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

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

Alex Bosiljevac
Environmental Coordinator

April 26, 2016

CERTIFIED MAIL # 7015 1660 0000 9399 6086

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

RE: R13 Permit Application
EQT Production Company
OXF-149/150 Natural Gas Production Site
Facility ID No. 017-00040

Dear Mr. Durham,

Enclosed are two electronic copies and one original hard copy of a proposed application for an R13 Air Permit for the OXF-149/150 Natural Gas Production Well Site. The site currently operates under a G70-A General Air Permit (G70-A013A). Please note that this application satisfies a requirement in Consent Order CO-R13-E-2016-04, in which EQT Production Company is required to submit an application with the equipment specified in the consent order. 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,

Alex Bosiljevac
EQT Corporation

Enclosures

PROJECT REPORT

EQT Production
OXF 149-150 Wellpad

R-13 Permit Application

Where energy meets innovation.

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

April 2016

Trinity Consultants

Environmental solutions delivered uncommonly well

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EQT Production Company (EQT) is submitting this construction permit application (R-13) to the West Virginia Department of Environmental Protection (WVDEP) for the construction and operation of new equipment at existing natural gas production well pads, OXF 149 and OXF-150, located in Doddridge County, West Virginia. The wellpads are currently permitted under General Permit G70-A031A.

1.1. FACILITY AND PROJECT DESCRIPTION

The OXF-149 and OXF-150 wellpads are existing natural gas production facilities. Natural gas and liquids (including water and condensate) are extracted from deposits underneath the surface. Natural gas is transported from the wells to a gas line for additional processing and compression, as necessary. The liquids produced are stored in storage vessels:

The OXF-149 and OXF 150 pads currently consist of the following equipment

- Twelve (12) 400 barrel (bbl) storage tanks for condensate/water(produced fluids) controlled by two(2) combustors, each rated at 11.66 MMBtu/hr ;
- One (1) line heater, rated at 0.77 MMbtu/hr heat input;
- Nine (9) line heaters, each rated at 1.54 MMbtu/hr heat input;
- Four (4) thermoelectric generators (TEGs), each rated at 0.013 MMBtu/hr heat input;
- Two (2) 140 bbl storage tanks for sand and produced fluids from the sand separator (vapors from these tanks may be controlled by combustors but are not represented as controlled in this application);
- Produced fluid truck loading; and
- Associated piping and components.

As part of this application, EQT seeks to permit the following equipment at the OXF-149 and OXF-150 pad:

- Two (2) new combustors rated at 11.66 MMbtu/hr each.

Additionally, EQT requests that the department consolidate all existing equipment and their requirements under the current G70-A137A permit in the proposed R-13 permit. The facility will not qualify for the current issued G-70B permit due to the total combustor size that exceed the G70-B permit requirements.

A process flow diagram is included as Attachment F.

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)."*

OXF 149 and 150 are separate wellpads that are functionally independent of each other. The pads are separated by approximately 0.5 miles and the production of each wellpad is independent of the other. WVDEP had previously determined that the OXF149 and OXF 150 wellpad should be aggregated as a single stationary source since both sites share a common loading battery area. Although the loading battery storage tanks have been removed, both wellpads will continue to be considered a single stationary source with respect to permitting programs, including Title V and Prevention of Significant Deterioration (PSD). As discussed in this application, the facility is a minor source of air emissions with respect to New Source Review (NSR) and Title V Permitting.

1.3. R-13 APPLICATION ORGANIZATION

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

- Section 2: Sample Emission Source Calculations;
- Section 3: R-13 and Permission to Commence Construction Application Forms;
- Attachment A: Business Certificate;
- Attachment B: Map;
- Attachment C: Installation and Start Up Schedule;
- Attachment D: Regulatory Discussion;
- Attachment E: Plot Plan;
- Attachment F: Detailed Process Flow Diagram;
- Attachment G: Process Description;
- Attachment I: Emission Units Table;
- Attachment J: Emission Points Data Summary Sheet;
- Attachment K: Fugitive Emissions Data Summary Sheet;
- Attachment L: Emissions Unit Data Sheets;
- Attachment M: Air Pollution Control Device Sheets:
- Attachment N: Supporting Emission Calculations;
- Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans
- Attachment P: Legal Ad

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 N 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 hazardous air pollutants (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]

- **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] Pneumatic devices at the wellpads are intermittent bleed and are assumed to be in operation 1/3 of the year.

- **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 OXF 149-150 well pad (i.e., the maximum monthly throughput for the pad times 12), and includes a safety factor of 1.3. The composition for the analysis was from a sample taken at OXF-150. 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:

$$Throughput\ \left(\frac{bbl}{day}\right) = \left(Condensate\ Throughput\ \left(\frac{bbl}{month}\right) + \left(Produced\ Water\ Throughput\ \left(\frac{bbl}{month}\right)\right)\right) * \frac{12\left(\frac{months}{year}\right)}{365\left(\frac{days}{year}\right)} \text{ x } 1.3$$

- **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. R-13 APPLICATION FORMS

The WVDEP permit application forms contained in this application include all applicable R-13 application forms including the required attachments.

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

APPLICATION FOR NSR PERMIT

AND

TITLE V PERMIT REVISION
(OPTIONAL)

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

☐ **CONSTRUCTION** ☒ **MODIFICATION** ☐ **RELOCATION**
☐ **CLASS I ADMINISTRATIVE UPDATE** ☐ **TEMPORARY**
☐ **CLASS II ADMINISTRATIVE UPDATE** ☐ **AFTER-THE-FACT**

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION**
☐ **SIGNIFICANT MODIFICATION**

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

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

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

3. Name of facility *(if different from above):*
OXF 149-150 Wellpad

4. The applicant is the:
☐ **OWNER** ☐ **OPERATOR** ☒ **BOTH**

5A. Applicant's mailing address:
625 Liberty Avenue, Suite 1700

Pittsburgh, PA 15222

5B. Facility's present physical address:
Co Rte 11/4
West Union

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☒ **YES** ☐ **NO**
- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation: EQT Corporation

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**
- If **YES,** please explain: Applicant owns the site
- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.): Natural Gas Production Wellsite

10. North American Industry Classification System **(NAICS)** code for the facility:
213111

11A. DAQ Plant ID No. (for existing facilities only):
017-00040

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
G70-A013A

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

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

OXF-149:

From Charleston take 1-77 north to exit 176. Go east on US Route 50 approximately 40.6 miles. Take a right on Arnolds Creek Road (Co. Rt. 11). Go approximately 0.7 miles and turn left on Punkin Center Road (Co. Rt. 11/4) (Note that Google maps calls this "Left Fork Run Rd" but signage says "Punkin Center Road"). Continue for approximately 3.3 miles (road turns to dirt after 3.1 miles) and veer left to an access gate. After going through gate go 0.4 miles on the access road. At that point the road turns hard to the left with a split going up a steep hill on the right. Take the steep hill and go approximately 0.3 miles to the well pad.

OXF-150:

From Charleston take 1-77 north to exit 176. Go east on US Route 50 approximately 40.6 miles. Take a right on Arnolds Creek Road (Co. Rt. 11). Go approximately 0.7 miles and turn left on Punkin Center Road (Co. Rt. 11/4) (Note google maps calls this "Left Fork Run Rd" but signage says "Punkin Center Road"). Continue for approximately 3.3 miles (road turns to dirt after 3.1 miles) and veer left to an access gate. After going through gate go 0.5 miles and cross a stream on the access road. After crossing the stream continue approximately 1.1 miles to the well pad.

12.B. New site address (if applicable):	12C. Nearest city or town: West Union	12D. County: Doddridge
12.E. UTM Northing (KM): OXF-149: Northing (KM): 4,341.348 OXF-150: Northing (KM): 4,341.558	12F. UTM Easting (KM): OXF-149: Easting (KM): 517.205 OXF-150: Easting (KM): 518.021	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:

EQT is proposing to install two (2) additional enclosed combustors at the wellpads.

14A. Provide the date of anticipated installation or change: Upon permit issuance – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen:	14B. Date of anticipated Start-Up if a permit is granted: / /

14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day 24 Days Per Week 7 Weeks Per Year 52

16. Is demolition or physical renovation at an existing facility involved? ☐ **YES** ☒ **NO**

17**. Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18**. Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known).* A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known).* Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

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

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

21. Provide a **Plot Plan,** e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to ***Plot Plan Guidance***) **.**

– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

23. Provide a **Process Description** as **Attachment G.**

– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

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

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**

– For chemical processes, provide a MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I.**

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

28. Check all applicable **Emissions Unit Data Sheets** listed below:

☒ Bulk Liquid Transfer Operations	☐ Haul Road Emissions	☐ Quarry
☐ Chemical Processes	☐ Hot Mix Asphalt Plant	☐ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	☒ Storage Tanks
☐ Grey Iron and Steel Foundry	☒ Indirect Heat Exchanger	

☒ General Emission Unit, specify: Thermoelectric Generator

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L.**

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

☐ Absorption Systems	☐ Baghouse	☐ Flare
☐ Adsorption Systems	☐ Condenser	☐ Mechanical Collector
☐ Afterburner	☐ Electrostatic Precipitator	☐ Wet Collecting System

☒ Other Collectors, specify Enclosed Combustors

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M.**

30. Provide all **Supporting Emissions Calculations** as **Attachment N,** or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and ***Example Legal Advertisement*** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33**. Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ **YES** ☒ **NO**

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's "***Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below.

☐ Authority of Corporation or Other Business Entity ☐ Authority of Partnership

☐ Authority of Governmental Agency ☐ Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R.**

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

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☒ **Responsible Official** / ☐ **Authorized Representative,** hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE _____ *(Please use blue ink)* DATE: 4-26-2016 *(Please use blue ink)*

35B. Printed name of signee: Kenneth Kirk		35C. Title: Executive Vice President
35D. E-mail: kkirk@eqt.com	36E. Phone:	36F. FAX:
36A. Printed name of contact person (if different from above): Alex Bosiljevac		36B. Title: Environmental Coordinator
36C. E-mail: abosiljevac@eqt.com	36D. Phone: 412-395-3699	36E. FAX: 412-395-3699

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

☒ **Attachment A: Business Certificate**
☒ **Attachment B: Map(s)**
☒ **Attachment C: Installation and Start Up Schedule**
☒ **Attachment D: Regulatory Discussion**
☒ **Attachment E: Plot Plan**
☒ **Attachment F: Detailed Process Flow Diagram(s)**
☒ **Attachment G: Process Description**
☐ **Attachment H: Material Safety Data Sheets (MSDS)**
☒ **Attachment I: Emission Units Table**
☒ **Attachment J: Emission Points Data Summary Sheet**
☒ **Attachment K: Fugitive Emissions Data Summary Sheet**
☒ **Attachment L: Emissions Unit Data Sheet(s)**
☒ **Attachment M: Air Pollution Control Device Sheet(s)**
☒ **Attachment N: Supporting Emissions Calculations**
☒ **Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans**
☒ **Attachment P: Public Notice**
☐ **Attachment Q: Business Confidential Claims**
☐ **Attachment R: Authority Forms**
☐ **Attachment S: Title V Permit Revision Information**
☒ **Application Fee**

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

- ☐ ***Forward 1 copy of the application to the Title V Permitting Group and:***
- ☐ ***For Title V Administrative Amendments:***
  - ☐ ***NSR permit writer should notify Title V permit writer of draft permit,***
- ☐ ***For Title V Minor Modifications:***
  - ☐ ***Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,***
  - ☐ ***NSR permit writer should notify Title V permit writer of draft permit.***
- ☐ ***For Title V Significant Modifications processed in parallel with NSR Permit revision:***
  - ☐ ***NSR permit writer should notify a Title V permit writer of draft permit,***
  - ☐ ***Public notice should reference both 45CSR13 and Title V permits,***
  - ☐ ***EPA has 45 day review period of a draft permit.***

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

ATTACHMENT A

Business Certificate

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

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

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

This certificate is issued on: 08/4/2010

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

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

This certificate is not transferrable and must be displayed at the location for which issued.

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

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

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

atL006 v.3
L0553297664

ATTACHMENT B

Map

ATTACHMENT B

Figure 1 - Map of OXF-149 and OXF-150 Locations

OXF-149
UTM Northing (KM): 4,341.348
UTM Easting (KM): 517.205
Elevation: ~1,250 ft

OXF-150
UTM Northing (KM): 4,341.558
UTM Easting (KM): 518.021
Elevation: ~1,270 ft

ATTACHMENT C

Installation and Start Up Schedule

ATTACHMENT C

Schedule of Planned Installation and Start-Up

Proposed Unit	Date of Installation
Enclosed Combustor – Rated at 11.66 MMBtu/hr - C003	2016
Enclosed Combustor – Rated at 11.66 MMBtu/hr - C004	2016

ATTACHMENT D

Regulatory Discussion

ATTACHMENT D – REGULATORY APPLICABILITY

This section documents the applicability determinations made for Federal and State air quality regulations. The monitoring, recordkeeping, reporting, and testing plan is presented in Attachment O. 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 R13 permit application forms, which fulfill the requirement to include citations and descriptions of applicable statutory and administrative code requirements.

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 wellpads. 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 wellpads. Regulations that are categorically non-applicable are not discussed (e.g., NSPS Subpart J, Standards of Performance for Petroleum Refineries).

Prevention of Significant Deterioration (PSD) Source Classification

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

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.[1]. The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility after the proposed project. Therefore, the wellpads are not a major source for Title V purposes.

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

[1] 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 wellpads. 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

NSPS Subparts D, Da, Db, and Dc – Steam Generating Units

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.

NSPS Subpart K, Ka, and Kb – Storage Vessels for Petroleum Liquids/Volatile Organic Liquids

These subparts apply to storage tanks of certain sizes constructed, reconstructed, or modified during various time periods. Subpart K applies to storage tanks constructed, reconstructed, or modified prior to 1978, and Subpart Ka applies to those constructed, reconstructed, or modified prior to 1984. Both Subparts K and Ka apply to storage tanks with a capacity greater than 40,000 gallons. Subpart Kb applies to volatile organic liquid (VOL) storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m^3 (~19,813 gallons). All of the tanks at the wellpads 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 wellpads.

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.[2] The potential applicability of Subpart OOOOa is discussed in the following section.

NSPS Subpart OOOOa—Crude Oil and Natural Gas Production, Transmission, and Distribution

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;
- 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;

[2] September 18, 2015 publication in Federal Register: https://www.federalregister.gov/articles/2015/09/18/2015-21023/oiland-natural-gas-sector-emission-standards-for-new-and-modified-sources

- 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.

There are twelve (12) produced fluid storage vessels and two (2) sand separator storage vessels at the wellpads. These tanks were installed prior to the applicability date of OOOOa. Furthermore, the storage vessels at both facilities will each have potential VOC emissions less than 6 tpy based on the permit application materials and enforceable limits to be included in the R-13 permit. As such, per 60.5365a(e), the tanks will not be storage vessel affected facilities under the rule.

Note that the proposed changes to the well pad do not meet the definition of modification under 60.5365a(i)(3)(i). Therefore, EQT will be not be subject to the leak detection and repair program under OOOOa.

The pneumatic controllers will potentially subject to NSPS OOOOa. 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 OOOOa.

Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas processing plants (Subpart OOOO) and the applicability of a particular NSPS to the wellpads can be readily ascertained based on the industrial source category covered. All other NSPS are categorically not applicable to the proposed project.

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 wellpads are 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 wellpads:

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

NESHAP Subpart HH — Oil and Natural Gas Production Facilities

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 wellpads do not include a triethylene glycol dehydration unit; therefore the requirements of this subpart do not apply.

NESHAP 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 line heaters at the wellpads are natural gas-fired and is specifically exempt from this subpart. Therefore, no sources at the wellpads are subject to any requirements under this subpart.

West Virginia SIP Regulations

The wellpads are 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).

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.

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

45 CSR 6: To Prevent and Control the 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.

45 CSR 16: Standards of Performance for New Stationary Sources

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

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 wellpads, 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.

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 at the wellpads are less than 40,000 gallons; therefore, 45 CSR 21-28 will not apply to the petroleum liquid storage tanks at the wellpads.

