E-05	0.718783
n-Decane	1.32889	0.10471	34.9845	5.16971E-06	1.33292
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	95.8577	0.615013	0.0116487	99.9797	96.1709
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0

* User Specified Values
? Extrapolated or Approximate Values

Blocks
Produced Fluid Tanks
Separator Report

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 5:29 PM, 11/12/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Mass Fraction	Total %	Vapor %	Light Liquid %	Heavy Liquid %	Mixed Liquid %
Cyclopentane	0	0	0	0	0
Isohexane	0.0891209	0.707218	2.28498	3.08633E-05	0.0870879
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	0.22464	0.488728	5.87318	2.58064E-06	0.223772
Decane, 2-Methyl-	0	0	0	0	0
Toluene	0.023466	0.040464	0.599894	0.000575968	0.0234101
m-Xylene	0.0811311	0.0405767	2.11985	0.000517585	0.0812645
Ethylbenzene	0.0125229	0.00738501	0.32691	8.78323E-05	0.0125398

Mass Flow	Total lb/h	Vapor lb/h	Light Liquid lb/h	Heavy Liquid lb/h	Mixed Liquid lb/h
Nitrogen	0.0482303	0.0459095	0.00113172	0.0011891	0.00232082
Methane	12.155	10.772	0.83512	0.547891	1.38301
CO2	0.463996	0.217927	0.0431977	0.202871	0.246069
Ethane	11.5524	7.84933	3.27234	0.430698	3.70303
Propane	10.9417	4.3239	6.38609	0.231757	6.61785
Isobutane	5.28911	1.1695	4.09674	0.0228583	4.1196
n-Butane	10.5721	1.77934	8.70958	0.0831784	8.79276
Isopentane	8.68028	0.648398	8.01402	0.0178701	8.03189
n-Pentane	7.42328	0.431666	6.97958	0.0120394	6.99162
n-Hexane	5.61334	0.10813	5.50398	0.00123294	5.50521
Methylcyclopentane	0	0	0	0	0
Benzene	0.20197	0.00337982	0.181295	0.0172957	0.19859
Cyclohexane	0.782974	0.0118179	0.769299	0.00185755	0.771156
n-Heptane	33.0756	0.222013	32.8516	0.00198559	32.8536
n-Octane	36.8706	0.0818129	36.7882	0.000591481	36.7888
n-Nonane	61.8441	0.0462695	61.7969	0.000968553	61.7979
n-Decane	114.628	0.02961	114.598	0.000427535	114.599
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	8268.54	0.173914	0.0381577	8268.33	8268.37
Triethylene Glycol	0	0	0	0	0
Oxygen	0	0	0	0	0
Argon	0	0	0	0	0
Carbon Monoxide	0	0	0	0	0
Cyclopentane	0	0	0	0	0
Isohexane	7.68743	0.199988	7.48489	0.0025524	7.48744
3-Methylpentane	0	0	0	0	0
Neohexane	0	0	0	0	0
2,3-Dimethylbutane	0	0	0	0	0
Methylcyclohexane	0	0	0	0	0
Isooctane	19.3771	0.138203	19.2387	0.000213419	19.2389
Decane, 2-Methyl-	0	0	0	0	0
Toluene	2.02414	0.0114424	1.96507	0.0476326	2.0127
m-Xylene	6.99825	0.0114743	6.94397	0.0428043	6.98677
Ethylbenzene	1.08021	0.00208834	1.07086	0.00726374	1.07812

Properties

Property	Units	Total	Vapor	Light Liquid	Heavy Liquid	Mixed Liquid
Temperature	°F	90.7999	90.7999	90.7999	90.7999	90.7999
Pressure	psig	70 *	70	70	70	70
Mole Fraction Vapor	%	0.242039	100	0	0	0
Mole Fraction Light Liquid	%	0.669536	0	100	0	0.67116
Mole Fraction Heavy Liquid	%	99.0884	0	0	100	99.3288
Molecular Weight	lb/lbmol	18.6204	25.2204	105.613	18.0165	18.6044
Mass Density	lb/ft ³	39.7366	0.371144	43.0443	62.0525	61.0258
Molar Flow	lbmol/h	463.247	1.12124	3.1016	459.024	462.125

* User Specified Values

? Extrapolated or Approximate Values

ProMax 3.2.15289.0
Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Blocks
Produced Fluid Tanks
Separator Report

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 5:29 PM, 11/12/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Properties

Property	Units	Total	Vapor	Light Liquid	Heavy Liquid	Mixed Liquid
Mass Flow	lb/h	8625.85	28.2781	327.569	8270	8597.57
Vapor Volumetric Flow	ft ³ /h	217.076	76.1917	7.61004	133.274	140.884
Liquid Volumetric Flow	gpm	27.064	9.49922	0.948785	16.616	17.5648
Std Vapor Volumetric Flow	MMSCFD	4.21908	0.0102118	0.0282482	4.18062	4.20887
Std Liquid Volumetric Flow	sgpm	17.631	0.150086	0.943662	16.5372	17.4809
Specific Gravity			0.870792	0.690155	0.994926	0.978463
API Gravity				69.1835	10.0229	12.313
Net Ideal Gas Heating Value	Btu/ft ³	39.264	1348.64	5351.27	0.172714	36.0872
Net Liquid Heating Value	Btu/lb	-221.938	20192	19071.2	-1055.93	-289.081
Gross Ideal Gas Heating Value	Btu/ft ³	92.2296	1480.45	5767.32	50.4923	88.8614
Gross Liquid Heating Value	Btu/lb	857.503	22175.4	20566.1	3.96396	787.387