45 CSR 34: Emissions Standards for Hazardous Air Pollutants

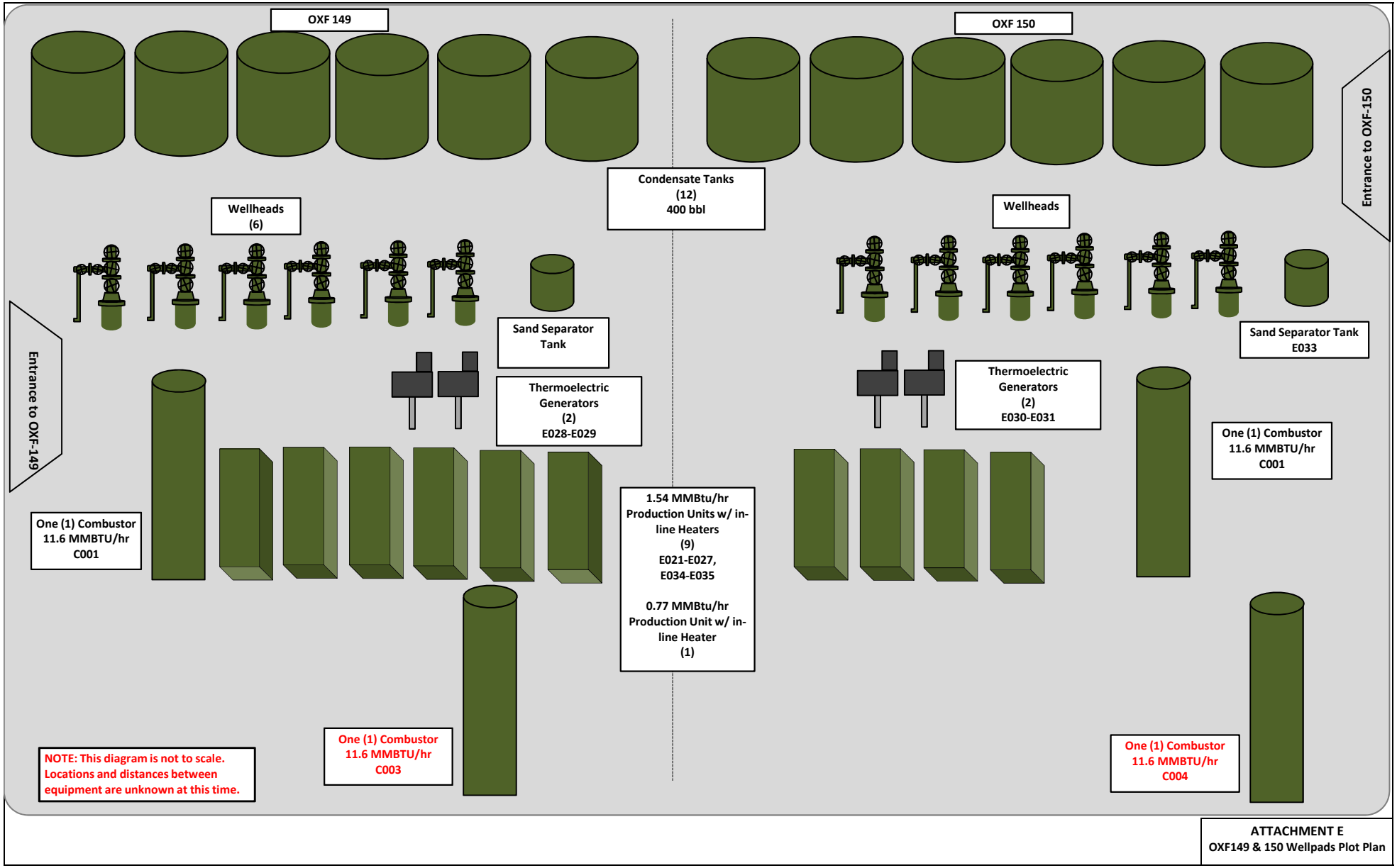
45 CSR 34-1 incorporates the federal Clean Air Act (CAA) national emissions standards for hazardous air pollutants (NESHAPs) as set forth in 40 CPR Parts 61 and 63 by reference. As noted above, no NESHAP are applicable.

Non-Applicability of Other SIP Rules

A thorough examination of the West Virginia SIP rules with respect to applicability at the wellpads reveal 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 wellpads.

ATTACHMENT E

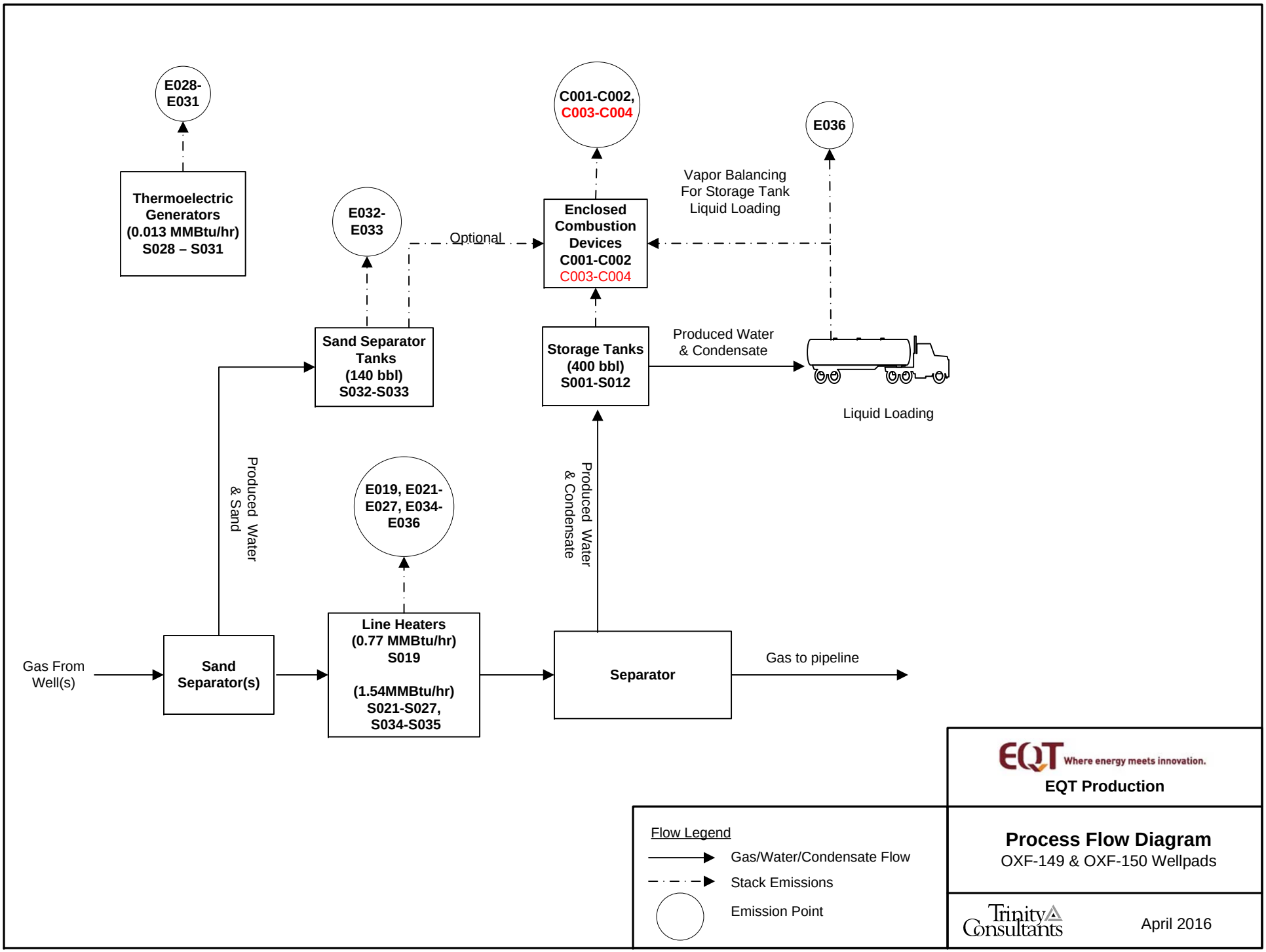
Plot Plan



ATTACHMENT E
OXF149 & 150 Wellpads Plot Plan

ATTACHMENT F

Detailed Process Flow Diagram


E028-E031
Thermoelectric Generators (0.013 MMBtu/hr) S028 – S031
C001-C002, C003-C004
E036
Vapor Balancing For Storage Tank Liquid Loading
E032-E033
Optional
Enclosed Combustion Devices C001-C002 C003-C004
Sand Separator Tanks (140 bbl) S032-S033
Storage Tanks (400 bbl) S001-S012
Produced Water & Condensate
Liquid Loading
Produced Water & Sand
E019, E021-E027, E034-E036
Produced Water & Condensate
Gas From Well(s)
Sand Separator(s)
Line Heaters (0.77 MMBtu/hr) S019
(1.54MMBtu/hr) S021-S027, S034-S035
Separator
Gas to pipeline
Flow Legend
Gas/Water/Condensate Flow
Stack Emissions
Emission Point
EQT Where energy meets innovation.
EQT Production
Process Flow Diagram
OXF-149 & OXF-150 Wellpads
Trinity Consultants
April 2016

ATTACHMENT G

Process Description

ATTACHMENT G: PROCESS DESCRIPTION

This R-13 permit application involves the permitting of two (2) combustors (C003-C004) at an existing natural gas production wellpads (OXF 149-150). OXF-149 and 150 are currently authorized under general permit G70-A031A.

The wellpads consist of twelve wells (12) each with the same basic operation. The incoming gas/liquid stream from the underground well will pass through a sand separator, where sand, water, and residual solids are displaced and transferred to the sand separator tanks (S032-S033). The gas stream will then pass through a line heater (S019, S021-S027, S034-S035) to raise/maintain temperature. The stream will then pass through a high pressure (3 phase) separator, which will separate gas (natural gas from the separator is sent to the sales line) from liquids (condensate and produced water). The produced water and condensate will be sent to the produced fluids tanks (S001-S012).

Emissions from the storage vessels are controlled by an enclosed combustor (C001-C004). 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 (S036) are routed back into the battery of tanks and ultimately to the combustor. Facility electricity is provided by thermoelectric generators (S028-S031)

A process flow diagram is included as Attachment F.

ATTACHMENT I

Emission Units Table

Attachment I

Emission Units Table

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

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
S001	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S002	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S003	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S004	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S005	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S006	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S007	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S008	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S009	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S010	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S011	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S012	C001, C002, C003, C004	Produced Liquid Tank	2015	400 BBL	Existing, No Change	C001-C004
S019	E019	Line Heater	2011	0.77 MMBtu/hr	Existing, No Change	None
S021	E021	Line Heater	2014	1.54 MMBtu/hr	Existing, No Change	None
S022	E022	Line Heater	2014	1.54 MMBtu/hr	Existing, No Change	None
S023	E023	Line Heater	2014	1.54 MMBtu/hr	Existing, No Change	None

S024	E024	Line Heater	2014	1.54 MMBtu/hr	Existing, No Change	None
S025	E025	Line Heater	2014	1.54 MMBtu/hr	Existing, No Change	None
S026	E026	Line Heater	2014	1.54 MMBtu/hr	Existing, No Change	None
S027	E027	Line Heater	2014	1.54 MMBtu/hr	Existing, No Change	None
S028	E028	Thermoelectric Generators	2011-2014	0.013 MMBtu/hr	Existing, No Change	None
S029	E029	Thermoelectric Generators	2011-2014	0.013 MMBtu/hr	Existing, No Change	None
S030	E030	Thermoelectric Generators	2011-2014	0.013 MMBtu/hr	Existing, No Change	None
S031	E031	Thermoelectric Generators	2011-2014	0.013 MMBtu/hr	Existing, No Change	None
S032	E032	Sand Separator Tank	2015	140 bbl	Existing, No Change	None
S033	E033	Sand Separator Tank	2015	140 bbl	Existing, No Change	None
S034	E034	Line Heater	2014	1.54 MMBtu/hr	Existing, No Change	None
S035	E035	Line Heater	2014	1.54 MMBtu/hr	Existing, No Change	None
S036	E036 (Uncaptured) C001-C004 (Controlled, Captured)	Liquid Loading	2015	21,324,030 gal/yr	Modified; Increased throughput	C001-C004
C001	C001	Enclosed Combustor	2015	11.66 MMBtu/hr	Existing, No Change	None
C002	C002	Enclosed Combustor	2015	11.66 MMBtu/hr	Existing, No Change	None
C003	C003	Enclosed Combustor	TBD	11.66 MMBtu/hr	New	None
C004	C004	Enclosed Combustor	TBD	11.66 MMBtu/hr	New	None

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

ATTACHMENT J

Emission Points Data Summary Sheet

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
C001	Vert Stack	S001-S012, S036	Condensate tanks, liquid loading	C001	Enclosed Combustor			NO_X	1.15	5.03	1.15	5.03	Gas	BRE ProMax	
								CO	0.96	4.22	0.96	4.22			
								VOC	40.35	130.48	0.81	2.61			
								SO_2	0.01	0.03	0.01	0.03			
								PM_{10}	0.09	0.38	0.09	0.38			
								$PM_{2.5}$	0.09	0.38	0.09	0.38			
								CO_2e	1,574	6,896	1,375	6,023			
								HAP	1.57	5.28	0.03	0.11			
								Toluene	0.08	0.31	<0.01	0.01			
								n-hexane	1.20	3.99	0.02	0.08			
C002	Vert Stack	S001-S012, S036	Condensate tanks, liquid loading	C002	Enclosed Combustor			NO_X	1.15	5.03	1.15	5.03	Gas	BRE ProMax	
								CO	0.96	4.22	0.96	4.22			
								VOC	40.35	130.48	0.81	2.61			
								SO_2	0.01	0.03	0.01	0.03			
								PM_{10}	0.09	0.38	0.09	0.38			
								$PM_{2.5}$	0.09	0.38	0.09	0.38			
								CO_2e	1,574	6,896	1,375	6,023			
								HAP	1.57	5.28	0.03	0.11			
								Toluene	0.08	0.31	<0.01	0.01			
								n-hexane	1.20	3.99	0.02	0.08			
C003	Vert Stack	S001-S012, S036	Condensate tanks, liquid loading	C003	Enclosed Combustor			NO_X	1.15	5.03	1.15	5.03	Gas	BRE ProMax	
								CO	0.96	4.22	0.96	4.22			
								VOC	40.35	130.48	0.81	2.61			
								SO_2	0.01	0.03	0.01	0.03			
								PM_{10}	0.09	0.38	0.09	0.38			
								$PM_{2.5}$	0.09	0.38	0.09	0.38			
								CO_2e	1,574	6,896	1,375	6,023			
								HAP	1.57	5.28	0.03	0.11			
								Toluene	0.08	0.31	<0.01	0.01			
								n-hexane	1.20	3.99	0.02	0.08			
C004	Vert Stack	S001-S012, S036	Condensate tanks, liquid loading	C004	Enclosed Combustor			NO_X	1.15	5.03	1.15	5.03	Gas	BRE ProMax	
								CO	0.96	4.22	0.96	4.22			
								VOC	40.35	130.48	0.81	2.61			
								SO_2	0.01	0.03	0.01	0.03			
								PM_{10}	0.09	0.38	0.09	0.38			
								$PM_{2.5}$	0.09	0.38	0.09	0.38			
								CO_2e	1,574	6,896	1,375	6,023			
								HAP	1.57	5.28	0.03	0.11			
								Toluene	0.08	0.31	<0.01	0.01			
								n-hexane	1.20	3.99	0.02	0.08			

E021-E035 (each)	Vert Stack	S021-S035	Line Heaters	N/A	N/A			NO_X CO VOC SO_2 PM_{10} $PM_{2.5}$ CO_2e HAP	0.15 0.12 0.01 <0.01 0.01 0.01 180 <0.01	0.64 0.54 0.04 <0.01 0.05 0.05 789 0.01	0.15 0.12 0.01 <0.01 0.01 0.01 180 <0.01	0.64 0.54 0.04 <0.01 0.05 0.05 789 0.01	Gas	AP-42	
E019	Vert Stack	S019	Line Heater	N/A	N/A			NO_X CO VOC SO_2 PM_{10} $PM_{2.5}$ CO_2e HAP	0.07 0.06 <0.01 <0.01 0.01 0.01 90 <0.01	0.32 0.27 0.02 <0.01 0.02 0.02 395 0.01	0.07 0.06 <0.01 <0.01 0.01 0.01 90 <0.01	0.32 0.27 0.02 <0.01 0.02 0.02 395 0.01	Gas	AP-42	
E028-E031 (each)	Vert Stack	S029-S031	TEG	N/A	N/A			NO_X CO_2e	<0.01 1.52	0.01 6.64	<0.01 1.52	0.01 6.64	Gas	AP-42	
E032-E033 (each)	Vert Stack	S032-S033	Sand Trap tank	N/A	N/A			VOC CO_2e HAP	0.07 0.50 <0.01	0.32 2.20 0.01	0.07 0.50 <0.01	0.32 2.20 0.01	Gas	E&P Tank	
E036	Fug	S036	Uncaptured liquid loading	N/A	N/A			VOC HAP	19.24 0.03	5.00 0.01	19.24 0.03	5.00 0.01	Gas	BRE ProMax	

*Note – Only pollutants with controlled emissions > 0.01 tpy are presented in this table.

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

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

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

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

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

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

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (^oF)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting

[1] Give at operating conditions. Include inerts.
[2] Release height of emissions above ground level.

ATTACHMENT K

Fugitive Emissions Data Summary Sheet

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? ☐ Yes ☒ No (no change to existing) ☐ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☐ Yes ☒ No ☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☒ Yes ☐ No ☐ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? ☒ Yes ☐ No ☐ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	NA	---	---	---	---	---
Unpaved Haul Roads	PM PM_{10} $PM_{2.5}$	---	23.71 6.04 0.60	---	23.71 6.04 0.60	C
Storage Pile Emissions	NA	---	---	---	---	---
Loading/Unloading Operations (Uncaptured Emissions)	VOC HAP Benzene Toluene Ethylbenzene Xylene n-hexane	19.24 0.67 0.01 0.03 <0.01 0.01 0.53	5.00 0.18 <0.01 0.01 <0.01 <0.01 0.14	---	---	B
Wastewater Treatment Evaporation & Operations	NA	---	---	---	---	---
Equipment Leaks	VOC HAP CO_2e Benzene Toluene Ethylbenzene Xylene n-hexane	N/A	35.06 1.09 541.51 0.01 0.03 <0.01 0.04 0.59	N/A	35.06 1.09 541.51 0.01 0.03 <0.01 0.04 0.59	A
General Clean-up VOC Emissions	NA	---	---	---	---	---
Other	NA	---	---	---	---	---

A –*Protocol for Equipment Leak Emission Estimates*, EPA 453/R-95-017, Table 2-1, November 1995. 40 CFR 98 Subpart W.
B- Bryan Research Engineering ProMax Software
C – AP-42 Chapter 13

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

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

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

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

ATTACHMENT L

Emissions Unit Data Sheet

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name OXF 149 -150 Wellpad	2. Tank Name Produced Fluid Tanks (Water and Condensate)
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) S001 – S012	4. Emission Point Identification No. (as assigned on *Equipment List Form*) C001-C004
5. Date of Commencement of Construction (for existing tanks) 2015	
6. Type of change ☐ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable) Not Applicable	
7A. Does the tank have more than one mode of operation? ☐ Yes ☒ No (e.g. Is there more than one product stored in the tank?)	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 400 bbls	
9A. Tank Internal Diameter (ft) 12	9B. Tank Internal Height (or Length) (ft) 20
10A. Maximum Liquid Height (ft) 20	10B. Average Liquid Height (ft) 10
11A. Maximum Vapor Space Height (ft) 10	11B. Average Vapor Space Height (ft) 10
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 400	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
See attached emissions calculations for all throughput values	See attached emissions calculations for all throughput values

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
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 ☐ Submerged ☒ Splash ☐ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
☒ Fixed Roof _x_ vertical __ horizontal ___ flat roof _x_ cone roof ___ dome roof
___ other (describe)
☐ External Floating Roof ___ pontoon roof ___ double deck roof
☐ Domed External (or Covered) Floating Roof
☐ Internal Floating Roof ___ vertical column support ___ self-supporting
☐ Variable Vapor Space ___ lifter roof ___ diaphragm
☐ Pressurized ___ spherical ___ cylindrical
☐ Underground
☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

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

20A. Shell Color Green	20B. Roof Color Green	20C. Year Last Painted New

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

22A. Is the tank heated? ☐ YES ☒ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig):

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft) 0.06

25. Complete the following section for **Floating Roof Tanks** ☒ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

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

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:

ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:

LADDER WELL	
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:

GAUGE-HATCH/SAMPLE PORT	
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:

ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)

VACUUM BREAKER	
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

RIM VENT	
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

DECK DRAIN (3-INCH DIAMETER)	
OPEN:	90% CLOSED:

STUB DRAIN
1-INCH DIAMETER:

OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)

26. Complete the following section for Internal Floating Roof Tanks ☒ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

Not applicable: Tank Calculations performed using ProMax Software

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☒ Conservation Vent (psig)
  - Vacuum Setting 0.5 oz Pressure Setting 14. 4 oz
- ☒ Emergency Relief Valve (psig) 14.4 oz (Vacuum setting)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☒ Vent to Vapor Combustion Device[1]
- ☐ Other[1] (describe):
- ☒ Cashco Lockdown Hatch

[1] Complete appropriate Air Pollution Control Device Sheet.

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

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
See attached Emissions Calculation					

[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 if applicable.

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

S019

Control Device ID No. (must match List Form): None

Equipment Information

1. Manufacturer:	2. Model No. Serial No.
3. Number of units: 1	4. Use Produces heat
5. Rated Boiler Horsepower: NA hp	6. Boiler Serial No.:
7. Date constructed: 2011	8. Date of last modification and explain: NA
9. Maximum design heat input per unit: 0.77 ×10^6 BTU/hr	10. Peak heat input per unit: 0.77 ×10^6 BTU/hr
11. Steam produced at maximum design output: NA - no steam LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☐ Others, specify	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: NA %
17. Will flash be reinjected? ☐ Yes ☒ No	18. Percent of carbon in flash: NA %

Stack or Vent Data

19. Inside diameter or dimensions: ft.	20. Gas exit temperature: °F
21. Height: ft.	22. Stack serves: ☒ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.						
	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	@60°F	732 ft^3/hr	ft^3/hr	TPH	
	Annually	$\times 10^3$ gal	6.42 $\times 10^6$ ft^3/yr	$\times 10^6$ ft^3/hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	neg gr/100 ft^3	gr/100 ft^3	Maximum: wt. %	
	Ash (%)				Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	1,216 BTU/ft^3	BTU/ft^3	BTU/lb	
	Source					
	Supplier					
	Halogens (Yes/No)		No			
	List and Identify Metals		NA			

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☒ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: TBD lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.06			
Hydrocarbons	<0.01			
NO_x	0.07			
Pb	<0.01			
PM_{10}	0.01			
SO_2	<0.01			
VOCs	<0.01			
Other (specify) CO_2e	90.09			

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.06			
Hydrocarbons	<0.01			
NO_x	0.07			
Pb	<0.01			
PM_{10}	0.01			
SO_2	<0.01			
VOCs	<0.01			
Other (specify) CO_2e	90.09			

39. How will waste material from the process and control equipment be disposed of?

N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet?

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

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

Monitor fuel usage throughput (scf/yr)

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
None

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

Maintain records of fuel throughput (scf/yr)

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

None

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

N/A

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

S021-S027, S034-S035

Control Device ID No. (must match List Form): None

Equipment Information

1. Manufacturer:	2. Model No. Serial No.
3. Number of units: 9	4. Use Produces heat
5. Rated Boiler Horsepower: NA hp	6. Boiler Serial No.:
7. Date constructed: 2014-2015	8. Date of last modification and explain: NA
9. Maximum design heat input per unit: 1.54 ×10^6 BTU/hr	10. Peak heat input per unit: 1.54 ×10^6 BTU/hr
11. Steam produced at maximum design output: NA - no steam LB/hr psig	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☐ Others, specify	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: NA %
17. Will flash be reinjected? ☐ Yes ☒ No	18. Percent of carbon in flash: NA %

Stack or Vent Data

19. Inside diameter or dimensions: ft.	20. Gas exit temperature: °F
21. Height: ft.	22. Stack serves: ☒ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	@60°F	1465 ft^3/hr	ft^3/hr	TPH	
	Annually	$\times 10^3$ gal	12.84 $\times 10^6$ ft^3/yr	$\times 10^6$ ft^3/hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	neg gr/100 ft^3	gr/100 ft^3	Maximum: wt. %	
	Ash (%)				Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	1,216 BTU/ft^3	BTU/ft^3	BTU/lb	
	Source					
	Supplier					
	Halogens (Yes/No)		No			
	List and Identify Metals		NA			

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☒ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: TBD lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.12			
Hydrocarbons	0.01			
NO_x	0.15			
Pb	<0.01			
PM_{10}	0.01			
SO_2	<0.01			
VOCs	0.01			
Other (specify) CO_2e	180.18			

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	0.12			
Hydrocarbons	0.01			
NO_x	0.15			
Pb	<0.01			
PM_{10}	0.01			
SO_2	<0.01			
VOCs	0.01			
Other (specify) CO_2e	180.18			

39. How will waste material from the process and control equipment be disposed of?

N/A

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet?

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

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

Monitor fuel usage throughput (scf/yr)

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
None

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

Maintain records of fuel throughput (scf/yr)

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

None

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

N/A

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name OXF 149 -150 Wellpad	2. Tank Name Sand Separator Tanks
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) S032-S033	4. Emission Point Identification No. (as assigned on *Equipment List Form*) E032-E033
5. Date of Commencement of Construction (for existing tanks) 2015	
6. Type of change ☐ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable) Not Applicable	
7A. Does the tank have more than one mode of operation? ☐ Yes ☒ No (e.g. Is there more than one product stored in the tank?)	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 140 bbls	
9A. Tank Internal Diameter (ft) 10	9B. Tank Internal Height (or Length) (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) 6
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 140	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
See attached emissions calculations for all throughput values	See attached emissions calculations for all throughput values

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
~ 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 ☐ Submerged ☒ Splash ☐ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
☒ Fixed Roof __ vertical _x_ horizontal ___ flat roof __ cone roof ___ dome roof
___ other (describe)
☐ External Floating Roof ___ pontoon roof ___ double deck roof
☐ Domed External (or Covered) Floating Roof
☐ Internal Floating Roof ___ vertical column support ___ self-supporting
☐ Variable Vapor Space ___ lifter roof ___ diaphragm
☐ Pressurized ___ spherical ___ cylindrical
☐ Underground
☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

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

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

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

22A. Is the tank heated? ☐ YES ☒ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig):

24. Complete the following section for **Vertical Fixed Roof Tanks** ☒ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☒ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

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

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:

ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:

LADDER WELL	
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:

GAUGE-HATCH/SAMPLE PORT	
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:

ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)

VACUUM BREAKER	
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

RIM VENT	
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

DECK DRAIN (3-INCH DIAMETER)	
OPEN:	90% CLOSED:

STUB DRAIN
1-INCH DIAMETER:

OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)

26. Complete the following section for Internal Floating Roof Tanks ☒ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

Not applicable: Tank Calculations performed using E&P Tanks Software

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☒ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)

  Vacuum Setting Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Vapor Combustion Device[1]
- ☐ Other[1] (describe):
- ☐ Cashco Lockdown Hatch

[1] Complete appropriate Air Pollution Control Device Sheet.

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

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss		Annual Loss (lb/yr)	Estimation Method[1]
		Amount	Units		
See attached Emissions Calculation					

[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 if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): S028-S031

1. Name or type and model of proposed affected source: Thermoelectric generators – 0.013 MMBtu/hr (consists of 4 identical units)
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of proposed process material(s) charged per hour: NA
4. Name(s) and maximum amount of proposed material(s) produced per hour: Does not produce any materials. Electrical generation from natural gas.
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: Combustion of natural gas

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Natural gas – 12.3 scf/hr

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

Natural gas

(c) Theoretical combustion air requirement (ACF/unit of fuel):

Unknown @ °F and psia.

(d) Percent excess air: Unknown

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

One (1) 0.013 MMBtu/hr natural gas fired burner per unit

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

NA

(g) Proposed maximum design heat input: 0.013 (each) × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	24	Days/Week	7	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ °F and psia

a.	NO_X	1.2E-3	lb/hr	grains/ACF
b.	SO_2	7.4E-6	lb/hr	grains/ACF
c.	CO	1.0E-3	lb/hr	grains/ACF
d.	PM_{10}	2.3E-5	lb/hr	grains/ACF
e.	Hydrocarbons	6.8E-5	lb/hr	grains/ACF
f.	VOCs	6.8E-5	lb/hr	grains/ACF
g.	Pb	6.2E-9	lb/hr	grains/ACF
h.	Specify other(s)			
	CO_2e	1.51	lb/hr	grains/ACF
	HAP	2.3E-5	lb/hr	grains/ACF
	Formaldehyde	9.3E-7	lb/hr	grains/ACF
			lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
Fuel throughput (scf/yr)	Fuel Throughput (scf/yr)
REPORTING	TESTING
None	None

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

See attached manufacturer's specification sheet

Attachment L
EMISSIONS UNIT DATA SHEET
BULK LIQUID TRANSFER OPERATIONS

Furnish the following information for each new or modified bulk liquid transfer area or loading rack, as shown on the *Equipment List Form* and other parts of this application. This form is to be used for bulk liquid transfer operations such as to and from drums, marine vessels, rail tank cars, and tank trucks.

Identification Number (as assigned on *Equipment List Form*):

1. Loading Area Name: Produced Liquids (Condensate and Produced Water) -S036

2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):

☐ Drums ☐ Marine Vessels ☐ Rail Tank Cars ☒ Tank Trucks

3. Loading Rack or Transfer Point Data:

Number of pumps	1
Number of liquids loaded	1
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1

4. Does ballasting of marine vessels occur at this loading area?

☐ Yes ☐ No ☒ Does not apply

5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point:

6. Are cargo vessels pressure tested for leaks at this or any other location?

☐ Yes ☒ No

If YES, describe:

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

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	Varies	Varies	Varies	Varies
days/week	7	7	7	7

weeks/quarter	13	13	13	13

8. Bulk Liquid Data *(add pages as necessary):*							
Pump ID No.	NA						
Liquid Name	Produced Liquids (Condensate and Produced Water)						
Max. daily throughput (1000 gal/day)	See Attached emission calculations for all values						
Max. annual throughput (1000 gal/yr)	See attached emission calculations for all values						
Loading Method [1]	SP						
Max. Fill Rate (gal/min)	Varies						
Average Fill Time (min/loading)	Varies						
Max. Bulk Liquid Temperature (^{o}F)	See ProMax results						
True Vapor Pressure [2]	See ProMax results						
Cargo Vessel Condition [3]	Unknown						
Control Equipment or Method [4]	VB, ECD -(Captured loading losses)						
Minimum control efficiency (%)	70% Capture/ 98% control efficiency						
Maximum Emission Rate – Loading (lb/hr)	See attached emissions calculations for breakdown						
Maximum Emission Rate – Annual (lb/yr)	See attached emissions calculations for breakdown						
Estimation Method [5]	Bryan Research Engineering Promax Software						

[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 LOA = Lean Oil AdsorptionCO = Condensation SC = Scrubber (Absorption)CRA = Compressor-Refrigeration-Absorption TO = Thermal Oxidation or Incineration
CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system)
O = other (descibe)

[5] EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance

TM = Test Measurement based upon test data submittal
O = other (describe)

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

MONITORING	RECORDKEEPING
Throughput of loaded liquids at site (gal/yr) on a monthly and rolling twelve month total.	Throughput of loaded liquids at site (gal/yr) on a monthly and rolling twelve month total.
REPORTING	**TESTING**
None	None

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

ATTACHMENT M

Air Pollution Control Devices

Attachment M
Air Pollution Control Device Sheet
(FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): C001(2014), C002 (2015)

Equipment Information

1. Manufacturer: LEED Fabrication

   Model No. Enclosed Combustor 48”

2. Method:
   - ☐ Elevated flare
   - ☐ Ground flare
   - ☒ Other

   Describe Enclosed Combustion Device

3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

4. Method of system used:
   - ☐ Steam-assisted
   - ☐ Air-assisted
   - ☐ Pressure-assisted
   - ☒ Non-assisted

5. Maximum capacity of flare:
   - ~ 130 scf/min
   - ~ 7,850 scf/hr

6. Dimensions of stack:
   - Diameter ft.
   - Height ft.

7. Estimated combustion efficiency:
   (Waste gas destruction efficiency)
   - Estimated: 98 %
   - Minimum guaranteed: 98 %

8. Fuel used in burners:
   - ☒ Natural Gas
   - ☐ Fuel Oil, Number
   - ☐ Other, Specify:

9. Number of burners:

   Rating: 11.66 MMBTU/hr

10. Will preheat be used? ☐ Yes ☐ No

11. Describe method of controlling flame:

12. Flare height: 25 ft

13. Flare tip inside diameter: 4 ft

14. Natural gas flow rate to flare pilot flame per pilot light:
    - scf/min
    - ~50 scf/hr

15. Number of pilot lights: One (1)

    Total 0.05 MMBTU/hr

16. Will automatic re-ignition be used?
    - ☐ Yes
    - ☒ No

17. If automatic re-ignition will be used, describe the method:

18. Is pilot flame equipped with a monitor? ☒ Yes ☐ No

    If yes, what type?
    - ☒ Thermocouple
    - ☐ Infra-Red
    - ☐ Ultra Violet
    - ☐ Camera with monitoring control room
    - ☐ Other, Describe:

19. Hours of unit operation per year: 8760

Steam Injection

20. Will steam injection be used? ☐ Yes ☒ No	21. Steam pressure PSIG Minimum Expected: Design Maximum:
22. Total Steam flow rate: LB/hr	23. Temperature: °F
24. Velocity ft/sec	25. Number of jet streams
26. Diameter of steam jets: in	27. Design basis for steam injected: LB steam/LB hydrocarbon
28. How will steam flow be controlled if steam injection is used?	

Characteristics of the Waste Gas Stream to be Burned

29.

Name	Quantity Grains of H_2S/100 ft^3	Quantity (LB/hr, ft^3/hr, etc)	Source of Material
See attached emissions calculations			

30. Estimate total combustible to flare: 422 LB/hr
(Maximum mass flow rate of waste gas) 130 scfm

31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.:
VOC ~ 422

32. Give composition of carrier gases:

33. Temperature of emission stream: >70 °F Heating value of emission stream: Varies BTU/ft^3 Mean molecular weight of emission stream: MW = Varies lb/lb-mole	34. Identify and describe all auxiliary fuels to be burned. BTU/scf BTU/scf BTU/scf BTU/scf BTU/scf
35. Temperature of flare gas: °F	36. Flare gas flow rate: scf/min
37. Flare gas heat content: BTU/ft^3	38. Flare gas exit velocity: scf/min
39. Maximum rate during emergency for one major piece of equipment or process unit: scf/min	
40. Maximum rate during emergency for one major piece of equipment or process unit: BTU/min	
41. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):	
42. Describe the collection material disposal system:	
43. Have you included ***Flare Control Device*** in the Emissions Points Data Summary Sheet?	