Stream:Flash Vapor

Composition

Mole Fraction	Total %	Vapor %			
Nitrogen	0.105895	0.105895			
Methane	46.1385	46.1385			
CO2	0.553142	0.553142			
Ethane	22.3397	22.3397			
Propane	12.4739	12.4739			
Isobutane	3.59096	3.59096			
n-Butane	6.18437	6.18437			
Isopentane	2.30006	2.30006			
n-Pentane	1.58874	1.58874			
n-Hexane	0.353955	0.353955			
Methylcyclopentane	0	0			
Benzene	0.0122874	0.0122874			
Cyclohexane	0.0400997	0.0400997			
n-Heptane	0.590773	0.590773			
n-Octane	0.175477	0.175477			
n-Nonane	0.0812332	0.0812332			
n-Decane	0.0420414	0.0420414			
n-Undecane	0	0			
Dodecane	0	0			
Water	2.37794	2.37794			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.656696	0.656696			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0.329314	0.329314			
Decane, 2-Methyl-	0	0			
Toluene	0.0336421	0.0336421			
m-Xylene	0.0263231	0.0263231			
Ethylbenzene	0.00487931	0.00487931			

Molar Flow	Total lbmol/h	Vapor lbmol/h			
Nitrogen	0.00171107	0.00171107			
Methane	0.745517	0.745517			
CO2	0.0089378	0.0089378			
Ethane	0.360971	0.360971			
Propane	0.201557	0.201557			

Blocks
Produced Fluid Tanks
Separator Report

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 5:29 PM, 11/12/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Molar Flow	Total lbmol/h	Vapor lbmol/h			
Isobutane	0.0580236	0.0580236			
n-Butane	0.0999285	0.0999285			
Isopentane	0.0371649	0.0371649			
n-Pentane	0.0256712	0.0256712			
n-Hexane	0.00571928	0.00571928			
Methylcyclopentane	0	0			
Benzene	0.000198543	0.000198543			
Cyclohexane	0.00064794	0.00064794			
n-Heptane	0.00954585	0.00954585			
n-Octane	0.00283541	0.00283541			
n-Nonane	0.00131259	0.00131259			
n-Decane	0.000679315	0.000679315			
n-Undecane	0	0			
Dodecane	0	0			
Water	0.0384234	0.0384234			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	0.0106111	0.0106111			
3-Methylpentane	0	0			
Neohexane	0	0			
2,3-Dimethylbutane	0	0			
Methylcyclohexane	0	0			
Isooctane	0.00532113	0.00532113			
Decane, 2-Methyl-	0	0			
Toluene	0.000543597	0.000543597			
m-Xylene	0.000425336	0.000425336			
Ethylbenzene	7.8841E-05	7.8841E-05			

Mass Fraction	Total %	Vapor %			
Nitrogen	0.0953254	0.0953254			
Methane	23.785	23.785			
CO2	0.782261	0.782261			
Ethane	21.5857	21.5857			
Propane	17.6754	17.6754			
Isobutane	6.70689	6.70689			
n-Butane	11.5506	11.5506			
Isopentane	5.33257	5.33257			
n-Pentane	3.68341	3.68341			
n-Hexane	0.980166	0.980166			
Methylcyclopentane	0	0			
Benzene	0.0308422	0.0308422			
Cyclohexane	0.108446	0.108446			
n-Heptane	1.90224	1.90224			
n-Octane	0.644117	0.644117			
n-Nonane	0.334794	0.334794			
n-Decane	0.192218	0.192218			
n-Undecane	0	0			
Dodecane	0	0			
Water	1.37661	1.37661			
Triethylene Glycol	0	0			
Oxygen	0	0			
Argon	0	0			
Carbon Monoxide	0	0			
Cyclopentane	0	0			
Isohexane	1.81851	1.81851			
3-Methylpentane	0	0			
Neohexane	0	0			

* User Specified Values
? Extrapolated or Approximate Values

ProMax 3.2.15289.0
Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Blocks
Produced Fluid Tanks
Separator Report

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 5:29 PM, 11/12/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Mass Fraction	Total %	Vapor %		
2,3-Dimethylbutane	0	0		
Methylcyclohexane	0	0		
Isooctane	1.2088	1.2088		
Decane, 2-Methyl-	0	0		
Toluene	0.0996077	0.0996077		
m-Xylene	0.0898024	0.0898024		
Ethylbenzene	0.0166459	0.0166459		

Mass Flow	Total lb/h	Vapor lb/h		
Nitrogen	0.0479329	0.0479329		
Methane	11.9599	11.9599		
CO2	0.393348	0.393348		
Ethane	10.854	10.854		
Propane	8.88778	8.88778		
Isobutane	3.37246	3.37246		
n-Butane	5.80806	5.80806		
Isopentane	2.6814	2.6814		
n-Pentane	1.85214	1.85214		
n-Hexane	0.492861	0.492861		
Methylcyclopentane	0	0		
Benzene	0.0155085	0.0155085		
Cyclohexane	0.0545303	0.0545303		
n-Heptane	0.956513	0.956513		
n-Octane	0.323884	0.323884		
n-Nonane	0.168346	0.168346		
n-Decane	0.0966541	0.0966541		
n-Undecane	0	0		
Dodecane	0	0		
Water	0.692208	0.692208		
Triethylene Glycol	0	0		
Oxygen	0	0		
Argon	0	0		
Carbon Monoxide	0	0		
Cyclopentane	0	0		
Isohexane	0.914412	0.914412		
3-Methylpentane	0	0		
Neohexane	0	0		
2,3-Dimethylbutane	0	0		
Methylcyclohexane	0	0		
Isooctane	0.607825	0.607825		
Decane, 2-Methyl-	0	0		
Toluene	0.0500862	0.0500862		
m-Xylene	0.0451558	0.0451558		
Ethylbenzene	0.00837016	0.00837016		