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

MONITORING:	RECORDKEEPING:
Monitor the presence of pilot flame (temperature) using a thermocouple or equivalent device	Maintain records of the times and duration of all periods where the pilot flame was absent Maintain records of visible emission opacity tests
REPORTING: None	TESTING: Conduct a Method 22 opacity test as required

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.
VOC – 100%
HAP – 100%

46. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
VOC – 98%
HAP – 98%

47. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M
Air Pollution Control Device Sheet
(FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): C003-C004 (New)

Equipment Information

1. Manufacturer: LEED Fabrication

   Model No. Enclosed Combustor 48”

2. Method:
   - ☐ Elevated flare
   - ☐ Ground flare
   - ☒ Other

   Describe Enclosed Combustion Device

3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

4. Method of system used:
   - ☐ Steam-assisted
   - ☐ Air-assisted
   - ☐ Pressure-assisted
   - ☒ Non-assisted

5. Maximum capacity of flare:
   - ~ 130 scf/min
   - ~ 7,850 scf/hr

6. Dimensions of stack:
   - Diameter ft.
   - Height ft.

7. Estimated combustion efficiency:
   (Waste gas destruction efficiency)
   - Estimated: 98 %
   - Minimum guaranteed: 98 %

8. Fuel used in burners:
   - ☒ Natural Gas
   - ☐ Fuel Oil, Number
   - ☐ Other, Specify:

9. Number of burners:

   Rating: 11.66 MMBTU/hr

10. Will preheat be used? ☐ Yes ☐ No

11. Describe method of controlling flame:

12. Flare height: 25 ft

13. Flare tip inside diameter: 4 ft

14. Natural gas flow rate to flare pilot flame per pilot light:
    - scf/min
    - ~50 scf/hr

15. Number of pilot lights: One (1)

    Total 0.05 MMBTU/hr

16. Will automatic re-ignition be used?
    - ☐ Yes
    - ☒ No

17. If automatic re-ignition will be used, describe the method:

18. Is pilot flame equipped with a monitor? ☒ Yes ☐ No

    If yes, what type?
    - ☒ Thermocouple
    - ☐ Infra-Red
    - ☐ Ultra Violet
    - ☐ Camera with monitoring control room
    - ☐ Other, Describe:

19. Hours of unit operation per year: 8760

Steam Injection

20. Will steam injection be used? ☐ Yes ☒ No	21. Steam pressure PSIG Minimum Expected: Design Maximum:
22. Total Steam flow rate: LB/hr	23. Temperature: °F
24. Velocity ft/sec	25. Number of jet streams
26. Diameter of steam jets: in	27. Design basis for steam injected: LB steam/LB hydrocarbon
28. How will steam flow be controlled if steam injection is used?	

Characteristics of the Waste Gas Stream to be Burned

29.

Name	Quantity Grains of H_2S/100 ft^3	Quantity (LB/hr, ft^3/hr, etc)	Source of Material
See attached emissions calculations			

30. Estimate total combustible to flare: 422 LB/hr
(Maximum mass flow rate of waste gas) 130 scfm

31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.:
VOC ~ 422

32. Give composition of carrier gases:

33. Temperature of emission stream: >70 °F Heating value of emission stream: Varies BTU/ft^3 Mean molecular weight of emission stream: MW = Varies lb/lb-mole	34. Identify and describe all auxiliary fuels to be burned. BTU/scf BTU/scf BTU/scf BTU/scf BTU/scf
35. Temperature of flare gas: °F	36. Flare gas flow rate: scf/min
37. Flare gas heat content: BTU/ft^3	38. Flare gas exit velocity: scf/min
39. Maximum rate during emergency for one major piece of equipment or process unit: scf/min	
40. Maximum rate during emergency for one major piece of equipment or process unit: BTU/min	
41. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):	
42. Describe the collection material disposal system:	
43. Have you included ***Flare Control Device*** in the Emissions Points Data Summary Sheet?	

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

MONITORING:	RECORDKEEPING:
Monitor the presence of pilot flame (temperature) using a thermocouple or equivalent device	Maintain records of the times and duration of all periods where the pilot flame was absent Maintain records of visible emission opacity tests
REPORTING: None	TESTING: Conduct a Method 22 opacity test as required

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.
VOC – 100%
HAP – 100%

46. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
VOC – 98%
HAP – 98%

47. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

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

GENERAL

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

PROCESS DATA

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

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

DESIGN DATA

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

EQUIPMENT SPECIFICATION

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

Environmental Control Equipment
Data Sheet

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

EQUIPMENT SPECIFICATION

Flame Detection: ☐ Thermocouple ☑ Ionization Rod ☐ UV Scanner

General Configuration:

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

FABRICATION AND INSPECTION

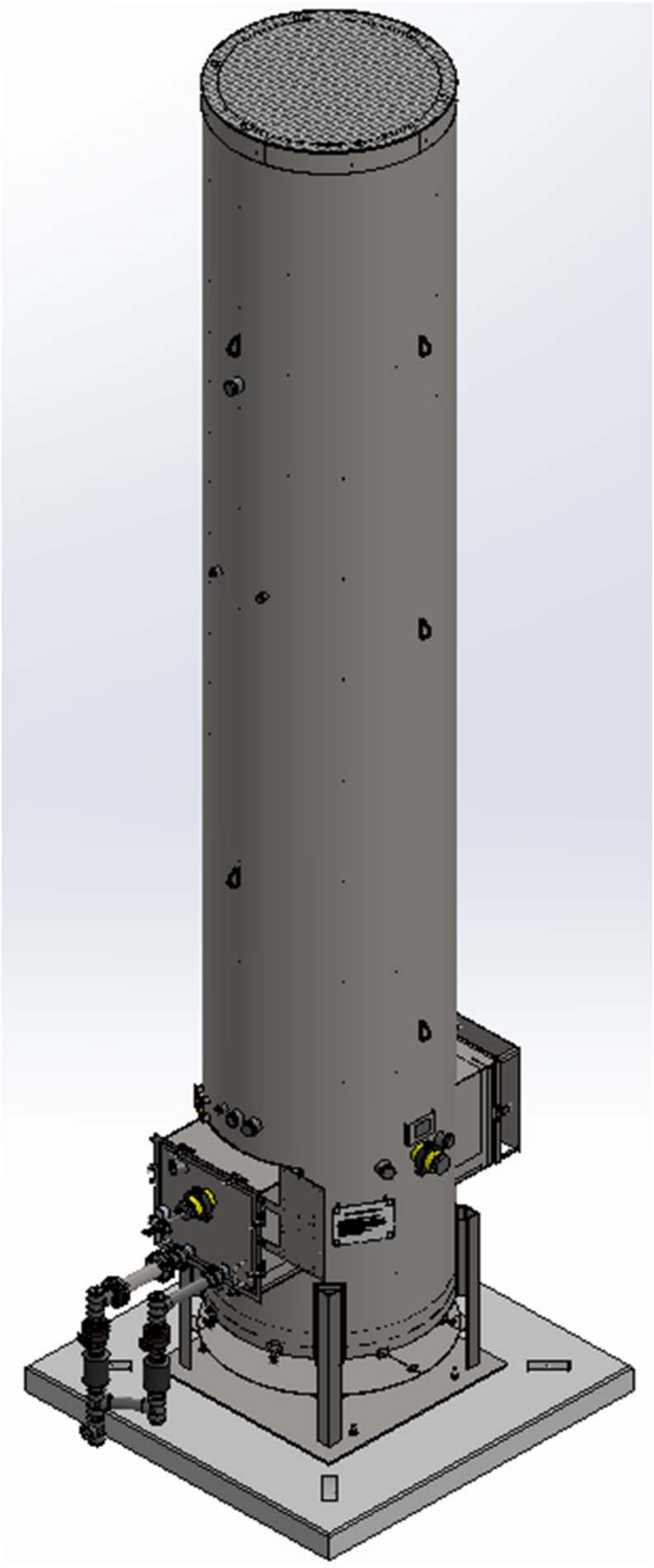
Special requirements	☐ Skid Mounted ☑ Concrete Pad ☐ Other
Inspection	☑ Vendor Standard ☐ Other. Specify:
Material Certification	☑ Vendor Standard ☐ MTR ☐ Certificate of Compliance ☐ Other (Specify):
NDE	☑ Vendor Standard ☐ Radiography. Specify: ☐ Ultrasonic. Specify: ☐ Liquid Penetrant. ☐ Magnetic Particles.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

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

Additional Notes:

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

GENERAL ARRANGEMENT



§ 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 N

Supporting Emission Calculations

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 Application

Facility-Wide Emission Summary - Controlled

Wells	12	
Storage Tanks	12	
Sand Separator Tank	2	
Line Heaters	10	
TEGs	4	
Dehy Reboiler	0	
Glycol Dehy	0	
Dehy Drip Tank	0	
Dehy Combustor	0	
Compressor	0	
High Pressure Separator	12	
Low Pressure Separator	0	
Vapor Recovery Unit	0	
Tank Combustor	4	
Length of lease road	5,410	feet

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

CO_2	1
CH_4	25
N_2O	298

Emission Point ID #	Emission Source ID#s	Emission Source Description	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		CO_2e	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
C001-C002, C003-C004	S001-S012	Storage Vessels	---	---	---	---	2.33	10.20	---	---	---	---	---	---	16.26	71.23
C001-C002, C003-C004	S036	Captured Liquid Loading	---	---	---	---	0.90	0.23	---	---	---	---	---	---	---	---
C001	C001	Tank Combustor	1.15	5.03	0.96	4.22	2.8E-04	1.2E-03	0.01	0.03	0.09	0.38	0.09	0.38	1,371.10	6,005.43
C002	C002	Tank Combustor	1.15	5.03	0.96	4.22	2.8E-04	1.2E-03	0.01	0.03	0.09	0.38	0.09	0.38	1,371.10	6,005.43
C003	C003	Tank Combustor	1.15	5.03	0.96	4.22	2.8E-04	1.2E-03	0.01	0.03	0.09	0.38	0.09	0.38	1,371.10	6,005.43
C004	C004	Tank Combustor	1.15	5.03	0.96	4.22	2.8E-04	1.2E-03	0.01	0.03	0.09	0.38	0.09	0.38	1,371.10	6,005.43
C001	**S001-S012, S036, C001**	**---**	**1.15**	**5.03**	**0.96**	**4.22**	**0.81**	**2.61**	**0.01**	**0.03**	**0.09**	**0.38**	**0.09**	**0.38**	**1,375.17**	**6,023.24**
C002	**S001-S012, S036, C002**	**---**	**1.15**	**5.03**	**0.96**	**4.22**	**0.81**	**2.61**	**0.01**	**0.03**	**0.09**	**0.38**	**0.09**	**0.38**	**1,375.17**	**6,023.24**
C003	**S001-S012, S036, C003**	**---**	**1.15**	**5.03**	**0.96**	**4.22**	**0.81**	**2.61**	**0.01**	**0.03**	**0.09**	**0.38**	**0.09**	**0.38**	**1,375.17**	**6,023.24**
C004	**S001-S012, S036, C004**	**---**	**1.15**	**5.03**	**0.96**	**4.22**	**0.81**	**2.61**	**0.01**	**0.03**	**0.09**	**0.38**	**0.09**	**0.38**	**1,375.17**	**6,023.24**
E021	S021	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	180.18	789.20
E022	S022	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	180.18	789.20
E023	S023	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	180.18	789.20
E024	S024	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	180.18	789.20
E025	S025	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	180.18	789.20
E026	S026	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	180.18	789.20
E027	S027	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	180.18	789.20
E034	S034	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	180.18	789.20
E035	S035	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	180.18	789.20
E019	S019	Line Heater	0.07	0.32	0.06	0.27	4.0E-03	0.02	4.4E-04	1.9E-03	0.01	0.02	0.01	0.02	90.09	394.60
E028	S028	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	1.52	6.64
E029	S029	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	1.52	6.64
E030	S030	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	1.52	6.64
E031	S031	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	1.52	6.64
E032	S032	Sand Separator Tank	---	---	---	---	0.07	0.32	---	---	---	---	---	---	0.50	2.20
E033	S033	Sand Separator Tank	---	---	---	---	0.07	0.32	---	---	---	---	---	---	0.50	2.20
E036	S036	Uncaptured Liquid Loading	---	---	---	---	19.24	5.00	---	---	---	---	---	---	---	---
---	---	Fugitives	---	---	---	---	---	35.06	---	---	---	---	---	---	---	541.51
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	6.04	---	0.60	---	---
Facility Total			5.99	26.24	5.03	22.04	22.70	51.49	0.04	0.16	0.46	8.04	0.46	2.60	7,219.47	32,162.81
Facility Total (excluding fugitive emissions)			5.99	26.24	5.03	22.04	3.45	11.43	0.04	0.16	0.46	1.99	0.46	1.99	7,219.47	31,621.30

1. Emissions routed to combustors are divided evenly by the total number of combustors (i.e., Combustor Point Emissions = [storage tanks emissions + captured loading emissions] / [number of combustors] + combustor emissions). However, emissions can be routed to either combustor.

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 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, C003-C004	S001-S012	Storage Vessels	---	---	2.6E-03	1.1E-02	5.5E-03	2.4E-02	2.5E-04	1.1E-03	2.3E-03	9.9E-03	0.07	0.31	0.09	0.41
C001-C002, C003-C004	S036	Captured Liquid Loading	---	---	6.2E-04	1.6E-04	1.2E-03	3.2E-04	6.0E-05	1.6E-05	5.4E-04	1.4E-04	0.02	0.01	0.03	0.01
C001	C001	Tank Combustor	---	---	---	---	---	---	---	---	---	---	---	---	---	---
C002	C002	Tank Combustor	---	---	---	---	---	---	---	---	---	---	---	---	---	---
C003	C003	Tank Combustor	---	---	---	---	---	---	---	---	---	---	---	---	---	---
C004	C004	Tank Combustor	---	---	---	---	---	---	---	---	---	---	---	---	---	---
C001	**S001-S012, S036, C001**	**---**	---	---	**8.0E-04**	**2.9E-03**	**1.7E-03**	**6.1E-03**	**7.7E-05**	**2.8E-04**	**7.0E-04**	**2.5E-03**	**0.02**	**0.08**	**0.03**	**0.11**
C002	**S001-S012, S036, C002**		---	---	**8.0E-04**	**2.9E-03**	**1.7E-03**	**6.1E-03**	**7.7E-05**	**2.8E-04**	**7.0E-04**	**2.5E-03**	**0.02**	**0.08**	**0.03**	**0.11**
C003	**S001-S012, S036, C003**		---	---	**8.0E-04**	**2.9E-03**	**1.7E-03**	**6.1E-03**	**7.7E-05**	**2.8E-04**	**7.0E-04**	**2.5E-03**	**0.02**	**0.08**	**0.03**	**0.11**
C004	**S001-S012, S036, C004**	**---**	---	---	**8.0E-04**	**2.9E-03**	**1.7E-03**	**6.1E-03**	**7.7E-05**	**2.8E-04**	**7.0E-04**	**2.5E-03**	**0.02**	**0.08**	**0.03**	**0.11**
E021	S021	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
E022	S022	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
E023	S023	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
E024	S024	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
E025	S025	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
E026	S026	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
E027	S027	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
E034	S034	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
E035	S035	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	5.5E-05	2.4E-04	1.5E-06	6.7E-06	2.5E-06	1.1E-05	---	---	---	---	1.3E-03	0.01	1.4E-03	0.01
E028	S028	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
E029	S029	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
E030	S030	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
E031	S031	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
E032	S032	Sand Separator Tank	---	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0E-03	<0.01	2.0E-03	1.0E-02
E033	S033	Sand Separator Tank	---	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.0E-03	<0.01	2.0E-03	1.0E-02
E036	S036	Uncaptured Liquid Loading	---	---	0.01	3.5E-03	0.03	0.01	1.3E-03	3.3E-04	1.2E-02	3.0E-03	0.53	0.14	0.67	0.17
---	---	Fugitives	---	---	---	0.01	---	0.03	---	<0.01	---	0.02	---	0.59	---	1.09
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Facility Total			1.0E-03	4.6E-03	0.02	0.03	0.03	0.07	1.6E-03	1.4E-03	0.01	0.03	0.66	1.16	0.83	1.83
Facility Total (excluding fugitive emissions)			1.0E-03	4.6E-03	3.2E-03	0.01	6.8E-03	2.5E-02	3.1E-04	1.1E-03	2.8E-03	1.0E-02	0.12	0.43	0.16	0.56

1. Emissions routed to combustors are divided evenly by the total number of combustors (i.e., Combustor Point Emissions = [storage tanks emissions + captured loading emissions] / [number of combustors] + combustor emissions). However, emissions can be routed to either combustor.

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 Application

Produced Fluids Storage Vessels

Potential Throughput

Operational Hours	8,760	hrs/yr
Maximum Condensate Throughput[1]	3,772	bbl/month
Maximum Produced Water Throughput[1]	38,538	bbl/month

[1] Based on the highest monthly throughput recorded at the site (July 2015). Includes a safety factor of 30%.

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	32.526	142.465	32.526	142.465
Ethane	<0.001	<0.001	<0.001	<0.001	37.878	165.907	37.878	165.907
Propane	0.340	1.489	0.497	2.175	42.055	184.200	42.891	187.864
Isobutane	0.081	0.357	0.119	0.521	11.100	48.620	11.301	49.498
n-Butane	0.184	0.804	0.268	1.175	25.457	111.500	25.909	113.479
Isopentane	0.070	0.306	0.102	0.447	9.870	43.230	10.042	43.983
n-Pentane	0.067	0.291	0.097	0.426	9.539	41.780	9.702	42.497
n-Hexane	0.023	0.103	0.034	0.150	3.516	15.400	3.574	15.653
Cyclohexane	0.001	0.007	0.002	0.010	0.262	1.146	0.265	1.162
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	0.026	0.113	0.038	0.165	4.164	18.240	4.228	18.518
n-Octane	0.008	0.036	0.012	0.052	1.363	5.971	1.383	6.059
n-Nonane	0.002	0.007	0.002	0.011	0.293	1.282	0.297	1.300
n-Decane	0.002	0.009	0.003	0.013	0.356	1.560	0.361	1.581
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	0.036	0.158	0.053	0.230	5.299	23.210	5.388	23.598
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	0.001	0.003	0.001	0.004	0.128	0.559	0.129	0.565
Toluene	0.001	0.005	0.002	0.007	0.273	1.195	0.276	1.207
Ethylbenzene	5.7E-05	2.5E-04	8.3E-05	3.6E-04	0.012	0.054	0.012	0.054
m-Xylene	0.001	0.002	0.001	0.003	0.111	0.488	0.113	0.494
Isooctane	0.004	0.017	0.006	0.024	0.612	2.680	0.621	2.721
Total VOC Emissions:	0.85	3.71	1.24	5.41	114.41	501.11	116.49	510.23
Total HAP Emissions:	3.0E-02	0.13	0.04	0.19	4.65	20.38	4.72	20.69

[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.
[2] Composition of condensate from OXF-149 sample from 04/29/2013.

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 Application

Produced Fluids 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	0.651	2.849	0.651	2.849
Ethane	<0.001	<0.001	<0.001	<0.001	0.758	3.318	0.758	3.318
Propane	0.007	0.030	0.010	0.044	0.841	3.684	0.858	3.757
Isobutane	0.002	0.007	0.002	0.010	0.222	0.972	0.226	0.990
n-Butane	0.004	0.016	0.005	0.024	0.509	2.230	0.518	2.270
Isopentane	0.001	0.006	0.002	0.009	0.197	0.865	0.201	0.880
n-Pentane	0.001	0.006	0.002	0.009	0.191	0.836	0.194	0.850
n-Hexane	4.7E-04	0.002	0.001	0.003	0.070	0.308	0.071	0.313
Cyclohexane	3.0E-05	1.3E-04	4.4E-05	1.9E-04	0.005	0.023	0.005	0.023
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	0.001	0.002	0.001	0.003	0.083	0.365	0.085	0.370
n-Octane	1.6E-04	0.001	2.4E-04	0.001	0.027	0.119	0.028	0.121
n-Nonane	3.4E-05	1.5E-04	4.9E-05	2.2E-04	0.006	0.026	0.006	0.026
n-Decane	3.9E-05	1.7E-04	5.7E-05	2.5E-04	0.007	0.031	0.007	0.032
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	0.001	0.003	0.001	0.005	0.106	0.464	0.108	0.472
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	1.2E-05	5.1E-05	1.7E-05	7.5E-05	0.003	0.011	0.003	0.011
Toluene	2.3E-05	1.0E-04	3.4E-05	1.5E-04	0.005	0.024	0.006	0.024
Ethylbenzene	1.1E-06	5.0E-06	1.7E-06	7.2E-06	2.5E-04	0.001	2.5E-04	0.001
m-Xylene	1.0E-05	4.4E-05	1.5E-05	6.5E-05	0.002	0.010	0.002	0.010
Isooctane	7.6E-05	3.3E-04	1.1E-04	4.9E-04	0.012	0.054	0.012	0.054
Total VOC Emissions:	1.7E-02	0.07	0.02	0.11	2.29	10.02	2.33	10.20
Total HAP Emissions:	5.9E-04	2.6E-03	8.6E-04	3.8E-03	9.3E-02	0.41	0.09	0.41

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 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)* [2, 3]

Constituent	Total Emissions [1] lb/hr	tpy
Methane	0.020	0.088
Ethane	0.032	0.140
Propane	0.033	0.143
Isobutane	0.008	0.035
n-Butane	0.017	0.073
Isopentane	0.006	0.026
n-Pentane	0.005	0.022
Hexanes	0.002	0.007
Heptanes	0.002	0.007
Octane	<0.001	0.002
Nonane	<0.001	<0.001
Decane	<0.001	<0.001
Benzene	<0.001	<0.001
Toluene	<0.001	<0.001
Ethylbenzene	<0.001	<0.001
Xylenes	<0.001	<0.001
n-Hexane	0.001	0.005
2,2,4-Trimethylpentane	<0.001	<0.001
Total HC Emissions:	0.126	0.552
Total VOC Emissions:	0.074	0.323
Total HAP Emissions:	0.002	0.010

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

[3] E&P TANK v2.0 emission calculations are based on 4/29/2013 condensate sample from OXF-149 wellpad

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 Application

Sand Separator Tank

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

Constituent	Total Emissions lb/hr	tpy
Methane	0.020	0.088
Ethane	0.032	0.140
Propane	0.033	0.143
Isobutane	0.008	0.035
n-Butane	0.017	0.073
Isopentane	0.006	0.026
n-Pentane	0.005	0.022
Hexanes	0.002	0.007
Heptanes	0.002	0.007
Octane	<0.001	0.002
Nonane	<0.001	<0.001
Decane	<0.001	<0.001
Benzene	<0.001	<0.001
Toluene	<0.001	<0.001
Ethylbenzene	<0.001	<0.001
Xylenes	<0.001	<0.001
n-Hexane	0.001	0.005
2,2,4-Trimethylpentane	<0.001	<0.001
Total Emissions:	0.126	0.550
Total VOC Emissions:	0.074	0.323
Total HAP Emissions:	0.002	0.010

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 Application

Tank Combustor

Source Designation:	**C001 & C002, C003 &C004**
Pilot Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,050
Pilot Rating (MMBtu/hr)	0.05
Combustor Rating (MMBtu/hr) [1]	11.66
Combustor Rating (Mscfd) [1]	188.38
Combustor Rating (scf/hr)	7849.17
Pilot Fuel Consumption (scf/hr):	50.00
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 Factors [2] (lb/MMBtu)	Combustor (lb/hr)	Combustor (tpy)	Pilot (lb/hr)	Pilot (tpy)	Total (lb/hr)	Total (tpy)
NO_x	0.10	1.14	5.01	5.1E-03	0.02	1.15	5.03
CO	0.08	0.96	4.21	4.3E-03	0.02	0.96	4.22
VOC	5.4E-03	---	---	2.8E-04	1.2E-03	0.00	0.00
SO_2	5.9E-04	0.01	0.03	3.1E-05	1.4E-04	0.01	0.03
PM/PM_{10}	0.01	0.09	0.38	3.9E-04	1.7E-03	0.09	0.38
CO_2	117.00	1364.189	5975.146	6.14	26.90	1370.33	6002.05
CH_4	2.2E-03	---	---	1.2E-04	5.1E-04	0.00	0.00
N_2O	2.2E-04	2.6E-03	0.01	1.2E-05	5.1E-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 wellpad. 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:

$$\frac{7849.17\ \text{scf}}{\text{hr}} \left| \frac{\text{lb-mol}}{379.5\ \text{scf}} \right| \frac{20.43\ \text{lb}}{\text{lb-mol}} = 422.65\ \text{lb/hr}$$

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 Application

Line Heaters

Source Designation:	**S021-S027, S034-S035**
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, 4]**	**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	2.8E-03	0.01
$PM_{2.5}$ (Filterable)	1.9	2.8E-03	0.01
Lead	5.00E-04	7.3E-07	3.2E-06
CO_2	117.0	180.00	788.38
CH_4	2.21E-03	3.4E-03	1.5E-02
N_2O	2.21E-04	3.4E-04	1.5E-03

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 Application

Line Heaters

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
HAPs:			
2-Methylnaphthalene	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:	**OXF 149-150 Pad**
Project Description:	**R13 Application**

Line Heater

Source Designation:	**S019**
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,050
Heat Input (MMBtu/hr)	0.77
Fuel Consumption (MMscf/hr):	7.33E-04
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	**Emission Factor (lb/MMscf)[1, 4]**	**Potential Emissions**	
		(lb/hr)[2]	**(tons/yr)[3]**
NO_x	100	0.07	0.32
CO	84	0.06	0.27
VOC	5.5	4.0E-03	0.02
SO_2	0.6	4.4E-04	1.9E-03
PM Total	7.6	0.01	0.02
PM Condensable	5.7	4.2E-03	0.02
PM_{10} (Filterable)	1.9	1.4E-03	0.01
$PM_{2.5}$ (Filterable)	1.9	1.4E-03	0.01
Lead	5.00E-04	3.7E-07	1.6E-06
CO_2	117.0	90.00	394.19
CH_4	2.21E-03	1.7E-03	7.4E-03
N_2O	2.21E-04	1.7E-04	7.4E-04

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 Application

Line Heater

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[1]	Potential Emissions (lb/hr)[2]	Potential Emissions (tons/yr)[3]
HAPs:			
2-Methylnaphthalene	2.4E-05	1.8E-08	7.7E-08
3-Methylchloranthrene	1.8E-06	1.3E-09	5.8E-09
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.2E-08	5.1E-08
Acenaphthene	1.8E-06	1.3E-09	5.8E-09
Acenaphthylene	1.8E-06	1.3E-09	5.8E-09
Anthracene	2.4E-06	1.8E-09	7.7E-09
Benz(a)anthracene	1.8E-06	1.3E-09	5.8E-09
Benzene	2.1E-03	1.5E-06	6.7E-06
Benzo(a)pyrene	1.2E-06	8.8E-10	3.9E-09
Benzo(b)fluoranthene	1.8E-06	1.3E-09	5.8E-09
Benzo(g,h,i)perylene	1.2E-06	8.8E-10	3.9E-09
Benzo(k)fluoranthene	1.8E-06	1.3E-09	5.8E-09
Chrysene	1.8E-06	1.3E-09	5.8E-09
Dibenzo(a,h) anthracene	1.2E-06	8.8E-10	3.9E-09
Dichlorobenzene	1.2E-03	8.8E-07	3.9E-06
Fluoranthene	3.0E-06	2.2E-09	9.6E-09
Fluorene	2.8E-06	2.1E-09	9.0E-09
Formaldehyde	7.5E-02	5.5E-05	2.4E-04
Hexane	1.8E+00	1.3E-03	5.8E-03
Indo(1,2,3-cd)pyrene	1.8E-06	1.3E-09	5.8E-09
Naphthalene	6.1E-04	4.5E-07	2.0E-06
Phenanthrene	1.7E-05	1.2E-08	5.5E-08
Pyrene	5.0E-06	3.7E-09	1.6E-08
Toluene	3.4E-03	2.5E-06	1.1E-05
Arsenic	2.0E-04	1.5E-07	6.4E-07
Beryllium	1.2E-05	8.8E-09	3.9E-08
Cadmium	1.1E-03	8.1E-07	3.5E-06
Chromium	1.4E-03	1.0E-06	4.5E-06
Cobalt	8.4E-05	6.2E-08	2.7E-07
Manganese	3.8E-04	2.8E-07	1.2E-06
Mercury	2.6E-04	1.9E-07	8.3E-07
Nickel	2.1E-03	1.5E-06	6.7E-06
Selenium	2.4E-05	1.8E-08	7.7E-08
Total HAP		**1.4E-03**	**6.1E-03**

[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: OXF 149-150 Pad
Project Description: R13 Application

Thermoelectric Generators

Source Designation:	**S028-S031**
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 Themorelectric specification sheet states 311 ft^3/day at 1000 BTU/ft^3.

Criteria and Manufacturer Specific Pollutant Emission Rates:

Pollutant	Emission Factor (lb/MMscf)[2, 5]	Potential Emissions (lb/hr)[3]	Potential Emissions (tons/yr)[4]
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	116.9	1.51	6.64
CH_4	2.21E-03	2.9E-05	1.3E-04
N_2O	2.21E-04	2.9E-06	1.3E-05

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 Application

Thermoelectric Generators

Hazardous Air Pollutant (HAP) Potential Emissions:

Pollutant	Emission Factor (lb/MMscf)[2]	Potential Emissions (lb/hr)[3]	Potential Emissions (tons/yr)[4]
HAPs:			
2-Methylnaphthalene	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**

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

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

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

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

Company Name: **EQT Production, LLC**
Facility Name: **OXF 149-150 Pad**
Project Description: **R13 Application**

Liquid Loading

Throughput 21,324,030 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	25.773	6.701	7.732	2.010	0.361	0.094
Isobutane	6.173	1.605	1.852	0.482	0.086	0.022
n-Butane	13.919	3.619	4.176	1.086	0.195	0.051
Isopentane	5.300	1.378	1.590	0.413	0.074	0.019
n-Pentane	5.042	1.311	1.513	0.393	0.071	0.018
n-Hexane	1.780	0.463	0.534	0.139	0.025	0.006
Cyclohexane	0.113	0.029	0.034	0.009	0.002	4.1E-04
Methylcyclopentane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Heptane	1.955	0.508	0.587	0.153	0.027	0.007
n-Octane	0.618	0.161	0.186	0.048	0.009	0.002
n-Nonane	0.128	0.033	0.038	0.010	0.002	4.7E-04
n-Decane	0.148	0.039	0.045	0.012	0.002	0.001
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	2.725	0.709	0.818	0.213	0.038	0.010
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	0.044	0.012	0.013	0.003	0.001	1.6E-04
Toluene	0.087	0.023	0.026	0.007	0.001	3.2E-04
Ethylbenzene	0.004	0.001	0.001	3.3E-04	6.0E-05	1.6E-05
m-Xylene	0.038	0.010	0.012	0.003	0.001	1.4E-04
Isooctane	0.289	0.075	0.087	0.023	0.004	0.001
Total VOC Emissions:	64.139	16.676	19.242	5.003	0.898	0.233
Total HAP Emissions:	2.243	0.583	0.673	0.175	0.031	0.008

[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: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 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	21	4.04	1.00	0.03	4.04	0.13
Compressor	Gas	0.22800	0	---	0.17	0.01	---	---
Valves	Gas	0.00597	588	33.90	0.17	0.01	5.62	0.18
Pressure Relief Valves	Gas	0.10400	43	43.18	0.17	0.01	7.16	0.22
Open-Ended Lines	All	0.00170	39	0.64	0.17	0.01	0.11	3.3E-03
Connectors	All	0.00183	2,577	45.54	0.17	0.01	7.55	0.24
Intermittent Pneumatic Devices[4]	Gas	13.5	60	---	---	---	10.58	0.33
			Emission Totals:	**127.29**	**---**	**---**	**35.06**	**1.09**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-1. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). SOCMI factors were used as it was representative of natural gas liquids extraction. 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 and one meter per wellhead. Pressure relief valves count includes one Emergency Pressure Relief valve and one lock-down hatch 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: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 Application

Fugitive Emissions

Fugitive Specific HAP Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Annual Fugitive Emissions (tpy)	Benzene Emissions[3] (tpy)	Toluene Emissions[3] (tpy)	Ethylbenzene Emissions[3] (tpy)	Xylene Emissions[3] (tpy)	n-Hexane Emissions[4] (tpy)
Pumps	Light Liquid	0.01990	21	4.04	3.1E-04	7.3E-04	<0.01	4.2E-04	0.01
Compressor	Gas	0.22800	0	---	---	---	<0.01	---	---
Valves	Gas	0.00597	588	33.90	2.6E-03	0.01	<0.01	3.5E-03	0.10
Pressure Relief Valves	Gas	0.10400	43	43.18	3.3E-03	0.01	<0.01	4.5E-03	0.13
Open-Ended Lines	All	0.00170	39	0.64	4.9E-05	1.2E-04	<0.01	6.7E-05	2.0E-03
Connectors	All	0.00183	2,577	45.54	3.5E-03	0.01	<0.01	4.7E-03	0.14
Intermittent Pneumatic Devices[4]	Gas	13.5	60	---	4.9E-03	0.01	<0.01	0.01	0.20
			Emission Totals:	**127.29**	**0.01**	**0.03**	**<0.01**	**0.02**	**0.59**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-1. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). SOCMI factors were used as it was representative of natural gas liquids extraction. 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 and one meter per wellhead. Pressure relief valves count includes one Emergency Pressure Relief valve and one lock-down hatch 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 HAP (tpy) = Emission factor (kg/hr/source) * Number of Sources * Weight % HAP x 2.2046 (lb/kg) x 8,760 (hr/yr) ÷ 2,000 (lb/ton)

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

GHG Fugitive Emissions from Component Leaks

Component	Component Count	GHG Emission Factor[1] (scf/hr/component)	CH_4 Emissions[2,3] (tpy)	CO_2 Emissions[2,3] (tpy)	CO_2e Emissions[4] (tpy)
Pumps	21	0.01	0.03	2.1E-04	0.77
Compressor	0	4.17	---	---	---
Valves	588	0.027	2.32	0.02	58.12
Pressure Relief Devices	43	0.04	0.25	1.7E-03	6.30
Open-Ended Lines	39	0.061	0.35	2.4E-03	8.71
Connectors	2,577	0.003	1.13	0.01	28.30
Intermittent Pneumatic Devices	60	6	17.57	0.12	439.31
Total			**21.65**	**0.15**	**541.51**

[1] Population emission factors for gas service in the Eastern U.S. from *Table W-1A of Subpart W - Default Whole Gas Emission Factors for Onshore Production* , 40 CFR 98, Subpart W (Table W-6 for compressor). Pneumatic assumes operation 1/3 of the year.