Properties

Property	Units	Total	Vapor		
Temperature	°F	70	70		
Pressure	psig	0.625 *	0.625		
Mole Fraction Vapor	%	100	100		
Mole Fraction Light Liquid	%	0	0		
Mole Fraction Heavy Liquid	%	0	0		
Molecular Weight	lb/lbmol	31.1194	31.1194		
Mass Density	lb/ft ³	0.0845531	0.0845531		
Molar Flow	lbmol/h	1.61582	1.61582		
Mass Flow	lb/h	50.2835	50.2835		
Vapor Volumetric Flow	ft ³ /h	594.697	594.697		
Liquid Volumetric Flow	gpm	74.144	74.144		
Std Vapor Volumetric Flow	MMSCFD	0.0147163	0.0147163		

* User Specified Values

? Extrapolated or Approximate Values

ProMax 3.2.15289.0
Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Blocks
Produced Fluid Tanks
Separator Report

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 5:29 PM, 11/12/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Properties

Property	Units	Total	Vapor		
Std Liquid Volumetric Flow	sgpm	0.235271	0.235271		
Specific Gravity		1.07447	1.07447		
API Gravity					
Net Ideal Gas Heating Value	Btu/ft ³	1625.13	1625.13		
Net Liquid Heating Value	Btu/lb	19687	19687		
Gross Ideal Gas Heating Value	Btu/ft ³	1776.97	1776.97		
Gross Liquid Heating Value	Btu/lb	21538.5	21538.5		

Stream:Water and Condensate

Composition

Mole Fraction	Total %	Light Liquid %	Heavy Liquid %	Mixed Liquid %	
Nitrogen	2.29976E-06	0.000161485	1.36954E-06	2.29976E-06	
Methane	0.00263371	0.246236	0.00121019	0.00263371	
CO2	0.000347744	0.00844147	0.000300448	0.000347744	
Ethane	0.00503082	0.748751	0.000684816	0.00503082	
Propane	0.0100903	1.66235	0.000435137	0.0100903	
Isobutane	0.00714341	1.2219	4.48337E-05	0.00714341	
n-Butane	0.0177557	3.02504	0.000182312	0.0177557	
Isopentane	0.0180114	3.09285	4.32445E-05	0.0180114	
n-Pentane	0.0167271	2.8742	2.9142E-05	0.0167271	
n-Hexane	0.0128716	2.21509	2.69409E-06	0.0128716	
Methylcyclopentane	0	0	0	0	
Benzene	0.000517104	0.0807726	4.8122E-05	0.000517104	
Cyclohexane	0.00187499	0.321975	4.44598E-06	0.00187499	
n-Heptane	0.0694373	11.9512	5.21681E-06	0.0694373	
n-Octane	0.0693073	11.9295	9.87322E-07	0.0693073	
n-Nonane	0.104171	17.9303	1.47574E-06	0.104171	
n-Decane	0.174374	30.0144	5.7203E-07	0.174374	
n-Undecane	0	0	0	0	
Dodecane	0	0	0	0	
Water	99.4161	0.0400384	99.9968	99.4161	
Triethylene Glycol	0	0	0	0	
Oxygen	0	0	0	0	
Argon	0	0	0	0	
Carbon Monoxide	0	0	0	0	
Cyclopentane	0	0	0	0	
Isohexane	0.0170257	2.92965	5.44575E-06	0.0170257	
3-Methylpentane	0	0	0	0	
Neohexane	0	0	0	0	
2,3-Dimethylbutane	0	0	0	0	
Methylcyclohexane	0	0	0	0	
Isooctane	0.0355942	6.12668	3.07105E-07	0.0355942	
Decane, 2-Methyl-	0	0	0	0	
Toluene	0.00464113	0.779678	0.000112123	0.00464113	
m-Xylene	0.0141874	2.42698	8.79672E-05	0.0141874	
Ethylbenzene	0.00218702	0.37382	1.53407E-05	0.00218702	

Molar Flow	Total lbmol/h	Light Liquid lbmol/h	Heavy Liquid lbmol/h	Mixed Liquid lbmol/h	
Nitrogen	1.06164E-05	4.3309E-06	6.28549E-06	1.06164E-05	
Methane	0.012158	0.00660384	0.00555416	0.012158	
CO2	0.00160529	0.000226393	0.0013789	0.00160529	
Ethane	0.0232238	0.0200809	0.00314296	0.0232238	
Propane	0.0465798	0.0445828	0.00199706	0.0465798	
Isobutane	0.0329762	0.0327704	0.000205764	0.0329762	
n-Butane	0.0819657	0.081129	0.000836717	0.0819657	
Isopentane	0.083146	0.0829476	0.00019847	0.083146	
n-Pentane	0.0772173	0.0770836	0.000133747	0.0772173	

* User Specified Values
? Extrapolated or Approximate Values

ProMax 3.2.15289.0
Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Blocks
Produced Fluid Tanks
Separator Report

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 5:29 PM, 11/12/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Molar Flow	Total lbmol/h	Light Liquid lbmol/h	Heavy Liquid lbmol/h	Mixed Liquid lbmol/h	
n-Hexane	0.0594193	0.0594069	1.23645E-05	0.0594193	
Methylcyclopentane	0	0	0	0	
Benzene	0.00238711	0.00216626	0.000220856	0.00238711	
Cyclohexane	0.00865551	0.00863511	2.04048E-05	0.00865551	
n-Heptane	0.320544	0.32052	2.39425E-05	0.320544	
n-Octane	0.319944	0.319939	4.5313E-06	0.319944	
n-Nonane	0.480884	0.480877	6.77287E-06	0.480884	
n-Decane	0.804964	0.804962	2.62533E-06	0.804964	
n-Undecane	0	0	0	0	
Dodecane	0	0	0	0	
Water	458.935	0.0010738	458.934	458.935	
Triethylene Glycol	0	0	0	0	
Oxygen	0	0	0	0	
Argon	0	0	0	0	
Carbon Monoxide	0	0	0	0	
Cyclopentane	0	0	0	0	
Isohexane	0.0785958	0.0785708	2.49932E-05	0.0785958	
3-Methylpentane	0	0	0	0	
Neohexane	0	0	0	0	
2,3-Dimethylbutane	0	0	0	0	
Methylcyclohexane	0	0	0	0	
Isooctane	0.164314	0.164312	1.40946E-06	0.164314	
Decane, 2-Methyl-	0	0	0	0	
Toluene	0.0214249	0.0209103	0.000514586	0.0214249	
m-Xylene	0.0654933	0.0650895	0.000403724	0.0654933	
Ethylbenzene	0.010096	0.0100256	7.0406E-05	0.010096	