[2] Calculated in accordance with Equations W-32a, W-35 and W-36 in Subpart W of 40 CFR 98. See footnote 4 above for sample calculation.

[3] 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)
Mole fractions of CH_4 and CO_2 based on gas analysis:
CH_4: 79% CO_2: 0.20%

[4] Carbon equivalent emissions (CO_2e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:
Carbon Dioxide (CO_2): 1
Methane (CH_4): 25

Company Name: EQT Production, LLC
Facility Name: OXF 149-150 Pad
Project Description: R13 Application

Haul Roads

Estimated Potential Road Fugitive Emissions

Unpaved Road Emissions

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

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

Description	Weight of Empty Truck (tons)	Weight of Truck w/ Max Load (tons)	Mean Vehicle Weight (tons)	Length of Unpaved Road Traveled (mile)	Trips Per Year	Mileage Per Year	Control (%)	Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
Liquids Hauling	20	40	30	1.02	5,331	10,925	0	23.40	5.96	0.60
Employee Vehicles	3	3	3	1.02	200	410	0	0.31	0.08	0.01
Total Potential Emissions								**23.71**	**6.04**	**0.60**

Company Name: **EQT Production, LLC**
Facility Name: **OXF 149-150 Pad**
Project Description: **R13 Application**

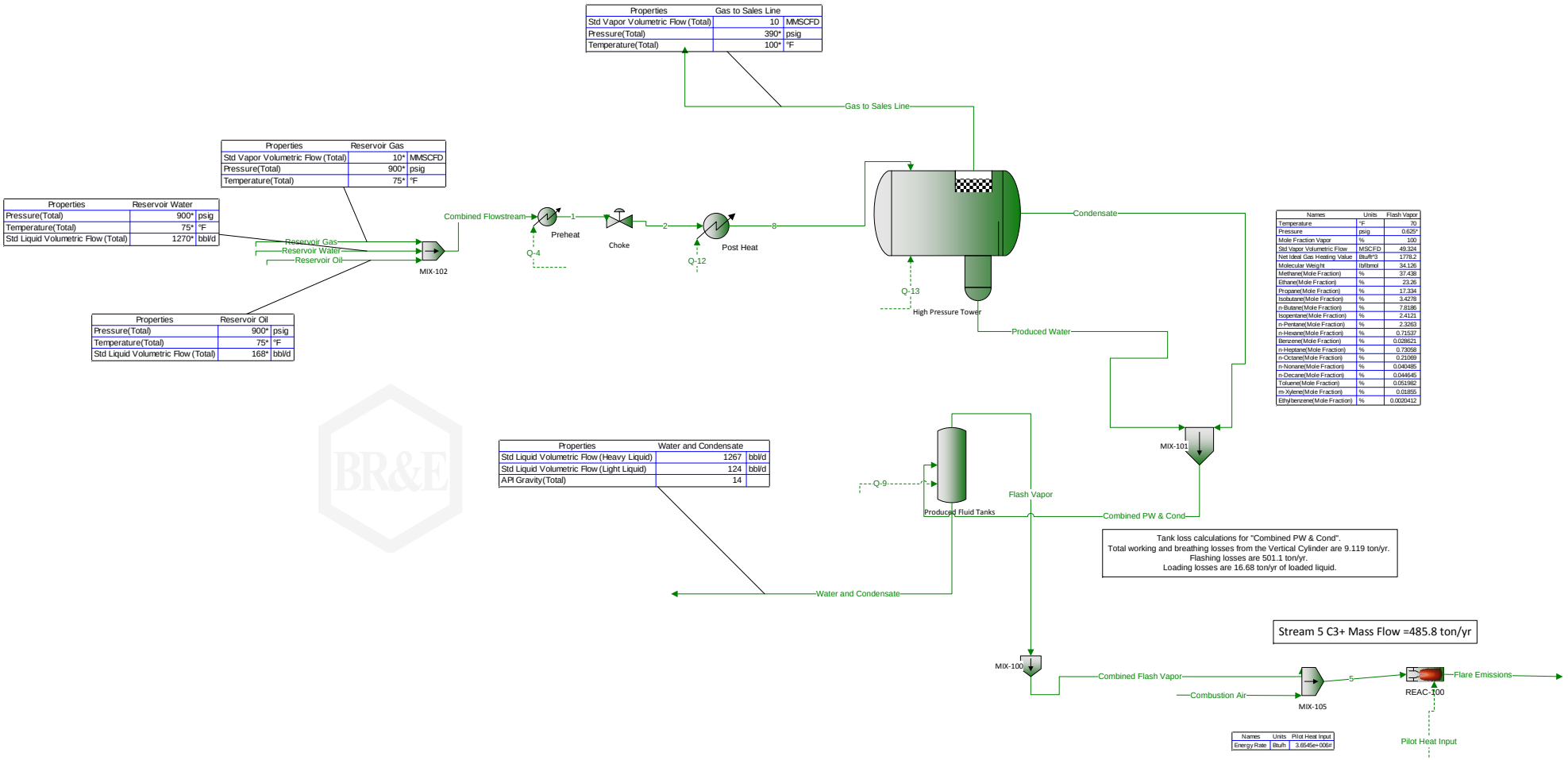
Gas Analysis

Sample Location: OXF 121 Gas Analysis
Sample Date: 5/29/2013
HHV (Btu/scf): 1,216 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	0.195	44.01	0.09	0.00	0.420
Nitrogen	0.532	28.01	0.15	0.01	0.729
Methane	78.965	16.04	12.67	0.62	61.983
Ethane	13.780	30.07	4.14	0.20	20.278
Propane	4.195	44.10	1.85	0.09	9.053
Isobutane	0.507	58.12	0.29	0.01	1.442
n-Butane	1.013	58.12	0.59	0.03	2.881
Isopentane	0.249	72.15	0.18	0.01	0.879
n-Pentane	0.239	72.15	0.17	0.01	0.844
Cyclopentane	<0.001	70.1	0.0	0.0	0.000
n-Hexane	0.073	86.18	0.06	0.00	0.308
Cyclohexane	0.011	84.16	0.01	0.00	0.045
Other Hexanes	0.113	86.18	0.10	0.00	0.477
Heptanes	0.079	100.21	0.08	0.00	0.387
Methylcyclohexane	<0.001	98.19	0.00	0.00	0.000
2,2,4-Trimethylpentane	0.031	114.23	0.04	0.00	0.173
Benzene*	0.002	78.11	0.00	0.00	0.008
Toluene*	0.004	92.14	0.00	0.00	0.018
Ethylbenzene*	<0.001	106.17	0.00	0.00	0.000
Xylenes*	0.002	106.16	0.00	0.00	0.010
C8 + Heavies	0.010	130.80	0.01	0.00	0.064
Totals	100.000		20.43	1.00	100

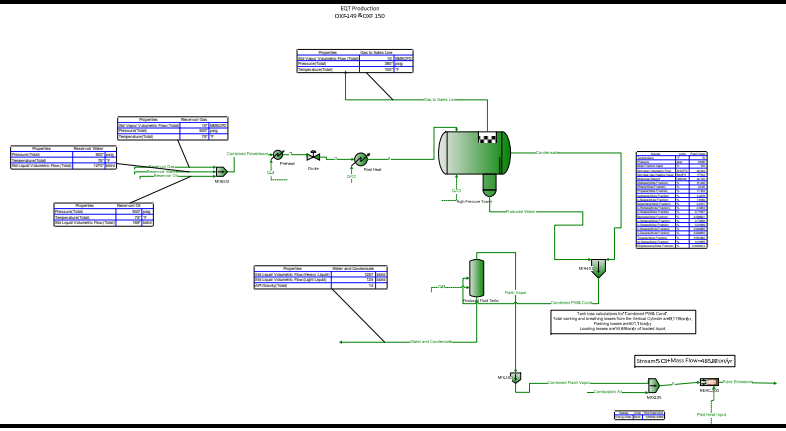
TOC (Total)	99.27	98.85
VOC (Total)	6.53	16.59
HAP (Total)	0.11	0.52

EQT Production
OXF-149 & OXF 150



OXF-149+150
Plant Schematic

Client Name:	EQT	Job:
Location:	OXF-149 & OXF-150	
Flowsheet:	OXF-149+150	



Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job:	
Location:	OXF-149 & OXF-150		
Flowsheet:	OXF-149+150		

Connections

	Combined Flash Vapor	Combined PW & Cond	Gas to Sales Line	Produced Water	Reservoir Gas
From Block	MIX-100	MIX-101	High Pressure Tower	High Pressure Tower	--
To Block	MIX-105	Produced Fluid Tanks	--	MIX-101	MIX-102

Stream Composition

Mass Flow	Combined Flash Vapor lb/h	Combined PW & Cond lb/h	Gas to Sales Line lb/h	Produced Water lb/h	Reservoir Gas lb/h
Nitrogen	0.152553	0.153424	163.48	0.0437854	163.633 *
Methane	32.5263	33.0585	13907	6.88403	13909.1 *
CO2	1.04138	1.18231	93.8014	0.776139	94.2271 *
Ethane	37.8784	40.809	4558.55	2.13904	4549.5 *
Propane	41.3963	53.0927	2043.17	0.812763	2031.06 *
Isobutane	10.7898	18.6058	329.84	0.0454229	323.552 *
n-Butane	24.6107	50.2999	660.691	0.213556	646.467 *
Isopentane	9.4248	36.2826	210.894	0.0364354	197.253 *
n-Pentane	9.08972	43.9108	200.737	0.03524	189.331 *
n-Hexane	3.33864	47.6195	78.0221	0.00514269	69.0718 *
Methylcyclopentane	0	0	0	0	0 *
Benzene	0.121077	1.87341	2.73195	0.0811374	1.71531 *
Cyclohexane	0.248089	4.45968	5.70493	0.00521384	10.1646 *
n-Heptane	3.96462	173.744	111.909	0.00454275	86.9156 *
n-Octane	1.3034	188.772	45.261	0.00151923	3.76262 *
n-Nonane	0.281205	131.285	11.9371	0.00101834	5.63286 *
n-Decane	0.344018	519.113	18.6465	0.000975721	4.68668 *
n-Undecane	0	0	0	0	0 *
Dodecane	0	0	0	0	0 *
Water	2.31798	18478.2	51.2454	18477.9	0 *
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	5.03049	52.6222	113.25	0.00859367	106.919 *
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	0.581602	23.4826	15.9741	0.000135761	38.8804 *
Decane, 2-Methyl-	0	0	0	0	0 *
Toluene	0.259387	12.9971	6.95827	0.151714	4.04665 *
m-Xylene	0.106653	20.8996	3.65058	0.0633808	2.33134 *
Ethylbenzene	0.0117361	1.91424	0.387001	0.00630266	0 *

Volumetric Flow	Combined Flash Vapor ft^3/h	Combined PW & Cond gpm	Gas to Sales Line ft^3/h	Produced Water gpm	Reservoir Gas ft^3/h
Nitrogen	2.032	0.000550142	89.7741	0.000120041	41.4668
Methane	752.986	0.213923	12434.2	0.0344292	5015.35
CO2	8.75572	0.00187466	28.7302	0.00123958	9.95737
Ethane	463.501	0.181578	1869.76	0.00728171	500.335
Propane	342.765	0.206089	498.07	0.00236202	64.538
Isobutane	67.3515	0.0672811	54.4977	0.000120584	0.384116
n-Butane	153.358	0.176183	103.362	0.000559622	-6.54661
Isopentane	47.0104	0.11901	22.8535	8.88298E-05	-5.72225
n-Pentane	45.2779	0.142853	21.1235	8.60696E-05	-6.21306
n-Hexane	13.8043	0.146594	5.44757	1.19317E-05	-3.39274
Methylcyclopentane	0	0	0	0	0

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job:
Location:	OXF-149 & OXF-150	
Flowsheet:	OXF-149+150	

Volumetric Flow	Combined Flash Vapor ft^3/h	Combined PW & Cond gpm	Gas to Sales Line ft^3/h	Produced Water gpm	Reservoir Gas ft^3/h
Benzene	0.555959	0.00420267	0.242947	0.000153102	-0.0722475
Cyclohexane	1.05399	0.0115215	0.434112	1.06606E-05	-0.467609
n-Heptane	13.9908	0.515307	4.94501	1.01931E-05	-5.29476
n-Octane	4.00171	0.539428	1.20684	3.30057E-06	-0.252608
n-Nonane	0.761948	0.364595	0.130439	2.15964E-06	-0.417402
n-Decane	0.833476	1.41436	-0.0183503	2.03626E-06	-0.364296
n-Undecane	0	0	0	0	0
Dodecane	0	0	0	0	0
Water	47.6824	37.1761	39.1537	37.1763	0
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	20.8352	0.163825	8.38099	1.99699E-05	-4.70031
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	1.79806	0.0681145	0.617486	2.91991E-07	-2.04722
Decane, 2-Methyl-	0	0	0	0	0
Toluene	1.00095	0.0295161	0.402543	0.000283282	-0.227243
m-Xylene	0.354253	0.0475582	0.134626	0.000117366	-0.149181
Ethylbenzene	0.0390252	0.00434397	0.0149868	1.16085E-05	0

Mole Fraction	Combined Flash Vapor	Combined PW & Cond	Gas to Sales Line	Produced Water	Reservoir Gas	
Nitrogen	0.00100554	5.25351E-06	0.00529227	1.52307E-06	0.00532	*
Methane	0.374377	0.00197667	0.786152	0.000418146	0.78965	*
CO2	0.00436925	2.57696E-05	0.00193288	1.7185E-05	0.00195	*
Ethane	0.232604	0.00130184	0.137483	6.93195E-05	0.1378	*
Propane	0.173345	0.00115494	0.0420195	1.79608E-05	0.04195	*
Isobutane	0.0342782	0.000307063	0.0051464	7.61533E-07	0.00507	*
n-Butane	0.0781856	0.00083013	0.0103086	3.58035E-06	0.01013	*
Isopentane	0.0241206	0.000482381	0.0026508	4.92097E-07	0.00249	*
n-Pentane	0.0232631	0.000583799	0.00252313	4.75951E-07	0.00239	*
n-Hexane	0.00715371	0.000530057	0.000821064	5.81518E-08	0.00073	*
Methylcyclopentane	0	0	0	0	0	*
Benzene	0.000286213	2.30058E-05	3.17174E-05	1.01219E-06	2E-05	*
Cyclohexane	0.000544314	5.08302E-05	6.14738E-05	6.03686E-08	0.00011	*
n-Heptane	0.00730584	0.00166324	0.00101282	4.41773E-08	0.00079	*
n-Octane	0.00210692	0.0015852	0.000359329	1.296E-08	3E-05	*
n-Nonane	0.000404849	0.000981888	8.4405E-05	7.73706E-09	4E-05	*
n-Decane	0.000446455	0.00349972	0.000118848	6.6824E-09	3E-05	*
n-Undecane	0	0	0	0	0	*
Dodecane	0	0	0	0	0	*
Water	0.0237582	0.983874	0.00257963	0.999467	0	*
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	0.0107788	0.000585743	0.00119179	9.71744E-08	0.00113	*
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	0.00094015	0.000197194	0.000126819	1.15813E-09	0.00031	*
Decane, 2-Methyl-	0	0	0	0	0	*

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job:	
Location:	OXF-149 & OXF-150		
Flowsheet:	OXF-149+150		

Mole Fraction	Combined Flash Vapor	Combined PW & Cond	Gas to Sales Line	Produced Water	Reservoir Gas
Toluene	0.00051982	0.000135309	6.84862E-05	1.6045E-06	4E-05 *
m-Xylene	0.000185498	0.000188833	3.11834E-05	5.81745E-07	2E-05 *
Ethylbenzene	2.0412E-05	1.72956E-05	3.30577E-06	5.78494E-08	0 *