Mass Fraction	Total %	Light Liquid %	Heavy Liquid %	Mixed Liquid %	
Nitrogen	3.46801E-06	3.94936E-05	2.12954E-06	3.46801E-06	
Methane	0.00227442	0.0344866	0.00107763	0.00227442	
CO2	0.000823831	0.00324334	0.000733938	0.000823831	
Ethane	0.00814311	0.196555	0.00114298	0.00814311	
Propane	0.0239514	0.63995	0.00106504	0.0239514	
Isobutane	0.0223501	0.620022	0.000144641	0.0223501	
n-Butane	0.0555535	1.53498	0.000588167	0.0555535	
Isopentane	0.0699532	1.94812	0.000173183	0.0699532	
n-Pentane	0.0649652	1.8104	0.000116706	0.0649652	
n-Hexane	0.0597101	1.66649	1.28866E-05	0.0597101	
Methylcyclopentane	0	0	0	0	
Benzene	0.00217434	0.055082	0.000208644	0.00217434	
Cyclohexane	0.00849441	0.236567	2.0769E-05	0.00849441	
n-Heptane	0.374542	10.4548	2.90152E-05	0.374542	
n-Octane	0.426172	11.8967	6.26005E-06	0.426172	
n-Nonane	0.719204	20.0767	1.05058E-05	0.719204	
n-Decane	1.33556	37.2827	4.51765E-06	1.33556	
n-Undecane	0	0	0	0	
Dodecane	0	0	0	0	
Water	96.4117	0.00629718	99.9935	96.4117	
Triethylene Glycol	0	0	0	0	
Oxygen	0	0	0	0	
Argon	0	0	0	0	
Carbon Monoxide	0	0	0	0	
Cyclopentane	0	0	0	0	
Isohexane	0.0789804	2.20408	2.60487E-05	0.0789804	
3-Methylpentane	0	0	0	0	
Neohexane	0	0	0	0	
2,3-Dimethylbutane	0	0	0	0	
Methylcyclohexane	0	0	0	0	
Isooctane	0.21887	6.10981	1.94718E-06	0.21887	
Decane, 2-Methyl-	0	0	0	0	

* User Specified Values

? Extrapolated or Approximate Values

ProMax 3.2.15289.0
Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Blocks
Produced Fluid Tanks
Separator Report

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 5:29 PM, 11/12/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Mass Fraction	Total %	Light Liquid %	Heavy Liquid %	Mixed Liquid %
Toluene	0.0230195	0.627168	0.000573427	0.0230195
m-Xylene	0.0810803	2.24945	0.000518378	0.0810803
Ethylbenzene	0.0124987	0.346476	9.04006E-05	0.0124987

Mass Flow	Total lb/h	Light Liquid lb/h	Heavy Liquid lb/h	Mixed Liquid lb/h
Nitrogen	0.000297401	0.000121323	0.000176078	0.000297401
Methane	0.195044	0.105942	0.0891024	0.195044
CO2	0.0706482	0.00996346	0.0606847	0.0706482
Ethane	0.698318	0.603813	0.0945057	0.698318
Propane	2.05397	1.96591	0.0880615	2.05397
Isobutane	1.91665	1.90469	0.0119594	1.91665
n-Butane	4.76403	4.7154	0.0486318	4.76403
Isopentane	5.99888	5.98457	0.0143194	5.99888
n-Pentane	5.57114	5.56149	0.00964968	5.57114
n-Hexane	5.12048	5.11941	0.00106552	5.12048
Methylcyclopentane	0	0	0	0
Benzene	0.186462	0.16921	0.0172514	0.186462
Cyclohexane	0.728444	0.726726	0.00171726	0.728444
n-Heptane	32.1191	32.1167	0.00239909	32.1191
n-Octane	36.5467	36.5462	0.000517604	36.5467
n-Nonane	61.6758	61.6749	0.000868655	61.6758
n-Decane	114.532	114.531	0.000373536	114.532
n-Undecane	0	0	0	0
Dodecane	0	0	0	0
Water	8267.85	0.0193447	8267.83	8267.85
Triethylene Glycol	0	0	0	0
Oxygen	0	0	0	0
Argon	0	0	0	0
Carbon Monoxide	0	0	0	0
Cyclopentane	0	0	0	0
Isohexane	6.77302	6.77087	0.0021538	6.77302
3-Methylpentane	0	0	0	0
Neohexane	0	0	0	0
2,3-Dimethylbutane	0	0	0	0
Methylcyclohexane	0	0	0	0
Isooctane	18.7693	18.7692	0.000161	18.7693
Decane, 2-Methyl-	0	0	0	0
Toluene	1.97406	1.92664	0.0474131	1.97406
m-Xylene	6.95309	6.91023	0.0428614	6.95309
Ethylbenzene	1.07184	1.06436	0.00747466	1.07184

Properties

Property	Units	Total	Light Liquid	Heavy Liquid	Mixed Liquid
Temperature	°F	70 *	70	70	70
Pressure	psig	0.625	0.625	0.625	0.625
Mole Fraction Vapor	%	0	0	0	0
Mole Fraction Light Liquid	%	0.580966	100	0	0.580966
Mole Fraction Heavy Liquid	%	99.419	0	100	99.419
Molecular Weight	lb/lbmol	18.5767	114.544	18.0159	18.5767
Mass Density	lb/ft^3	61.3809	44.2809	62.2744	61.3809
Molar Flow	lbmol/h	461.631	2.68192	458.949	461.631
Mass Flow	lb/h	8575.57	307.197	8268.37	8575.57
Vapor Volumetric Flow	ft^3/h	139.711	6.93746	132.773	139.711
Liquid Volumetric Flow	gpm	17.4185	0.86493	16.5535	17.4185
Std Vapor Volumetric Flow	MMSCFD	4.20436	0.0244259	4.17994	4.20436
Std Liquid Volumetric Flow	sgpm	17.3957	0.865515	16.5302	17.3957
Specific Gravity		0.984158	0.709983	0.998483	0.984158
API Gravity		12.0494	66.5135	10.0156	12.0494
Net Ideal Gas Heating Value	Btu/ft^3	33.7131	5793.64	0.0543442	33.7131

* User Specified Values

? Extrapolated or Approximate Values

ProMax 3.2.15289.0
Copyright © 2002-2015 BRE Group, Ltd.

Licensed to Trinity Consultants, Inc. and Affiliates

Blocks
Produced Fluid Tanks
 Separator Report

Client Name:	EQT	Job: V1.0
Location:	BIG-177	Modified: 5:29 PM, 11/12/2015
Flowsheet:	BIG 177	Status: Solved 10:24 AM, 11/24/2015

Properties

Property	Units	Total	Light Liquid	Heavy Liquid	Mixed Liquid	
Net Liquid Heating Value	Btu/lb	-338.675	19037.2	-1058.55	-338.675	
Gross Ideal Gas Heating Value	Btu/ft ³	86.3326	6240.98	50.3673	86.3326	
Gross Liquid Heating Value	Btu/lb	736.238	20519.3	1.2323	736.238	

Remarks

Flowsheet Environment SRK Environment					
Client Name:	EQT			Job: V1.0	
Location:	BIG-177				
Flowsheet:	BIG 177				
Environment Settings					
Number of Poynting Intervals	0		Freeze Out Temperature Threshold Difference	10 °F	
Gibbs Excess Model Evaluation Temperature	77 °F		Phase Tolerance	1 %	
Components					
Component Name	Henry's Law Component	Phase Initiator	Component Name	Henry's Law Component	Phase Initiator
Nitrogen	False	False	Dodecane	False	False
Methane	False	False	Water	False	True
CO2	False	False	Triethylene Glycol	False	True
Ethane	False	False	Oxygen	False	False
Propane	False	False	Argon	False	False
Isobutane	False	False	Carbon Monoxide	False	False
n-Butane	False	False	Cyclopentane	False	False
Isopentane	False	False	Isohexane	False	False
n-Pentane	False	False	3-Methylpentane	False	False
n-Hexane	False	False	Neohexane	False	False
Methylcyclopentane	False	False	2,3-Dimethylbutane	False	False
Benzene	False	False	Methylcyclohexane	False	False
Cyclohexane	False	False	Isooctane	False	False
n-Heptane	False	False	Decane, 2-Methyl-	False	False
n-Octane	False	False	Toluene	False	False
n-Nonane	False	False	m-Xylene	False	False
n-Decane	False	False	Ethylbenzene	False	False
n-Undecane	False	False			
Physical Property Method Sets					
Liquid Molar Volume	COSTALD		Overall Package	SRK	
Stability Calculation	SRK		Vapor Package	SRK	
Light Liquid Package	SRK		Heavy Liquid Package	SRK	
Remarks					

* Project Setup Information

*

Project File : Z:\Client\EQT Corporation\West Virginia\WV Production Wells\153901.0056 WV Wellpads 2015\BIG 177\02 Draft\2015-1120 G70 Application\Attach I - Emission Calcs\01 E&P TANK\2015-1124_EQT_BIG 177_G70_Sand Separator Tank.ept

Flowsheet Selection : Oil Tank with Separator

Calculation Method : RVP Distillation

Control Efficiency : 100.0%

Known Separator Stream : Geographical Region

Geographical Region : All Regions in US

Entering Air Composition : No

Filed Name : BIG 177 - Sand Separator Tank

Well Name : PTE for G70 Application

Date : 2015.11.23

* Data Input

*

Separator Pressure : 300.00[psig]

Separator Temperature : 80.00[F]

Ambient Pressure : 14.70[psia]

Ambient Temperature : 80.00[F]

C10+ SG : 0.8820

C10+ MW : 296.00

-- Low Pressure Oil -----

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.0300
4	N2	0.0900
5	C1	8.4300
6	C2	4.2300
7	C3	5.9100
8	i-C4	5.1700
9	n-C4	6.2200
10	i-C5	8.9100
11	n-C5	4.9700
12	C6	9.1100
13	C7	11.3400
14	C8	10.3900
15	C9	5.9600
16	C10+	11.7500
17	Benzene	0.3700
18	Toluene	0.9800
19	E-Benzene	0.1500
20	Xylenes	1.1900
21	n-C6	4.8000

22 224Trimethylp 0.0000

-- Sales Oil -----

Production Rate : 0.1[bbbl/day]
Days of Annual Operation : 365 [days/year]
API Gravity : 58.0
Reid Vapor Pressure : 10.60[psia]

* Calculation Results *

-- Emission Summary -----

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
Page 1-----		E&P TANK
Total HAPs	0.010	0.002
Total HC	0.553	0.126
VOCs, C2+	0.484	0.111
VOCs, C3+	0.419	0.096

Uncontrolled Recovery Info.