Stream Properties

Property	Units	Combined Flash Vapor	Combined PW & Cond	Gas to Sales Line	Produced Water	Reservoir Gas
Temperature	°F	70	100	100 *	100	75 *
Pressure	psig	0.625	390	390 *	390	900 *
Mole Fraction Vapor		1	0	1	0	0.999974
Mole Fraction Light Liquid		0	0.0156144	0	1	2.61384E-05
Mole Fraction Heavy Liquid		0	0.984386	0	0	0
Molecular Weight	lb/lbmol	34.1265	19.1216	20.5259	18.0167	20.436
Mass Density	lb/ft^3	0.0928855	59.7508	1.49069	61.9279	4.00958
Mass Flow	lb/h	184.819	19934.4	22633.9	18489.3	22438.3
Vapor Volumetric Flow	ft^3/h	1989.75	333.625	15183.5	298.561	5596.17
Liquid Volumetric Flow	gpm	248.073	41.5948	1893	37.2232	697.704
Std Vapor Volumetric Flow	MMSCFD	0.0493242	9.49476	10.043	9.34651	10 *
Std Liquid Volumetric Flow	sgpm	0.827281	41.3779	133.032	37.0037	132.468
Specific Gravity		1.1783	0.958021	0.708703	0.992927	
API Gravity			14.9402		10.0523	
Net Ideal Gas Heating Value	Btu/ft^3	1778.22	71.1004	1119.5	0.565722	1117.55
Net Liquid Heating Value	Btu/lb	19633.4	417.425	20637.2	-1047.23	20695.2

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job:	
Location:	OXF-149 & OXF-150		
Flowsheet:	OXF-149+150		

Connections

	Reservoir Oil				
From Block	--				
To Block	MIX-102				

Stream Composition

Mass Flow	Reservoir Oil lb/h				
Nitrogen	0 *				
Methane	30.9666 *				
CO2	0.756584 *				
Ethane	49.8611 *				
Propane	65.2018 *				
Isobutane	24.8931 *				
n-Butane	64.5245 *				
Isopentane	49.9236 *				
n-Pentane	55.3163 *				
n-Hexane	56.5697 *				
Methylcyclopentane	0 *				
Benzene	2.89005 *				
Cyclohexane	0 *				
n-Heptane	198.737 *				
n-Octane	230.27 *				
n-Nonane	137.589 *				
n-Decane	533.072 *				
n-Undecane	0 *				
Dodecane	0 *				
Water	0 *				
Triethylene Glycol	0 *				
Oxygen	0 *				
Argon	0 *				
Carbon Monoxide	0 *				
Cyclopentane	0 *				
Isohexane	58.953 *				
3-Methylpentane	0 *				
Neohexane	0 *				
2,3-Dimethylbutane	0 *				
Methylcyclohexane	0 *				
Isooctane	0.576317 *				
Decane, 2-Methyl-	0 *				
Toluene	15.9087 *				
m-Xylene	22.2189 *				
Ethylbenzene	2.30124 *				

Volumetric Flow	Reservoir Oil gpm				
Nitrogen	0				
Methane	0.197346				
CO2	0.0011232				
Ethane	0.213586				
Propane	0.243926				
Isobutane	0.0868506				
n-Butane	0.218623				
Isopentane	0.158777				
n-Pentane	0.174707				
n-Hexane	0.169579				
Methylcyclopentane	0				
Benzene	0.00641442				
Cyclohexane	0				
n-Heptane	0.575298				
n-Octane	0.643396				
n-Nonane	0.374138				

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job:	
Location:	OXF-149 & OXF-150		
Flowsheet:	OXF-149+150		

Volumetric Flow	Reservoir Oil gpm				
n-Decane	1.4235				
n-Undecane	0				
Dodecane	0				
Water	0				
Triethylene Glycol	0				
Oxygen	0				
Argon	0				
Carbon Monoxide	0				
Cyclopentane	0				
Isohexane	0.178501				
3-Methylpentane	0				
Neohexane	0				
2,3-Dimethylbutane	0				
Methylcyclohexane	0				
Isooctane	0.00162932				
Decane, 2-Methyl-	0				
Toluene	0.0356234				
m-Xylene	0.0498409				
Ethylbenzene	0.00514668				

Mole Fraction	Reservoir Oil					
Nitrogen	0	*				
Methane	0.1033	*				
CO2	0.00092	*				
Ethane	0.08874	*				
Propane	0.07913	*				
Isobutane	0.02292	*				
n-Butane	0.05941	*				
Isopentane	0.03703	*				
n-Pentane	0.04103	*				
n-Hexane	0.03513	*				
Methylcyclopentane	0	*				
Benzene	0.00198	*				
Cyclohexane	0	*				
n-Heptane	0.10614	*				
n-Octane	0.10788	*				
n-Nonane	0.05741	*				
n-Decane	0.2005	*				
n-Undecane	0	*				
Dodecane	0	*				
Water	0	*				
Triethylene Glycol	0	*				
Oxygen	0	*				
Argon	0	*				
Carbon Monoxide	0	*				
Cyclopentane	0	*				
Isohexane	0.03661	*				
3-Methylpentane	0	*				
Neohexane	0	*				
2,3-Dimethylbutane	0	*				
Methylcyclohexane	0	*				
Isooctane	0.00027	*				
Decane, 2-Methyl-	0	*				
Toluene	0.00924	*				
m-Xylene	0.0112	*				
Ethylbenzene	0.00116	*				

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	EQT	Job:	
Location:	OXF-149 & OXF-150		
Flowsheet:	OXF-149+150		

Stream Properties

Property	Units	Reservoir Oil					
Temperature	°F	75	*				
Pressure	psig	900	*				
Mole Fraction Vapor		0					
Mole Fraction Light Liquid		1					
Mole Fraction Heavy Liquid		0					
Molecular Weight	lb/lbmol	85.6527					
Mass Density	lb/ft^3	41.9391					
Mass Flow	lb/h	1600.53					
Vapor Volumetric Flow	ft^3/h	38.1632					
Liquid Volumetric Flow	gpm	4.75801					
Std Vapor Volumetric Flow	MMSCFD	0.170188					
Std Liquid Volumetric Flow	sgpm	4.9	*				
Specific Gravity		0.672435					
API Gravity		76.5036					
Net Ideal Gas Heating Value	Btu/ft^3	4363.51					
Net Liquid Heating Value	Btu/lb	19177.2					

Remarks

Energy Stream Report

Client Name:	EQT	Job:
Location:	OXF-149 & OXF-150	
Flowsheet:	OXF-149+150	

Energy Streams

Energy Stream	Energy Rate	Power	From Block	To Block
Pilot Heat Input	3.65455E+06 * Btu/h	1436.29 * hp	--	REAC-100

Remarks

User Value Sets Report

Client Name:	EQT	Job:	
Location:	OXF-149 & OXF-150		

Tank Losses.53

User Value [ShellLength]

*	Parameter	20 ft		Upper Bound	ft
*	Lower Bound	0 ft	*	Enforce Bounds	False

User Value [ShellDiam]

*	Parameter	12 ft		Upper Bound	ft
*	Lower Bound	0 ft	*	Enforce Bounds	False

User Value [BreatherVP]

*	Parameter	0.875 psig		Upper Bound	psig
	Lower Bound	psig	*	Enforce Bounds	False

User Value [BreatherVacP]

*	Parameter	-0.0375 psig		Upper Bound	psig
	Lower Bound	psig	*	Enforce Bounds	False

User Value [DomeRadius]

	Parameter	ft		Upper Bound	ft
	Lower Bound	ft	*	Enforce Bounds	False

User Value [OpPress]

*	Parameter	0 psig		Upper Bound	psig
	Lower Bound	psig	*	Enforce Bounds	False

User Value [AvgPercentLiq]

*	Parameter	50 %		Upper Bound	%
	Lower Bound	%	*	Enforce Bounds	False

User Value [MaxPercentLiq]

*	Parameter	90 %		Upper Bound	%
	Lower Bound	%	*	Enforce Bounds	False

User Value [AnnNetTP]

*	Parameter	1426.11 bbl/day		Upper Bound	bbl/day
*	Lower Bound	0 bbl/day	*	Enforce Bounds	False

User Value [OREff]

*	Parameter	0 %		Upper Bound	%
	Lower Bound	%	*	Enforce Bounds	False

User Value [AtmPressure]

*	Parameter	14.2535 psia		Upper Bound	psia
	Lower Bound	psia	*	Enforce Bounds	False

User Value [MaxLiqSurfaceT]

*	Parameter	68.7091 °F		Upper Bound	°F
	Lower Bound	°F	*	Enforce Bounds	False

User Value [TotalLosses]

*	Parameter	9.11877 ton/yr		Upper Bound	ton/yr
	Lower Bound	ton/yr	*	Enforce Bounds	False

User Value [WorkingLosses]

*	Parameter	0.451098 ton/yr		Upper Bound	ton/yr
	Lower Bound	ton/yr	*	Enforce Bounds	False

User Value Sets Report

Client Name:	EQT	Job:	
Location:	OXF-149 & OXF-150		

User Value [StandingLosses]

*	Parameter	0.3088 ton/yr	Upper Bound		ton/yr
	Lower Bound	ton/yr	* Enforce Bounds	False	

User Value [RimSealLosses]

*	Parameter	0 ton/yr	Upper Bound		ton/yr
	Lower Bound	ton/yr	* Enforce Bounds	False	

User Value [WithdrawalLoss]

*	Parameter	0 ton/yr	Upper Bound		ton/yr
	Lower Bound	ton/yr	* Enforce Bounds	False	

User Value [LoadingLosses]

*	Parameter	16.6766 ton/yr	Upper Bound		ton/yr
	Lower Bound	ton/yr	* Enforce Bounds	False	

User Value [DeckFittingLosses]

*	Parameter	0 ton/yr	Upper Bound		ton/yr
	Lower Bound	ton/yr	* Enforce Bounds	False	

User Value [DeckSeamLosses]

*	Parameter	0 ton/yr	Upper Bound		ton/yr
	Lower Bound	ton/yr	* Enforce Bounds	False	

User Value [FlashingLosses]

*	Parameter	501.071 ton/yr	Upper Bound		ton/yr
	Lower Bound	ton/yr	* Enforce Bounds	False	

User Value [GasMoleWeight]

*	Parameter	0.0553619 kg/mol	Upper Bound		kg/mol
	Lower Bound	kg/mol	* Enforce Bounds	False	

Remarks
This User Value Set was programmatically generated. GUID={5524AB8C-40B1-4354-9DD7-EED65770BF87}

****
* Project Setup Information *
****
Project File : \\tsclient\Z\Client\EQT Corporation\West Virginia\WV Wells\163901.0058 WV Wells 2016\OXF 149-150\02 Draft\2016-0307 OXF 149-150 Wellpad Application\Attachment N - Emission Calculations\20160310_DRAFT_EQT_OXF14-150_Sand Sep Tank.ept
Flowsheet Selection : Oil Tank with Separator
Calculation Method : RVP Distillation
Control Efficiency : 0.0%
Known Separator Stream : Low Pressure Oil
Entering Air Composition : No

Filed Name : OXF 149 & OXF 150
Well Name : Sand Separator Tank
Well ID : OXF-149 Condensate Sample
Date : 2016.03.10

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

Separator Pressure : 320.00[psig]
Separator Temperature : 60.00[F]
Ambient Pressure : 14.70[psia]
Ambient Temperature : 70.00[F]
C10+ SG : 0.8024
C10+ MW : 210.576

-- Low Pressure Oil ----------

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.0920
4	N2	0.0000
5	C1	10.3300
6	C2	8.8740
7	C3	7.9130
8	i-C4	2.2920
9	n-C4	5.9410
10	i-C5	3.7030
11	n-C5	4.1030
12	C6	3.6610
13	C7	10.6140
14	C8	10.7880
15	C9	5.7410
16	C10+	20.0500
17	Benzene	0.1980
18	Toluene	0.9240
19	E-Benzene	0.1160
20	Xylenes	1.1200
21	n-C6	3.5130

22 224Trimethylp 0.0270

-- Sales Oil ----------
Production Rate : 0.1[bbl/day]
Days of Annual Operation : 365 [days/year]
API Gravity : 56.11
Reid Vapor Pressure : 10.60[psia]

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

-- Emission Summary ----------
Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
Page 1---------- E&P TANK				
Total HAPs	0.010	0.002	0.010	0.002
Total HC	0.552	0.126	0.552	0.126
VOCs, C2+	0.464	0.106	0.464	0.106
VOCs, C3+	0.323	0.074	0.323	0.074

Uncontrolled Recovery Info.
Vapor 33.7500 x1E-3 [MSCFD]
HC Vapor 33.6500 x1E-3 [MSCFD]
GOR 337.50 [SCF/bbl]

-- Emission Composition ----------
No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	Controlled [ton/yr]	Controlled [lb/hr]
1	H2S	0.000	0.000	0.000	0.000
2	O2	0.000	0.000	0.000	0.000
3	CO2	0.002	0.000	0.002	0.000
4	N2	0.000	0.000	0.000	0.000
5	C1	0.088	0.020	0.088	0.020
6	C2	0.140	0.032	0.140	0.032
7	C3	0.143	0.033	0.143	0.033
8	i-C4	0.035	0.008	0.035	0.008
9	n-C4	0.073	0.017	0.073	0.017
10	i-C5	0.026	0.006	0.026	0.006
11	n-C5	0.022	0.005	0.022	0.005
12	C6	0.007	0.002	0.007	0.002
13	C7	0.007	0.002	0.007	0.002
14	C8	0.002	0.000	0.002	0.000
15	C9	0.000	0.000	0.000	0.000
16	C10+	0.000	0.000	0.000	0.000
17	Benzene	0.000	0.000	0.000	0.000
18	Toluene	0.000	0.000	0.000	0.000
19	E-Benzene	0.000	0.000	0.000	0.000
20	Xylenes	0.000	0.000	0.000	0.000
21	n-C6	0.005	0.001	0.005	0.001
22	224Trimethylp	0.000	0.000	0.000	0.000
	Total	0.550	0.126	0.550	0.126

-- Stream Data ----------

No.	Component	MW	LP Oil mol %	Flash Oil mol %	Sale Oil mol %	Flash Gas mol %	W&S Gas mol %	Total Emissions 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	0.0920	0.0060	0.0001	0.3030	0.2695	0.3013
4	N2	28.01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	C1	16.04	10.3300	0.2188	0.0000	35.1483	9.8854	33.8466
6	C2	30.07	8.8740	1.1428	0.1436	27.8504	45.2926	28.7492
7	C3	44.10	7.9130	3.1683	2.6468	19.5591	26.2078	19.9017
8	i-C4	58.12	2.2920	1.7024	1.6483	3.7393	4.0924	3.7575
9	n-C4	58.12	5.9410	5.2118	5.1424	7.7308	8.2786	7.7590
10	i-C5	72.15	3.7030	4.3039	4.3484	2.2280	2.3393	2.2337
11	n-C5	72.15	4.1030	5.0206	5.0902	1.8508	1.9436	1.8556
12	C6	86.16	3.6610	4.9381	5.0373	0.5262	0.5556	0.5277
13	C7	100.20	10.6140	14.7477	15.0702	0.4677	0.4983	0.4692
14	C8	114.23	10.7880	15.1282	15.4674	0.1347	0.1451	0.1353
15	C9	128.28	5.7410	8.0709	8.2530	0.0222	0.0259	0.0224
16	C10+	210.58	20.0500	28.2185	28.8572	0.0001	0.0001	0.0001
17	Benzene	78.11	0.1980	0.2703	0.2759	0.0206	0.0219	0.0207
18	Toluene	92.13	0.9240	1.2905	1.3191	0.0244	0.0261	0.0245
19	E-Benzene	106.17	0.1160	0.1629	0.1666	0.0009	0.0010	0.0009
20	Xylenes	106.17	1.1200	1.5732	1.6087	0.0075	0.0081	0.0075
21	n-C6	86.18	3.5130	4.7873	4.8865	0.3851	0.4077	0.3862
22	224Trimethylp	114.24	0.0270	0.0376	0.0384	0.0009	0.0010	0.0009
	MW		98.36	124.65	126.60	33.83	38.71	34.09
	Stream Mole Ratio		1.0000	0.7105	0.6948	0.2895	0.0157	0.3052
	Heating Value [BTU/SCF]					1957.33	2221.01	1970.91
	Gas Gravity [Gas/Air]					1.17	1.34	1.18
	Bubble Pt. @ 100F [psia]		412.67	26.87	13.10			

RVP @ 100F [psia]	105.20	15.66	10.93
Spec. Gravity @ 100F	0.659	0.690	0.691

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

Certificate of Analysis : 13050027-001A

Company:	Gas Analytical Services	**For:**	Gas Analytical Services
Well:	Oxford 149 Pad		Alan Ball
Field:	EQT Midstream		PO Box 1028
Sample of:	Condensate		
Conditions:	320 @ N.G.		Bridgeport, WV, 26330
Sampled by:	RM-GAS		
Sample date:	4/29/2013	**Report Date:**	5/13/2013
Remarks:	Cylinder No.: GAS		
Remarks:	Well 512480		