Vapor 28.7100 x1E-3 [MSCFD]
HC Vapor 28.5800 x1E-3 [MSCFD]
GOR 287.10 [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	0.001	0.000
4	N2	0.001	0.000
5	C1	0.069	0.016
6	C2	0.065	0.015
7	C3	0.119	0.027
8	i-C4	0.084	0.019
9	n-C4	0.079	0.018
10	i-C5	0.065	0.015
11	n-C5	0.028	0.006
12	C6	0.020	0.005
13	C7	0.009	0.002
14	C8	0.003	0.001
15	C9	0.001	0.000
16	C10+	0.000	0.000
17	Benzene	0.001	0.000
18	Toluene	0.000	0.000
19	E-Benzene	0.000	0.000
20	Xylenes	0.000	0.000
21	n-C6	0.009	0.002
22	224Trimethylp	0.000	0.000
	Total	0.554	0.126

-- 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	0.0300	0.0021	0.0000	0.1194	0.0496	0.1111
4 N2	28.01	0.0900	0.0006	0.0000	0.3763	0.0145	0.3332
5 C1	16.04	8.4300	0.2054	0.0000	34.7691	4.8646	31.2062
6 C2	30.07	4.2300	0.5879	0.0039	15.8939	13.8313	15.6481
7 C3	44.10	5.9100	2.4063	0.8494	17.1306	37.7108	19.5826
8 i-C4	58.12	5.1700	3.7204	3.2119	9.8124	15.2521	10.4605
9 n-C4	58.12	6.2200	5.2238	4.8805	9.4102	13.0089	9.8389
10 i-C5	72.15	8.9100	9.7007	9.7854	6.3777	7.7795	6.5447
11 n-C5	72.15	4.9700	5.6802	5.7866	2.6955	3.2686	2.7638
12 C6	86.16	9.1100	11.4207	11.8324	1.7100	2.0852	1.7547
13 C7	100.20	11.3400	14.6665	15.2753	0.6869	0.8605	0.7075
14 C8	114.23	10.3900	13.5756	14.1635	0.1882	0.2442	0.1949
15 C9	128.28	5.9600	7.8101	8.1523	0.0352	0.0503	0.0370
16 C10+	138.51	11.7500	15.4190	16.0990	0.0000	0.0000	0.0000
17 Benzene	78.11	0.3700	0.4701	0.4881	0.0496	0.0610	0.0509
18 Toluene	92.13	0.9800	1.2750	1.3293	0.0351	0.0448	0.0363
19 E-Benzene	106.17	0.1500	0.1963	0.2049	0.0017	0.0022	0.0017
20 Xylenes	106.17	1.1900	1.5580	1.6260	0.0114	0.0152	0.0119
21 n-C6	86.18	4.8000	6.0812	6.3116	0.6969	0.8566	0.7160
22 224Trimethylp	114.24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MW	100.95	120.35	123.46	38.83	49.76	40.13
Stream Mole Ratio	1.0000	0.7620	0.7299	0.2380	0.0322	0.2701
Heating Value [BTU/SCF]				2218.43	2811.04	2289.04
Gas Gravity [Gas/Air]				1.34	1.72	1.39
Bubble Pt. @ 100F [psia]	322.24	24.57	11.47			

Page 2----- E&P TANK

RVP @ 100F [psia]	79.39	15.92	10.57
Spec. Gravity @ 100F	0.672	0.695	0.698

Gas Analytical

Report Date: Nov 3, 2015 11:52a

Client:	Equitable Production	Date Sampled:	Oct 28, 2015 2:30p
Site:	513867	Analysis Date:	Nov 2, 2015 4:08p
Field No:	9998	Collected By:	Danial Collins
Meter:	513867	Date Effective:	Oct 28, 2015 12:00a
Source Laboratory	Clarksburg (Bridgeport), WV	Sample Pressure (PSI):	85.0
Lab File No:	X_CH1-7314.CHR	Sample Temp (°F):	
Sample Type:	Spot	Field H2O:	No Test
Reviewed By:		Field H2S:	No Test

Component	Mol %	Gal/MSCF
Methane	82.3765	
Ethane	12.4095	3.30
Propane	2.7650	0.76
I-Butane	0.4808	0.16
N-Butane	0.7097	0.22
I-Pentane	0.2062	0.08
N-Pentane	0.1357	0.05
Nitrogen	0.4513	
Oxygen	0.0275	
Carbon Dioxide	0.1563	
Hexanes+	0.2815	0.12
TOTAL	100.0000	4.68

Analytical Results at Base Conditions (Real)	
BTU/SCF (Dry):	1,194.1357 BTU/ft ³
BTU/SCF (Saturated):	1,174.2302 BTU/ft ³
PSIA:	14.730 PSI
Temperature (°F):	60.00 °F
Z Factor (Dry):	0.99691
Z Factor (Saturated):	0.99652

Analytical Results at Contract Conditions (Real)	
BTU/SCF (Dry):	1,194.1357 BTU/ft ³
BTU/SCF (Saturated):	1,174.2302 BTU/ft ³
PSIA:	14.730 PSI
Temperature (°F):	60.00 °F
Z Factor (Dry):	0.99691
Z Factor (Saturated):	0.99652

Calculated Specific Gravities		
Ideal Gravity:	0.6757	Real Gravity: 0.6775
Molecular Wt:	19.5709 lb/lbmol	

Gross Heating Values are Based on:
GPA 2145-09, 2186
Compressibility is Calculated using AGA-8.

Source	Date	Notes
Gas Analytical	Nov 2, 2015	email bob gum

**LAFAYETTE AREA LABORATORY**4790 N.E. EVANGELINE THRUWAY
CARENCRO, LA 70520
PHONE (337) 896-3055
FAX (337) 896-3077

Certificate of Analysis : 13120146-001A

Company:	Gas Analytical Services	For:	Gas Analytical Services
Well:	512753		Alan Ball
Field:	Equitable		PO Box 1028
Sample of:	Liquid-Spot		
Conditions:	60 psi @ N.G. ° F		Bridgeport, WV, 26330
Sampled by:	CD-GAS	Report Date:	1/4/2014
Sample date:	12/4/2013		
Remarks:	Cylinder No.: GAS		
Remarks:			

<u>Analysis: (GPA 2186M)</u>	<u>Mol. %</u>	<u>MW</u>	<u>Wt. %</u>	<u>Sp. Gravity</u>	<u>L.V. %</u>
Nitrogen	0.000	28.013	0.000	0.8094	0.000
Methane	0.016	16.043	0.003	0.3000	0.006
Carbon Dioxide	0.003	44.010	0.001	0.8180	0.001
Ethane	0.328	30.070	0.101	0.3562	0.200
Propane	1.585	44.097	0.716	0.5070	0.994
Iso-butane	1.322	58.123	0.788	0.5629	0.985
N-butane	4.226	58.123	2.518	0.5840	3.035
Iso-pentane	5.528	72.150	4.088	0.6244	4.608
N-pentane	6.306	72.150	4.664	0.6311	5.203
i-Hexanes	8.500	86.177	7.422	0.6795	7.887
n-Hexane	6.494	85.647	5.741	0.6640	6.041
2,2,4 trimethylpentane	0.040	114.231	0.045	0.6967	0.046
Benzene	0.157	78.114	0.071	0.8846	0.101
Heptanes	23.265	98.747	23.632	0.6979	23.809
Toluene	1.331	92.141	0.706	0.8719	1.019
Octanes	25.117	108.813	28.791	0.7398	27.056
E-benzene	0.160	106.167	0.088	0.8718	0.141
M-,O-,P-xylene	1.818	106.167	1.980	0.8731	1.611
Nonanes	7.984	121.922	10.382	0.7624	9.745
Decanes Plus	5.820	138.508	8.263	0.7744	7.512
	-----		-----		-----
	100.000		100.000		100.000

Calculated Values	Total Sample	Decanes Plus
Specific Gravity at 60 °F	0.7041	0.7744
Api Gravity at 60 °F	69.476	51.225
Molecular Weight	97.560	138.508
Pounds per Gallon (in Vacuum)	5.870	6.456
Pounds per Gallon (in Air)	5.864	6.449
Cu. Ft. Vapor per Gallon @ 14.73 psia	22.886	17.648



Southern Petroleum Laboratories, Inc.



LAFAYETTE AREA LABORATORY
 4790 N.E. EVANGELINE THRUWAY
 CARENCRO, LA 70520
 PHONE (337) 896-3055
 FAX (337) 896-3077

Certificate of Analysis : 13120146-001A

Company:	Gas Analytical Services	For:	Gas Analytical Services
Well:	512753		Alan Ball
Field:	Equitable		PO Box 1028
Sample of:	Liquid-Spot		
Conditions:	60 psi @ N.G. ° F		Bridgeport, WV, 26330
Sampled by:	CD-GAS	Report Date:	1/4/2014
Sample date:	12/4/2013		
Remarks:	Cylinder No.: GAS		
Remarks:			

<u>Analysis: (GPA 2103M)</u>	<u>Mol. %</u>	<u>MW</u>	<u>Wt. %</u>	<u>Sp. Gravity</u>	<u>L.V. %</u>
Nitrogen	0.000	28.013	0.000	0.8094	0.000
Methane	0.016	16.043	0.003	0.3000	0.006
Carbon Dioxide	0.003	44.010	0.001	0.8180	0.001
Ethane	0.328	30.070	0.101	0.3562	0.200
Propane	1.585	44.097	0.716	0.5070	0.994
Iso-butane	1.322	58.123	0.788	0.5629	0.985
N-butane	4.226	58.123	2.518	0.5840	3.035
Iso-pentane	5.528	72.150	4.088	0.6244	4.608
N-pentane	6.306	72.150	4.664	0.6311	5.203
Hexanes	14.994	85.647	13.163	0.6654	13.928
Heptanes Plus	65.692	98.747	73.958	0.6979	71.040
	-----		-----		-----
	100.000		100.000		100.000

Calculated Values	Total Sample	Heptanes Plus
Specific Gravity at 60 °F	0.7041	0.7340
Api Gravity at 60 °F	69.476	61.268
Molecular Weight	97.560	109.837
Pounds per Gallon (in Vacuum)	5.870	6.120
Pounds per Gallon (in Air)	5.864	6.113
Cu. Ft. Vapor per Gallon @ 14.73 psia	22.886	21.194
Standing-Katz Density (lb. / ft ³)		



Southern Petroleum Laboratories, Inc.