Analysis: (*GPA 2186M*)	**Mol. %**	**MW**	**Wt. %**	**Sp. Gravity**	**L.V. %**
Nitrogen	0.000	28.013	0.000	0.8094	0.000
Methane	10.330	16.043	1.686	0.3000	3.891
Carbon Dioxide	0.092	44.010	0.041	0.8180	0.035
Ethane	8.874	30.070	2.715	0.3562	5.271
Propane	7.913	44.097	3.551	0.5070	4.842
Iso-butane	2.292	58.123	1.356	0.5629	1.666
N-butane	5.941	58.123	3.514	0.5840	4.162
Iso-pentane	3.703	72.150	2.719	0.6244	3.011
N-pentane	4.103	72.150	3.013	0.6311	3.302
i-Hexanes	3.661	86.177	3.170	0.6795	3.308
n-Hexane	3.513	85.648	3.083	0.6640	3.191
2,2,4 trimethylpentane	0.027	114.231	0.030	0.6967	0.031
Benzene	0.198	78.114	0.144	0.8846	0.123
Heptanes	10.614	97.459	10.576	0.7048	10.397
Toluene	0.924	92.141	0.795	0.8719	0.690
Octanes	10.788	107.237	11.986	0.7433	11.205
E-benzene	0.116	106.167	0.054	0.8718	0.100
M-,O-,P-xylene	1.120	106.167	1.207	0.8731	0.966
Nonanes	5.741	121.906	7.394	0.7646	6.765
Decanes Plus	20.050	210.576	42.966	0.8024	37.044
	100.000		100.000		100.000

Calculated Values	**Total Sample**	**Decanes Plus**
Specific Gravity at 60 °F	0.6917	0.8024
Api Gravity at 60 °F	73.054	44.854
Molecular Weight	98.266	210.576
Pounds per Gallon (in Vacuum)	5.767	6.690
Pounds per Gallon (in Air)	5.761	6.682
Cu. Ft. Vapor per Gallon @ 14.73 psia	22.324	12.028

Brian Gaspard

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 : 13050027-001A

Company:	Gas Analytical Services	**For:**	Gas Analytical Services
Well:	Oxford 149 Pad		Alan Ball
Field:	EQT Midstream		PO Box 1028
Sample of:	Condensate		
Conditions:	320 @ N.G.		Bridgeport, WV, 26330
Sampled by:	RM-GAS		
Sample date:	4/29/2013	**Report Date:**	5/13/2013
Remarks:	Cylinder No.: GAS		
Remarks:	Well 512480		

Analysis: (*GPA 2103M*)	**Mol. %**	**MW**	**Wt. %**	**Sp. Gravity**	**L.V. %**
Nitrogen	0.000	28.013	0.000	0.8094	0.000
Methane	10.330	16.043	1.686	0.3000	3.891
Carbon Dioxide	0.092	44.010	0.041	0.8180	0.035
Ethane	8.874	30.070	2.715	0.3562	5.271
Propane	7.913	44.097	3.551	0.5070	4.842
Iso-butane	2.292	58.123	1.356	0.5629	1.666
N-butane	5.941	58.123	3.514	0.5840	4.162
Iso-pentane	3.703	72.150	2.719	0.6244	3.011
N-pentane	4.103	72.150	3.013	0.6311	3.302
Hexanes	7.174	85.648	6.253	0.6655	6.499
Heptanes Plus	49.578	97.459	75.152	0.7048	67.321
	100.000		100.000		100.000

Calculated Values	**Total Sample**	**Heptanes Plus**
Specific Gravity at 60 °F	0.6917	0.7740
Api Gravity at 60 °F	73.054	51.311
Molecular Weight	98.266	148.955
Pounds per Gallon (in Vacuum)	5.767	6.453
Pounds per Gallon (in Air)	5.761	6.446
Cu. Ft. Vapor per Gallon @ 14.73 psia	22.324	16.479
Standing-Katz Density (lb. / ft^3)		

Brian Gaspard

Southern Petroleum Laboratories, Inc.

Certificate of Analysis

Number: 2030-13050027-001A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

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

May 07, 2013

Station Name: Oxford 149 Pad
Station Location: EQT Midstream
Cylinder No: GAS

Sampled By: RM-GAS
Sample Of: Condensate Spot
Sample Date: 04/29/2013 12:30
Sample Conditions: 320 psig

Analytical Data

Test	Method	Result	Units	Detection Limit	Lab Tech.	Analysis Date
Color-Visual	Proprietary	STRAW			AR	05/07/2013
API Gravity @ 60° F	ASTM D-5002	60.09	°		AR	05/07/2013
Specific Gravity @ 60/60° F	ASTM D-5002	0.7386			AR	05/07/2013
Density @ 60° F	ASTM D-5002	0.7378	g/ml		AR	05/07/2013
Shrinkage Factor	Proprietary	0.8679			AR	05/07/2013
Flash Factor	Proprietary	263.1562	Cu. Ft./S.T. Bbl		AR	05/07/2013

Patti L. Pecoro

Hydrocarbon Laboratory Manager

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

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

Certificate of Analysis : 13050027-002A

Company:	Gas Analytical Services	**For:**	Gas Analytical Services
Well:	Pad 150		Alan Ball
Field:	EQT Midstream		PO Box 1028
Sample of:	Condensate		
Conditions:	316 @ N.G.		Bridgeport, WV, 26330
Sampled by:	RM-GAS		
Sample date:	4/29/2013	**Report Date:**	5/13/2013
Remarks:	Cylinder No.: GAS		
Remarks:	Well 512475		

Analysis: (*GPA 2186M*)	**Mol. %**	**MW**	**Wt. %**	**Sp. Gravity**	**L.V. %**
Nitrogen	0.000	28.013	0.000	0.8094	0.000
Methane	14.611	16.043	2.591	0.3000	5.857
Carbon Dioxide	0.104	44.010	0.051	0.8180	0.042
Ethane	8.607	30.070	2.861	0.3562	5.441
Propane	7.492	44.097	3.652	0.5070	4.879
Iso-butane	2.107	58.123	1.354	0.5629	1.630
N-butane	5.523	58.123	3.549	0.5840	4.118
Iso-pentane	3.340	72.150	2.664	0.6244	2.891
N-pentane	3.833	72.150	3.057	0.6311	3.283
i-Hexanes	3.582	86.177	3.371	0.6795	3.447
n-Hexane	3.376	85.668	3.218	0.6640	3.265
2,2,4 trimethylpentane	0.023	114.231	0.030	0.6967	0.029
Benzene	0.148	78.114	0.103	0.8846	0.099
Heptanes	10.220	97.761	11.096	0.7032	10.696
Toluene	0.780	92.141	0.635	0.8719	0.620
Octanes	11.958	108.185	14.599	0.7465	13.211
E-benzene	0.106	106.167	0.055	0.8718	0.097
M-,O-,P-xylene	1.104	106.167	1.296	0.8731	1.014
Nonanes	6.903	122.870	9.668	0.7602	8.714
Decanes Plus	16.183	202.077	36.150	0.7990	30.667
	100.000		100.000		100.000

Calculated Values	**Total Sample**	**Decanes Plus**
Specific Gravity at 60 °F	0.6778	0.7990
Api Gravity at 60 °F	77.272	45.591
Molecular Weight	90.462	202.077
Pounds per Gallon (in Vacuum)	5.651	6.662
Pounds per Gallon (in Air)	5.645	6.654
Cu. Ft. Vapor per Gallon @ 14.73 psia	23.760	12.481

Brian Kaspard

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 : 13050027-002A

Company:	Gas Analytical Services	**For:**	Gas Analytical Services
Well:	Pad 150		Alan Ball
Field:	EQT Midstream		PO Box 1028
Sample of:	Condensate		
Conditions:	316 @ N.G.		Bridgeport, WV, 26330
Sampled by:	RM-GAS		
Sample date:	4/29/2013	**Report Date:**	5/13/2013
Remarks:	Cylinder No.: GAS		
Remarks:	Well 512475		

Analysis: (*GPA 2103M*)	**Mol. %**	**MW**	**Wt. %**	**Sp. Gravity**	**L.V. %**
Nitrogen	0.000	28.013	0.000	0.8094	0.000
Methane	14.611	16.043	2.591	0.3000	5.857
Carbon Dioxide	0.104	44.010	0.051	0.8180	0.042
Ethane	8.607	30.070	2.861	0.3562	5.441
Propane	7.492	44.097	3.652	0.5070	4.879
Iso-butane	2.107	58.123	1.354	0.5629	1.630
N-butane	5.523	58.123	3.549	0.5840	4.118
Iso-pentane	3.340	72.150	2.664	0.6244	2.891
N-pentane	3.833	72.150	3.057	0.6311	3.283
Hexanes	6.958	85.668	6.589	0.6654	6.712
Heptanes Plus	47.425	97.761	73.632	0.7032	65.147
	100.000		100.000		100.000

Calculated Values	**Total Sample**	**Heptanes Plus**
Specific Gravity at 60 °F	0.6778	0.7677
Api Gravity at 60 °F	77.272	52.809
Molecular Weight	90.462	140.452
Pounds per Gallon (in Vacuum)	5.651	6.401
Pounds per Gallon (in Air)	5.645	6.394
Cu. Ft. Vapor per Gallon @ 14.73 psia	23.760	17.334
Standing-Katz Density (lb. / ft^3)		

Brian Lapard

Southern Petroleum Laboratories, Inc.

Certificate of Analysis

Number: 2030-13050027-002A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

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

May 07, 2013

Station Name: Pad 150
Station Location: EQT Midstream
Cylinder No: GAS

Sampled By: RM-GAS
Sample Of: Condensate Spot
Sample Date: 04/29/2013 11:30
Sample Conditions: 316 psig

Analytical Data

Test	Method	Result	Units	Detection Limit	Lab Tech.	Analysis Date
Color-Visual	Proprietary	STRAW			AR	05/07/2013
API Gravity @ 60° F	ASTM D-5002	61.86	°		AR	05/07/2013
Specific Gravity @ 60/60° F	ASTM D-5002	0.8713			AR	05/07/2013
Density @ 60° F	ASTM D-5002	0.8705	g/ml		AR	05/07/2013
Shrinkage Factor	Proprietary	0.8281			AR	05/07/2013
Flash Factor	Proprietary	255.8535	Cu. Ft./S.T. Bbl		AR	05/07/2013

Patti L. Pesso

Hydrocarbon Laboratory Manager

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

Certificate of Analysis

Number: 2030-13050229-003A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

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

May 29, 2013

Station Name: 512425
Station Location: EQT Production
Sample Point: Submeter
Cylinder No: GAS
Analyzed: 05/29/2013 13:24:38 by CC

Sampled By: RM-GAS
Sample Of: Gas
Sample Date: 05/20/2013 13:15
Sample Conditions: 379 psig
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia
Nitrogen	0.532	0.729	
Carbon Dioxide	0.195	0.420	
Methane	78.965	61.996	
Ethane	13.780	20.278	3.697
Propane	4.195	9.053	1.159
Iso-Butane	0.507	1.442	0.166
n-Butane	1.013	2.881	0.320
Iso-Pentane	0.249	0.879	0.091
n-Pentane	0.239	0.844	0.087
i-Hexanes	0.113	0.461	0.045
n-Hexane	0.073	0.304	0.030
Benzene	0.002	0.008	0.001
Cyclohexane	0.011	0.044	0.004
i-Heptanes	0.057	0.266	0.025
n-Heptane	0.022	0.106	0.010
Toluene	0.004	0.017	0.001
i-Octanes	0.031	0.168	0.015
n-Octane	0.003	0.017	0.002
Ethylbenzene	NIL	NIL	NIL
Xylenes	0.002	0.007	0.001
i-Nonanes	0.003	0.027	0.002
n-Nonane	0.001	0.006	0.001
Decane Plus	0.003	0.047	0.004
	100.000	100.000	5.661

GPM TOTAL C2+ 5.661

Certificate of Analysis

Number: 2030-13050229-003A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

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

May 29, 2013

Station Name:	512425	Sampled By:	RM-GAS
Station Location:	EQT Production	Sample Of:	Gas
Sample Point:	Submeter	Sample Date:	05/20/2013 13:15
Cylinder No:	GAS	Sample Conditions:	379 psig
Analyzed:	05/29/2013 13:24:38 by CC	Method:	GPA 2286

Physical Properties	**Total**	**C10+**
Calculated Molecular Weight	20.43	163.67
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.73 psia & 60°F		
Real Gas Dry BTU	1239.6	8669.4
Water Sat. Gas Base BTU	1218.5	8518.5
Relative Density Real Gas	0.7077	5.6511
Compressibility Factor	0.9966	

Patti L. Pecoro

Hydrocarbon Laboratory Manager

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

Certificate of Analysis

Number: 2030-13050229-003A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

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

May 29, 2013

Station Name:	512425	Sampled By:	RM-GAS
Station Location:	EQT Production	Sample Of:	Gas
Sample Point:	Submeter	Sample Date:	05/20/2013 13:15
Cylinder No:	GAS	Sample Conditions:	379 psig
Analyzed:	05/29/2013 13:24:38 by CC	Method:	GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia		
Nitrogen	0.532	0.729		GPM TOTAL C2+	5.661
Carbon Dioxide	0.195	0.420		GPM TOTAL C3+	1.964
Methane	78.965	61.996		GPM TOTAL iC5+	0.319
Ethane	13.780	20.278	3.697		
Propane	4.195	9.053	1.159		
Iso-butane	0.507	1.442	0.166		
n-Butane	1.013	2.881	0.320		
Iso-pentane	0.249	0.879	0.091		
n-Pentane	0.239	0.844	0.087		
Hexanes Plus	0.325	1.478	0.141		
	100.000	100.000	5.661		

Physical Properties	**Total**	**C6+**
Relative Density Real Gas	0.7077	3.2076
Calculated Molecular Weight	20.43	92.90
Compressibility Factor	0.9966	
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.73 psia & 60°F		
Real Gas Dry BTU	1239.6	5071.5
Water Sat. Gas Base BTU	1218.5	4983.2

Comments: H2O Mol% : 1.740 ; Wt% : 1.538

Patti L. Pecora

Hydrocarbon Laboratory Manager

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

Certificate of Analysis

Number: 2030-13050229-003A

Carencro Laboratory
4790 NE Evangeline Thruway
Carencro, LA 70520

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

May 29, 2013

Station Name:	512425	Sampled By:	RM-GAS
Station Location:	EQT Production	Sample Of:	Gas
Sample Point:	Submeter	Sample Date:	05/20/2013 13:15
Cylinder No:	GAS	Sample Conditions:	379 psig
Analyzed:	05/29/2013 13:24:38 by CC	Method:	GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia		
Nitrogen	0.532	0.729		GPM TOTAL C2+	5.661
Carbon Dioxide	0.195	0.420		GPM TOTAL C3+	1.964
Methane	78.965	61.995		GPM TOTAL iC5+	0.319
Ethane	13.780	20.278	3.697		
Propane	4.195	9.053	1.159		
Iso-Butane	0.507	1.442	0.166		
n-Butane	1.013	2.882	0.320		
Iso-Pentane	0.249	0.879	0.091		
n-Pentane	0.239	0.844	0.087		
Hexanes	0.186	0.765	0.075		
Heptanes Plus	0.139	0.713	0.066		
	100.000	100.000	5.661		

Physical Properties	**Total**	**C7+**
Relative Density Real Gas	0.7077	3.5343
Calculated Molecular Weight	20.43	102.36
Compressibility Factor	0.9966	
GPA 2172-09 Calculation:		
Calculated Gross BTU per ft³ @ 14.73 psia & 60°F		
Real Gas Dry BTU	1239.6	5520.5
Water Sat. Gas Base BTU	1218.5	5424.5

Comments: H2O Mol% : 1.740 ; Wt% : 1.538

Patti L. Pecoro

Hydrocarbon Laboratory Manager

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

ATTACHMENT O

Monitoring/Recordkeeping/Reporting/Testing Plans

ATTACHMENT O: MONITORING, RECORDING, REPORTING, AND TESTING PLANS

EQT requests that the currently applicable G70-A permit conditions be transferred to the R13 permit, as no changes are being proposed that would add new conditions.

ATTACHMENT P

Legal Ad

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 modification permit (R-13) for an existing natural gas production wellpad operation (OXF-149 and OXF-1450 wellpads), currently permitted under G70-A031A. The facility is located off of County Route 11/4 in Doddridge County, West Virginia approximately 5 miles Southwest of West Union, WV at 39.221247, -80.800687 (OXF-149) and 39.223119, -80.791219 (OXF-150).

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

Particulate Matter (PM) = 1.99 tpy
Sulfur Dioxide (SO2) = 0.16 tpy
Volatile Organic Compounds (VOC) = 11.43 tpy
Carbon Monoxide (CO) = 22.04 tpy
Nitrogen Oxides (NOx) = 26.24 tpy
Hazardous Air Pollutants (HAPs) = 1.83 tpy
Greenhouse Gases (CO2e) = 31,621.30 tpy

This facility is currently in operation and seeks to add two (2) enclosed combustors at the wellpad. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

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

Dated this XX day of XX, 2016.

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