Certificate of Analysis
 Number: 2030-13120146-001A

Carencro Laboratory
 4790 NE Evangeline Thruway
 Carencro, LA 70520

Alan Ball
 Gas Analytical Services
 PO Box 1028
 Bridgeport, WV 26330

Dec. 23, 2013

Field: Equitable
 Station Name: 512753
 Sample Point: Wellhead
 Cylinder No: GAS

Sampled By: CD-GAS
 Sample Of: Liquid Spot
 Sample Date: 12/04/2013 13:30
 Sample Conditions: 60 psig

Analytical Data

Test	Method	Result	Units	Detection Limit	Lab Tech.	Analysis Date
Color Visual	Proprietary	D. STRAW			AR	12/22/2013
API Gravity @ 60° F	ASTM D-5002	70.07	°		AR	12/22/2013
Specific Gravity @ 60/60° F	ASTM D-5002	0.702			AR	12/22/2013
Density @ 60° F	ASTM D-5002	0.7013	g/ml		AR	12/22/2013
Shrinkage Factor	Proprietary	0.9548			AR	12/22/2013
Flash Factor	Proprietary	5.5738	Cu. Ft./S.T. Bbl		AR	12/22/2013

Hydrocarbon Laboratory Manager

Quality Assurance:

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

ATTACHMENT T

Emission Summary Sheet

ATTACHMENT T – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID# (Emission Source ID)	NO _x		CO		VOC		SO ₂		PM ₁₀		PM _{2.5}		GHG (CO ₂ e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
C001 (S001-S008, S022, C001)	1.15	5.02	0.96	4.22	0.38	1.35	0.01	0.03	0.09	0.38	0.09	0.38	1,371	6,005
C002 (S001-S008, S022, C002)	1.15	5.02	0.96	4.22	0.38	1.35	0.01	0.03	0.09	0.38	0.09	0.38	1,371	6,005
E009 (S009)	---	---	---	---	0.10	0.42	---	---	---	---	---	---	0	2
E010 (S010)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E011 (S011)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E012 (S012)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E013 (S013)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E014 (S014)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E015 (S015)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E016 (S016)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E017 (S017)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E018 (S018)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E019 (S019)	0.15	0.64	0.12	0.54	0.01	0.04	8.8E-04	3.9E-03	0.01	0.05	0.01	0.05	180	789
E020 (S020)	1.2E-03	5.4E-03	1.0E-03	4.5E-03	6.8E-05	3.0E-04	7.4E-06	3.2E-05	9.4E-05	4.1E-04	9.4E-05	4.1E-04	2	7
E021 (S021)	1.2E-03	5.4E-03	1.0E-03	4.5E-03	6.8E-05	3.0E-04	7.4E-06	3.2E-05	9.4E-05	4.1E-04	9.4E-05	4.1E-04	2	7
E022 (S022)	---	---	---	---	3.45	0.90	---	---	---	---	---	---	---	---
Fugitives	---	---	---	---	---	27.36	---	---	---	---	---	---	---	1,117

Haul Roads	---	---	---	---	---	---	---	---	---	0.97	---	0.10	---	---
Facility Total	3.76	16.46	3.16	13.83	4.39	31.74	0.02	0.10	0.29	2.23	0.29	1.35	4,547	21,034
Facility Total (excl. fugitives)	3.76	16.46	3.16	13.83	0.95	3.48	0.02	0.10	0.29	1.25	0.29	1.25	4,547	19,917

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.

According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

ATTACHMENT T – FACILITY-WIDE HAP CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
C001 (S001-S008, S022, C001)	---	---	2.4E-04	8.9E-04	7.8E-04	3.0E-03	1.3E-04	5.1E-04	7.3E-04	2.8E-03	0.01	0.03	0.02	0.07
C002 (S001-S008, S022, C002)	---	---	2.4E-04	8.9E-04	7.8E-04	3.0E-03	1.3E-04	5.1E-04	7.3E-04	2.8E-03	0.01	0.03	0.02	0.07
E009 (S009)	---	---	<0.01	1.0E-03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.0E-03	0.01	2.0E-03	0.01
E010 (S010)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E011 (S011)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E012 (S012)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E013 (S013)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E014 (S014)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E015 (S015)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E016 (S016)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E017 (S017)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E018 (S018)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E019 (S019)	1.1E-04	4.8E-04	3.1E-06	1.3E-05	5.0E-06	2.2E-05	---	---	---	---	2.6E-03	0.01	2.8E-03	0.01
E020 (S020)	9.3E-07	4.1E-06	2.6E-08	1.1E-07	4.2E-08	1.8E-07	---	---	---	---	2.2E-05	9.7E-05	2.3E-05	1.0E-04
E021 (S021)	9.3E-07	4.1E-06	2.6E-08	1.1E-07	4.2E-08	1.8E-07	---	---	---	---	2.2E-05	9.7E-05	2.3E-05	1.0E-04
E022 (S022)	---	---	1.5E-03	3.9E-04	4.4E-03	1.1E-03	8.0E-04	2.1E-04	4.3E-03	1.1E-03	0.06	0.02	0.15	0.04

Fugitives	---	---	---	0.02	---	0.06	---	7.8E-03	---	0.07	---	0.65	---	0.86
Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Facility Total	1.1E-03	4.8E-03	2.0E-03	0.03	0.01	0.08	1.1E-03	0.01	0.01	0.08	0.11	0.90	0.22	1.17
Facility Total (excl. fugitives)	1.1E-03	4.8E-03	5.0E-04	2.9E-03	1.6E-03	0.01	2.7E-04	1.0E-03	1.5E-03	0.01	0.04	0.18	0.07	0.28

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators. According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

ATTACHMENT U

Class I Legal Advertisement

RECOMMENDED PUBLIC NOTICE TEMPLATE

AIR QUALITY PERMIT NOTICE Notice of Application

Notice is given that EQT Production Company has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G70-B General Permit Registration for a proposed natural gas production facility located on Wiley Fork Road, near Big Run, in Wetzel County, West Virginia. The latitude and longitude coordinates are: 39.58256 N, -80.58412 W.

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

Pollutant	Emissions in tpy (tons per year)
NO _x	16.46
CO	13.83
VOC	31.74
SO ₂	0.10
PM	2.23
Total HAPs	1.17
Carbon Dioxide Equivalents (CO ₂ e)	21,034

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 **(Day)** day of **(Month)**, 2015.

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

ATTACHMENT V

General Permit Registration Application Fee